

**Faculty of Informatics  
and Information Technologies**

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# **ANNUAL REPORT 2012**

•••• **STU**  
•••• **FIIT**

© 2013, Pavel Čičák, Daniela Chudá, Ladislav Hudec,  
Katarína Jelemenská, Ivan Kotuliak, Tibor Krajčovič,  
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# 1 Message from the dean

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The Report shows the current state the Faculty has achieved in education, research and cooperation with business partners. The reader can find the study programmes offered by the Faculty and the research projects realized at the Faculty.

The evaluation of the Long term strategy for the year 2012 showed that almost all goals for this year have been successfully achieved.

In research we achieved slight improvement in scientific publications, but we would like to have a better structure of the research outputs, mainly considering journal papers.

The Faculty has developed and in April 2012 submitted to the Accreditation Board of Slovak government the request for accreditation of 4 years Bc study programmes. The 4-year Bc programmes present a new route to the current Bc degree for those students who are not fully prepared for the first year of the provided 3-year Bc programmes.

FIIT has accredited two new study programs in the 4-year full time Bachelor's degree (in accordance to law no. 131/2002):

- Informatics (in the field of the study 9.2.1 Informatics), and
- Computer and Communication Systems and Networks (in the field of the study 9.2.4 Computer Engineering).

The study programs are based on deep theoretical bases and they are oriented towards the students' creativity and practical skills development. The main goal of the first year of 4-year study is to strengthen the foundations of mathematical and algorithmic thinking. The graduate profile and bachelor study level remains unchanged. The new 4-year Bc study programmes are offered from winter semester of academic year 2012-13.

In May 2012 we have got The IET Accreditation of all Study Programmes offered by FIIT STU – including the two new study programmes – for the next five years.

The Report shows the results achieved in research that is of high priority at the Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava (FIIT STU). Interlink of research and education is not only declared but also documented

by research activities of our students. Research results of our students were presented at the 8<sup>th</sup> Student Research Conference IIT.SRC 2012 organised by the Faculty.



At the end of this year FIIT STU has moved to the new building.

A handwritten signature in cursive script, reading "Pavel Čičák".

Assoc. Prof. Pavel Čičák  
Dean of the FIIT STU

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## 2 Faculty Management Bodies

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According to the Act No. 131 of February 21, 2002 (the University Code and Amendments and Supplements to some Acts and subsequent acts that have amended them), the faculty management is to be formed out of its academic community members. It is composed of lecturers and research workers (representing the employee part of the academic community of the faculty) and of students (representing the student part of the academic community of the faculty).

According to the University Code, academic management bodies of a faculty are the following:

- a) the Academic Senate of the faculty,
- b) the Dean,
- c) the Scientific Board of the faculty,
- d) the Disciplinary Commission of the faculty for students.

### 2.1 Academic Senate of the Faculty

The Academic Senate of a faculty is a representative body of the faculty. It comprises of the employee part and the student part.

#### Members of the Academic Senate in 2012

*Presidium of the Academic Senate*  
presidium@as.fiit.stuba.sk

*Pavol Návrat, Professor*  
chair  
chair@as.fiit.stuba.sk

*Ladislav Hudec*  
chairman of the employee section

*Jakub Šimko*  
chairman of the student section

*Secretary of the Academic Senate*  
secretary@as.fiit.stuba.sk

Mária Hricová

*Members of the faculty section of the Academic Senate*

staff@as.fiit.stuba.sk

Michal Barla (till Oct. 2012)  
Gabriela Kosková (from Oct. 2012)  
Dušan Bernát  
Miroslav Galbavý  
Ján Hudec  
Ladislav Hudec, Assoc. Professor  
Pavol Návrát, Professor  
Juraj Štefanovič  
Peter Trúchly

*Members of the student section of the Academic Senate*

students@as.fiit.stuba.sk

Peter Pišteň  
Jakub Ševcech  
Veronika Štrbáková  
Jaroslav Abaffy (till March 2012)  
Jakub Šimko (from April 2012)

**Activities of the Academic Senate of the Faculty in 2012**

The Academic Senate of the Faculty of Informatics and Information Technologies in 2012

- discussed the proposal of Rules for forming study plans, conditions for continuation of study and for regular completion of study, and took note of the proposed recommended study plans for each study programme as presented by the Dean, approved members of the Scientific Board of the faculty, proposed by the Dean
- approved the additional conditions for admission to the study programmes offered by the faculty, presented by the Dean,
- approved the budget of the Faculty, presented by the Dean,
- approved the annual report on activities and annual statement on economic management of the Faculty, presented by the Dean,
- submitted the annual report on its activity to the academic community of the Faculty.

Prof. Pavol Návrát  
Chair Academic Senate FIIT STU

**2.2 Dean**

The Dean is the representative of the Faculty who manages, represents and acts on behalf of the faculty. The current Dean was elected by the Academic Senate of the Faculty in its meeting held on October 24, 2011 and appointed by the Rector to his office on December 2, 2011 for a four year office term Vice-Deans were approved by the Academic Senate in November 2011.



## Dean and Vice-Deans

*Pavel Čičák, Assoc. Professor*

Dean

dean@fiit.stuba.sk

*Viera Rozinajová, Assoc. Professor*

Vice-Dean for Research

vice dean\_research@fiit.stuba.sk

*Ivan Kotuliak, Assoc. Professor*

Vice-Dean for National and International Relations and for Public Relations

vice dean\_cooperation@fiit.stuba.sk

*Daniela Chudá, Assoc. Professor*

Vice-Dean for Education

vice dean\_education@fiit.stuba.sk

*Tibor Krajčovič, Assoc. Professor*

Vice-Dean for Services and Development

vice dean\_development@fiit.stuba.sk

## 2.3 Scientific Board of the Faculty

### Members of the Scientific Board in 2012

#### *Chair of the Scientific Board*

Pavel Čičák, Assoc. Professor

#### *Deputy chair of the Scientific Board*

Viera Rozinajová, Assoc. Professor

#### *Members from the academic community of the Slovak University of Technology*

Mária Bieliková, Professor

Pavel Čičák, Assoc. Professor

Elena Gramatová, Assoc. Professor

Ladislav Hudec, Assoc. Professor

Daniela Chudá, Assoc. Professor

Gabriel Juhás, Assoc. Professor

Margaréta Kotočová, Assoc. Professor

Ivan Kotuliak, Assoc. Professor

Tibor Krajčovič, Assoc. Professor

Oliver Moravčík, Professor

Ján Murgaš, Professor

Pavol Návrat, Professor

Jiří Pospíchal, Professor

Gregor Rozinaj, Assoc. Professor

Viera Rozinajová, Assoc. Professor

Peter Volauf, Assoc. Professor

*External members*

Ladislav Hluchý, Assoc. Professor – Institute of Inf., Slovak Academy of Sciences

Tomáš Hruška, Professor – Brno University of Technology

Ivan Kalaš, Professor – Comenius University in Bratislava

Hana Kubátová, Professor – Czech Technical University in Prague

Karol Matiaško, Professor – University of Ťilina

Jiří Šafařík, Professor – University of West Bohemia in Pilsen

Jaroslav Šušol, Assoc. Professor – Comenius University in Bratislava

Liberius Vokorokos, Professor – Technical University in Košice

*Honourable members*

Pavol Horváth, Professor

Eudovít Molnár, Professor

**Activities of the Scientific Board of the Faculty in 2012**

The Scientific Board of the Faculty of Informatics and Information Technologies in 2012:

- evaluated the level of the Faculty regarding its educational activity and activities in the field of science and technology,
- discussed and approved the proposal of the study programmes for the academic year 2012/13 offered by the Faculty,
- endorsed other experts with the right to conduct Final examinations in the study programmes offered by the Faculty (in accordance with the University Code),
- endorsed members of the Board of Specialists for doctoral study programmes,
- endorsed supervisors for doctoral study programmes (in accordance with the University Code).

Assoc. Professor Pavel Čičák  
Chair Scientific Board FIIT STU

**2.4 Disciplinary Commission of the Faculty for Students**

The Disciplinary Commission of a faculty according to the University Code shall discuss misdemeanours of students and submit the proposal to the Dean who will resolve on it.

**Members of the Disciplinary Commission for Students in 2012**

*Chair of the Disciplinary Commission of the Faculty for Students*

Ladislav Hudec, Assoc. Professor

*Members of the Disciplinary Commission of the Faculty for Students*

Ivan Kapustík

Juraj Štefanovič

Ľubomír Varga – student of the doctoral degree programme

Valéria Harvanová – student of the master degree programme

Matúš Michalko – student of the bachelor degree programme

Assoc. Prof. Ladislav Hudec  
Chair Disciplinary Commission for Students FIIT STU



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## 3 Study

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### 3.1 Undergraduate Study (Bc)

In 2012 three accredited study programmes with regular length three or four years were offered:

- *Informatics (four years study program since academic year 2012/13)*
- *Computer and Communication Systems and Networks, new programme since academic year 2009/10 which substitutes older programme Computer Systems and Networks (four years study program since academic year 2012/13)*

The following table shows the numbers of full-time bachelor programme students throughout the study (from the first to the final year) for last eight years.

*Numbers of the full-time bachelor programme students*

Academic year	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year <sup>1</sup>
2003/2004 <sup>1</sup>	150	103	123	134
2004/2005	333 (216/117)	112 (60/52)	95 <sup>1</sup>	156
2005/2006	344 (230/114)	262 (176/86)	91 (54/37)	92
2006/2007	332 (221/111)	269 (192/77)	246 (163/83)	19
2007/2008	290 (195/95)	272 (188/84)	266 (186/80)	1
2008/2009	265 (181/84)	229 (159/70)	308 (215/93)	-
2009/2010	291 (189/102)	169 (124/45)	244 (170/74)	-
2010/2011	253 (172/81)	196 (143/53)	190 (141/49)	-
2011/2012	444 (291/153)	173 (123/50)	198 (142/56)	-
2012/2013	492(305+52/10+25)	214 (161/53)	156 (109/47)	-

Note: First number in parentheses refers to number students in study programme Informatics, second number refers to number students in study programmes Computer Systems and Networks or Computer and Communication Systems and Networks.

On the course we have 7 overseas students.

In June 2012 the students defended their bachelor theses and passed the final examination. The number of all graduates was 141. From it, there were 104 in study programme Informatics and 37 in study programme Computer Systems and Networks.

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<sup>1</sup> Only the students in study programme Informatics.

The following students were conferred awards for their excellent study results:

- “*Magna cum laude*”: Jozef Gajdoš, Miroslav Hudák, Miroslav Ignačák, Martin Konôpka, Juraj Kostolanský, Matúš Michalko, Filip Pakan, Marek Šrank, Juraj Šubín
- “*Cum laude*”: Martin Geier, Onrej Kaššák, Viktor Kucsera, Jakub Obetko, Ján Skalný, Matúš Tomlein, Martin Uhrin
- *Dean’s Award for Excellent Bachelor Thesis*: Martin Konôpka, Juraj Šubín
- *Dean’s Commendatory Letter for Bachelor Thesis*: Michal Adda, Ivana Bohunická, Martin Čechvala, Peter Dulačka, Ondrej Kaššák, Andrej Kincel, Viktor Kucsera, Michal Kyňanský, Martin Lipták, Lukáš Loch, Marián Maruniak, Fipil Pakan, Ondrej Proksa, Ján Skalný, Marek Šurek, Matúš Ujhelyi

1 236 applicants took part in the entrance examination to bachelor study programmes (916 applicants for study programme Informatics, 320 applicants for study programme Computer and Communication Systems and Networks). 995 applicants were offered admission, 492 out of them actually made use of it and were enrolled (305+52 Informatics, 110+25 Computer Systems and Networks).

### 3.2 Master Study (Ing)

In 2012, FIIT STU offered three accredited study programmes with regular length two or three years<sup>2</sup>:

- Software Engineering (SI),
- Computer and Communication Systems and Networks (CCSN),
- Information Systems (IS).

The following table shows the numbers of full-time master programme students throughout the study for last ten years.

*Numbers of the full-time master programme SI, CSN (CCSN), IS students*

		all	SI	CSN or CCSN	IS	Informatics*
Academic year	2003/2004	151	-	-	-	151
	2004/2005	182	72	38	-	72
	2005/2006	231	119	73	39	-
	2006/2007	290	124	106	60	-
	2007/2008	326	141	113	72	-
	2008/2009	362	154	110	98	-
	2009/2010	394	160	128	106	-
	2010/2011	395	157	126	112	-
	2011/2012	355	155	100	100	-
	2012/2013	149	74+2	42+1	29+1	-

Note: \* Only the students in old study programme Informatics.

On the course we have 4 overseas students.

<sup>2</sup> Three years for students who have not obtained their first degree in related field.

In these study programmes 155 students graduated in June 2012 (61 in Software Engineering, 53 in Computer and Communication Systems and Networks, 41 in Information Systems).

- “*Magna cum laude*”: Peter Kajan, Róbert Móro, Ivan Polko, Miroslav Šimulčík, Ivan Srba
- “*Cum laude*”: Anton Benčíč, Maroš Ďuriček, Marek Sobôtka, Katarína Valalíková
- *Dean’s Award for Excellent Master Thesis*: Maroš Ďuriček, Róbert Móro, Ivan Srba
- *Institute of Inf., Slovak Academy of Sciences Award for Excellent Master Thesis*: Anton Benčíč, Martin Nagy, Ivan Polko, Marek Sobôtka
- *Dean’s Commendatory Letter for Master Thesis*: Miroslav Babiš, Miroslav Beno, Filip Hlaváček, Radek Hvizdoš, Martin Jánoš, Peter Kajan, Matej Kompánek, Milan Laslop, Miroslav Šimulčík, Tomáš Takács, Marek Takáč, Katarína Valalíková, Ivan Valenčík, Martin Vojtko

139 applicants took part in an entrance examination to the master programmes. 162 students were offered admission, 149 out of whom were enrolled.

### 3.3 Doctoral Study (PhD)

Quality and number of doctoral students significantly influence the results obtained in research. We still observe an insufficient number of motivated doctoral students in the fields of informatics and information technologies. The graduates have excellent opportunities in finding positions in the labour market, therefore, even if they are interested in further studies they often prefer to be admitted as part-time students.

This trend has been slightly reversed in recent years. In 2012 the number of applicants and accepted full-time doctoral students for the second time increased significantly. Number of applicants increased 1.5 times compared to year before last year and 5 times compared to the previous years. This is reflected also by the number of accepted doctoral students. We worked towards motivating students to finish their theses. This resulted to increased number of defended dissertation theses – 6 this year (most doctoral students who finished their study this year started doctoral study more than three years ago).

*Evolution of number of doctoral full-time students (year-end figures)*

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Num of students	11	16	22	22	24	25	30	34	43	48	47

In 2012 two accredited study programmes were offered:

- *Applied Informatics*,
- *Software Systems* (as an orientation in Software Engineering).

Regular length of all doctoral study programmes is 3 years for full-time study and 5 years for part-time study.

In 2012 following dissertations were defended:

- *Peter Magula*: Quality of Service in Mobile Ad-hoc Networks (Applied Informatics, supervisor: Margaréta Kotočová)
- *Jakub Mařgut*: Generalized Multilinear Model for Dimensionality Reduction of Binary Tensors (Applied Informatics, supervisor: Peter Tiňo)
- *Mária Pohronská*: Implementing Embedded Expert System via Programmable Hardware (Applied Informatics, supervisor: Tibor Krajčovič)
- *Tomáš Kováčik*: IMS Service Provisioning Improvement (Applied Informatics, supervisor: Ivan Kotuliak)
- *Marián Šimko*: Automated Acquisition of Domain Model for Adaptive Collaborative Web-based Learning (Software Engineering, supervisor: Mária Bieliková)
- *Juraj Števek*: Intelligent Embedded Systems (Applied Informatics, supervisor: Štefan Kozák)

### 3.4 Student Conferences and Competitions

The Faculty organised and supported in 2012 several student competitions and conferences. The importance of involvement of the students in such events is very high. Students took active participation in various technical and research activities (co)organised by the Faculty. We are proud to list also successes of our students in national and international competitions organized outside our university.

#### *Imagine Cup*

- 1<sup>st</sup> place, Slovak finals of the Imagine Cup 2012 competition: Ľuboš Demovič, Martin Konôpka, Marek Láni, Matúš Tomlein (supervisor: M. Barla) advanced to the Imagine Cup 2012 Worldwide Finals, Sydney, Australia

*IIT.SRC 2012 – Informatics and Information Technologies Student Research Conference*  
(to be mentioned in the following section in more detail)

#### *NAG 2012 – national CISCO competition*

- Martin Čechvala – 2<sup>nd</sup> place in category PT
- Michal Jarkovský – 1<sup>st</sup> place in category UNI

#### *ISTROBOT 2012*

- Andrej Lenčucha – 1<sup>st</sup> place in category “Tracker with a robot“, 3<sup>rd</sup> place in category “Mouse in a maze”
- Andrej Lenčucha – 1<sup>st</sup> place in Lego Sumo and 1<sup>st</sup> place in Line Follower Enhanced – Robot Challenge

#### *ACM SPY – Student Project of the Year Czech and Slovak Competition*

- Ivan Srba – was among the winners of the winners and presented his project in the ACM SPY 2012 Finals, 5<sup>th</sup> place with diploma project Encouragement of Collaborative Learning Based on Dynamic Groups (supervised by M. Bieliková)



*IAB Slovakia 2012, The Best diploma project competition with topic Internet as a Medium*

- Róbert Móro – 3<sup>rd</sup> place (supervised by M. Bielíková)

*RoboCup, Soccer Simulation League*

- Winners of the Slovak University of Technology RoboCup 2012, 3D Team JimJet: Ján Hudec

*ACM ICPC Open Contest*

- Jakub Kříž, Mária Šajgalík, Ondrej Proksa – Winners of the Slovak University of Technology in Bratislava round

*TP Cup*

- Best Team of the year 2012 winners: Máté Fejes, Ľuboš Gelányi, Juraj Mäsiar, Ľuboš Masný, Adam Mihálik, Dávid Pzota: An Intelligent Game for Smart Phones, supervisor: M. Tomša

**3.5 Awarded Theses****Excellent Bachelor Theses**

*Student name:* Martin Konôpka  
*Thesis title:* Innovative Application within an International Competition  
*Supervisor:* Michal Barla, PhD.  
*Defended on:* May 2012  
*Degree program:* Informatics  
*Annotation:* Internet, with its most popular service – the Web, has changed the way we communicate and educate ourselves. As it is an almost endless source of information, it has the potential to help solve the world's toughest problems, such as the right to have access to education for everyone. However, developing countries which could profit from it the most, suffer from slow and intermittent Internet connections. We propose OwNet, a software solution to enhance the Web surfing experience in conditions of slow and intermittent Internet connections. OwNet enables higher utilization of the available connection. The concept is based on placing a proxy interface on the users' computers and a shared proxy interface on their local networks. Using caching and prefetching techniques, we store portions of the Web locally, so the users can browse them offline. With collaborative tools, they can cooperate while browsing and enhance the utilization of their Internet connections. The project was created within the Imagine Cup 2012 competition by a team of four students. The author of this thesis focused on the implementation of prefetching technique and collaborative tools as well as documentation and presentation of the project.

*Student name:* Juraj Šubín  
*Thesis title:* Debugger for Systems on the Base of 80386EX  
*Supervisor:* Tibor Krajčovič, Assoc. Professor  
*Defended on:* May 2012  
*Degree program:* Computer and Communication Systems and Networks

*Annotation:* This bachelor thesis deals with desing and implementation of debugger for systems on the base of Intel 80386EX processor. The final debugger allows to debug programs in the real-mode. The debugger allows to load an application program into RWM, step through the program instruction by instruction, run the program in the real time, initialize and set up of all integrated peripherals. Furthermore, the debugger allows to work with registers, work with memory, work with input/output ports and to set breakpoints. The debugger was developed on experimental microcomputer EMP386EX. Communication with microcomputer is provided by asynchronous serial line RS-232. Execution part of the debugger is stored in microcomputer's EPROM memory. Presentation part is represented by serial terminal on personal computer.

#### **Excellent Master Theses**

*Student name:* Maroš Ďuriček  
*Thesis title:* *Securing System with Multiple FPGA Hardware Watchdogs*  
*Supervisor:* Mária Pohronská, PhD.  
*Defended on:* May 2012  
*Degree program:* Computer and Communication Systems and Networks  
*Annotation:* This thesis analyzes the security requirements for compliance response time in real-time systems and a description of internal and external watchdog timers and their use in systems. Another part analyzes the existing multiple FPGA watchdog timers system, its architecture and principle of operation. This thesis contains original design of securing system with multiple hardware watchdog timers which communicates with the designed communication protocol through two USB interfaces. The outcome of this thesis is functional prototype of the system implemented in programmable circuit Xilinx Spartan-3A.

*Student name:* Róbert Móra  
*Thesis title:* *Personalized Text Summarization*  
*Supervisor:* Mária Bieliková, Professor  
*Defended on:* May 2012  
*Degree program:* Software Engineering  
*Annotation:* Automatic text summarization aims to address the information overload problem by extracting the most important information from a document, which can help users to decide, whether it is relevant for them and they should read the whole text or not. In this work, we have proposed a method of personalized text summarization, which unlike the conventional methods takes into account differences in users' characteristics. Our contribution lies in the proposal of the specific raters and the method of their combination which allows considering various parameters or context of the summarization. We have focused on summarization for knowledge revision in the domain of learning. For this purpose, we have also proposed a method of personalized selection of documents for revision. We have evaluated the proposed method of summarization in learning system ALEF (Adaptive Learning Framework). The results of our experiments suggest that consider-

ing the domain relevant terms as well as annotations in the process of summarization improves the generic variant and the resulting summaries are capable of extracting important concepts explained in the documents even for revision.

*Student name:* Ivan Srba  
*Thesis title:* *Encouragement of Collaborative Learning Based on Dynamic Groups*  
*Supervisor:* Mária Bieliková, Professor  
*Defended on:* May 2012  
*Degree program:* Software Engineering  
*Annotation:* Our main goal is to propose a method for creating different types of user groups and a collaborative platform which allows effective collaboration together with the proposed method. The method takes many types of users' characteristics as inputs, i.e. interests, knowledge but also their collaborative characteristics, i.e. argumentation and reaching consensus. In order to create these groups we will enhance Group Technology approach. Users in created groups are able to communicate and cooperate by means of several collaborative tools in the collaborative platform. We designed collaborative tools and the collaborative platform itself in the manner which allows simple approach to automatically observe dynamic aspects of created groups, especially how students collaborate to achieve their goals. We evaluate the method for creating different types of groups by experimenting in domain of learning. The evaluation is based on our implementation of designed collaborative platform named PopCorm (Popular Collaborative Platform). The result of our experiments is the observation that the proposed method is able to create groups with better results in comparison with the reference method.

*Student name:* Anton Benčíč  
*Thesis title:* *Information Recommendation Using Context in a Specific Domain*  
*Supervisor:* Mária Bieliková, Professor  
*Defended on:* May 2012  
*Degree program:* Software Engineering  
*Annotation:* Personalization and adaptation methods engage in recommendation process that consists of a few decisions. More often than not these methods engage in only one decision and that is what to deliver. This is especially true for methods working in on-demand basis delivering content after a query. These methods generally do not consider if it is the right time to deliver the content, in what volume should it be delivered and how should it be presented, which are the other three important decisions. In this work we concentrate mainly on methods that work proactively. A proactive method decides on an action by considering various criteria. This can be simple as setting the sound profile according to the user defined time frames or as complicated as recommending the right music for a given group considering their mood. Our project is aimed at designing a method that is able to effectively and efficiently learn what actions should be performed in what situations and then use this model to recommend actions given a particular

situation. Besides the general method's design we also describe our method in the domain of internet news and evaluate it using both our simulation framework and results from our experiment.

*Student name:* Martin Nagy  
*Thesis title:* Security in wireless networks  
*Supervisor:* Margaréta Kotočová, Assoc. Professor  
*Defended on:* May 2012  
*Degree program:* Computer and Communication Systems and Networks  
*Annotation:* Submitted document analyses the security aspects of technologies and protocols that are used by masses today. These include for example mobile GSM networks, their evolutions and mobile ad-hoc networks. Next, the document deals with IP protocol version 6. As a new and yet undeployed protocol it poses a potential security risk. Finally, the document describes SIP, which is nowadays probably the most widely used signaling protocol in modern communication networks. Most significant is its deployment in next generation networks. In the context of this document, we must not forget the wireless Wi-Fi networks, which are present in most households. Second part of the document is devoted only to GSM mobile networks and their evolutions. A series of experiments aimed to security of mobile networks is designed. They are aimed at problems associated with security on radio interface as well as issues related to security and proper configuration of the core network nodes. The main part of document is aimed to the security of the core network and its proper configuration. Multiple ways of securing the client devices and the core network are proposed. In conclusion, the results of experiments and the security risks concluded from these results are summarized.

*Student name:* Ivan Polko  
*Thesis title:* Optimization of Path Planning for Multiple Robots  
*Supervisor:* Jiří Pospíchal, Professor  
*Defended on:* May 2012  
*Degree program:* Software Engineering  
*Annotation:* Presented thesis deals with problem of path planning for multiple robots in environment modeled by undirected graph. The objective is to move robots from initial positions to goal positions using minimal number of steps. The aim of this thesis is to improve algorithm BIBOX designed by P. Surynek, that is targeted on 2-connected graphs with small number of unoccupied vertices and is based on ear decomposition of graph. Focus is on influence of ear decomposition on the quality of BIBOX solutions. Our approach for searching in space of possible decompositions is based on existing algorithm for ear decomposition and Monte-Carlo tree search. Two heuristics are also proposed, which significantly improve progress of search. With selected settings, our method was tested on test set consisting of 190 different graphs. On average, better decomposition was found in 94% of graphs. Solution improvement in comparison with original decomposition was up to 38%.

*Student name:* Marek Sobôtka  
*Thesis title:* *Image segmentation using methods of distributed agents to obtain information from medical images*  
*Supervisor:* Vanda Benešová, PhD.  
*Defended on:* May 2012  
*Degree program:* Software Engineering  
*Annotation:* Nowadays, a large amount of information is worked with every day. Different systems for data processing have been created. These systems can be manual or fully automatic. One type of data being processed is image data. Daily, countless numbers of photos are created and hours of videos are recorded around the world. With so many records there naturally arises the need for its recognition, sorting and further processing. Medicine is one area where it is necessary to process image data. Several devices are being used here that produce different types of output. Typical examples include X-rays or pictures obtained by the magnetic resonance imaging (MRI). There is already a vast array of systems for image processing. An integral part of image processing is image segmentation. This work describes the image segmentation and its basic methods, analysis of multi-agent system and some selected existing solutions of multi-agent systems in the medical field. Multi-agent system which we are researching combines several types of basic image information. Centralized coordination of agents is used. Agents are controlled by a moderator.

Assoc. Prof. Daniela Chudá  
Vice-Dean for Education (first and second levels)

Assoc. Prof. Viera Rozinajová  
Vice-Dean for Research (including the third level education)



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## 4 Research

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### 4.1 Research Areas

The economic and social development is featured by an exponential growth of new scientific knowledge today. Informatics and information technologies are playing the key role. They boost the development of all scientific branches with the creation of new methodological base to do research and development. The development time decreases and the traditional theoretical and experimental abilities are extended broadly.

Informatics has developed to be an autonomous scientific area, which supports success not only in the branch of information technologies, but it also has wide consequences as for the lives of individuals and society. It is not a mere coincidence that research in the IIT area has become the priority among the research topics in the European Union.

Research at FIIT STU is oriented on these main research areas that respect the organisation, existing technical and laboratory equipment and professional skills:

- intelligent information analysis and processing in large information spaces, e.g. the World Wide Web,
- personalized context-aware information and knowledge retrieval and recommendation for the adaptive social semantic web,
- methods for distributed information processing,
- advanced methods and tools for software systems design, development and integration,
- computer vision and computer graphics in virtual and augmented reality systems,
- advanced methods of computational intelligence oriented to “echo state” neural networks, recurrent neural networks, evolutionary algorithms,
- methods and tools for security and administration of network and mobile computer systems,
- methods and tools for mobile computing,
- formal specification and automated engineering tasks in the area of HW/SW co-design of the mobile computing systems,
- security, reliability and fault tolerance in distributed computer systems and mobile computer networks,
- methods for improvement of quality of service in the Next Generation Networks,
- design of digital systems and embedded systems.

FIIT STU recognizes as part of its mission to serve the broader academic community in Slovakia and also internationally in promoting cooperation in relevant fields. In 2012 FIIT STU supported the Slovak ACM Chapter activities. FIIT STU supported also the publishing Bulletin “Information Sciences and Technologies” – a web based scientific journal, activity initiated and executed by the ACM Slovakia Chapter.

#### **4.2 Scientific Activities**

In the year 2012, FIIT STU has organised or co-organised several scientific events:

- scientific conference Cognition and Artificial Life XII,
- scientific conference Znalosti 2012,
- scientific workshop WIKT 2012 – Workshop on Intelligent and Knowledge Oriented Technologies,
- workshop 4th ngnlab.eu 2012,
- HBB - Next project meeting,
- WMNC, Joint IFIP Wireless and Mobile Networking Conference,
- regular scientific seminar on Artificial Intelligence (organized at FIIT STU),
- regular scientific seminar on Vision and Computer Graphics (FIIT STU),
- regular scientific seminar on Personalized Web (organized at FIIT STU).

The Faculty took part in providing technical and scientific programmes, especially through the work in programme committees of more than 40 conferences, mostly international:

- ACIIDS, Asian Conference on Intelligent Information and Database Systems,
- ADBIS, East-European Conference on Advances in Databases and Information Systems,
- ASEA, International Conference on Advanced Software Engineering & Its Applications,
- ASONAM, International Conference on Advances in Social Networks Analysis and Mining,
- Baltic DB&IS, International Baltic Conference on Databases and Information Systems,
- BCI, Balkan Conference in Informatics,
- CASoN, International Conference on Computational Aspects of Social Networks,
- CSE, International Scientific Conference on Computer Science and Engineering,
- CESCg, Central European Seminar on Computer Graphics,
- Cognition and Artificial Life, Annual Conference on Cognition and Artificial Life,
- CompSysTech, International Conference on Computer Systems and Technologies,
- CSSim, International Conference on Computer Modelling and Simulation,
- Datakon, Annual Conference on the Current Trends in Databases and Information Systems,



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- DDECS, IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems,
  - eGSSN, International Workshop on Trust, Security and Privacy in e-Government, e-Systems & Social Networking,
  - EIDWT, Web Science and Business Intelligence Track – International Conference on Emerging Intelligent Data and Web Technologies,
  - EJC, European Japanese Conference on Information Modelling and Knowledge Bases,
  - ENASE, International Working Conference of Evaluation of Novel Approaches to Software Engineering,
  - ETS, IEEE European Test Symposium,
  - FedCSIS Multiconference, Workshop on Model Driven Approaches in System Development (MDASD)
  - HT, ACM Conference on Hypertext and Hypermedia,
  - ICCCI, International Conference on Collective Intelligence Technologies and Applications,
  - ICETA, International Conference on Emerging E-Learning Technologies and Applications,
  - ICWL, International Conference on Web-based Learning,
  - ICWE, International Conference on Web Engineering,
  - ISMIS, International Symposium on Methodologies for Intelligent Systems,
  - ITAT, Workshop on Information Technologies – Applications and Theory,
  - ITS, International Conference on Intelligent Tutoring Systems,
  - JCKBSE, Joint Conference on Knowledge-Based Software Engineering,
  - MCCIS-ISA, IADIS International Conference, Intelligent Systems and Agents Conference,
  - MEMICS, Annual Doctoral Workshop on Mathematical and Engineering Methods in Computer Science,
  - MENDEL, International Conference on Soft Computing,
  - NWESP, International Conference on Next Generation Web Services Practices,
  - PAD, Czech and Slovak Seminar on Computer Architectures and Diagnostics,
  - SAMI, International Symposium on Applied Machine Intelligence and Informatics,
  - SCLIT, Symposium on Computer Languages, Implementations, and Tools,
  - SLE, Doctoral Symposium of the International Conference on Software Language Engineering,
  - SERA, International Conference on Software Engineering Research, Management and Applications,
  - SMAP, International Workshop on Semantic Media Adaptation and Personalization,

- SNAA, International Workshop on Social Network Analysis and Applications,
- SNPD, International Conference on Software Engineering, Artificial Intelligence,
- SOFSEM, Annual Conference on Current Trends in Theory and Practice of Informatics,
- UMAP, International Conference on User Modelling, Adaptation and Personalization,
- WEBIST, International Conference on Web Information Systems and Technologies,
- WIKT, Workshop on Intelligent and Knowledge oriented Technologies,
- WIRSS, International Workshop on Web Information Retrieval Support Systems,
- WMNC, Joint IFIP Wireless and Mobile Networking Conference,
- WWW, Web Engineering Track – International World Wide Web Conference,
- Znalosti, Annual Conference on Knowledge Acquisition, Representation and Exploitation.

In 2012, FIIT STU organised or co-organised several events aimed at exhibition of students' research work. Above all, the most important event was the 8<sup>th</sup> *Informatics and Information Technologies Students Research Conference – IIT.SRC 2012*, which was held on April 25, 2012.

IIT.SRC 2012 attracted 92 research papers from which 79 were accepted (21 bachelor, 45 master, 20 doctoral students as authors) submitted by 86 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.

Papers were in two categories: full papers (further organized as researching solutions and developing innovative solutions) and extended abstracts.

The conference was organized in five sections:

- Intelligent Information Processing,
- Software Engineering and Computer Science,
- Computer Systems, Computer Networks and Security,
- Web Science and Technologies,
- User Interaction, Computer Graphics, Image Processing.

The Conference was opened by a keynote of Keith G. Jeffery (Science and Technology Facilities Council, UK) titled *The Challenges in ICT: Debunking the Hype*.

The excellent student papers were awarded. The best paper award was conferred to:

- *category of doctoral students* – Michal Kottman (Performance Evaluation of Feature Descriptors for Visual Vocabulary Based Methods, supervisor M. Šperka)
- *category of master students* – Ivan Srba (Encouragement of Collaborative Learning Based on Dynamic Groups, supervisor M. Bieliková)
- *category of bachelor students* – Peter Dulačka (Validation of Music Metadata via Game with a Purpose, supervisor J. Šimko)

Dean's award was the highest appreciation. It was conferred to:

- *Luboš Demovič, Martin Konôpka, Marek Láni a Matúš Tomlein* (Enhancing Web Surfing Experience in Conditions of Slow and Intermittent Internet Connection, supervisor M. Barla)
- *Peter Korenek* (Emotion Classification of Microblogs Based on Appraisal Theory, supervisor M. Šimko)
- *Róbert Móro* (Personalized Text Summarization, supervisor M. Bielíková)
- *František Kudlačák* (Variometer with GPS Logger, supervisor M. Pohronská)
- *Michal Kompan* (Exploring Group Recommendation for Single-User Recommendation Tasks, supervisor M. Bielíková)

Besides the 79 papers presented at the conference in two poster sessions several accompanied events were organized

- *RoboCup Exhibition*, where students presented interesting results in simulated league both 2D and 3D; RoboCup is an attractive project with free participation, designed to support education and research in artificial intelligence, robotics and information technologies,
- *TP-Cup Showcase*, where seven teams presented their 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 in master study programs.

IIT.SRC 2012 accompanying events included also programming competition, FiitaPixel – photo contest best pictures exhibition, games with a purpose tournament, RoboCup, Nokia Lab, and technical presentations related to modern information technologies given by the IIT.SRC 2012 conference sponsors.

FIIT STU initiated in 2010 a join of two Czech and Slovak student competitions ACM CZ Student Research Competition organized by Czech ACM Chapter and Czech and Slovak Universities and Diploma Thesis Competition organized by IT company Profinit, which resulted to establishing

- *Czech ACM Chapter & Slovakia ACM Chapter Student Project of the Year Competition – ACM SPY*

in beginning of 2010. The ACM SPY 2012 Finals were organized in October 2012 in Prague, where 8 best master student projects were presented. The finalists projects were selected by the judges from the best thesis submitted by 13 Czech and Slovak universities based on 1513 successfully defended master thesis in 2011/12.

The project

- *Encouragement of Collaborative Learning Based on Dynamic Groups* authored by Ivan Srba (supervisor M. Bielíková) won the 5<sup>th</sup> prize.

In September 2012 we actively participated in “The Night of Researcher”, event supported by European Commission. This event was organized in more than 150 European cities. Researchers in many countries prepared presentations from the field of science and research for the laic public.

We are proud of ten FIIT STU student teams who presented their interesting research projects to public:

- *Intelligent Robotic Soccer Players* – Tomáš Boleček
- *Games with Higher Purpose* – Roman Burger, Jakub Šimko, Peter Dulačka, Peter Meliško, Balázs Nagy
- *Make New Friends through Game* – Máté Fejes, Ľuboš Gelányi, Ľuboš Masný, Juraj Mäsiar, Adam Mihalik, Dávid Pszota, Marek Tomša
- *BumpyBot: Fight Malicious Diseases* – Viktor Blesák, Ján Laštinec, Ondrej Perešíni
- *Computer as a Musical Instrument* – Roman Broniš, Maroš Ďuriček, Valéria Harvanová, Ján Malovec, Mária Pohronská, Martin Vojtko
- *The Green Game* – Eduard Kuric, Karol Rástočný
- *Pocket-band* – Alena Kovárová, Viktor Kucsera, Marek Takáč,
- *Multimedia System for Travel* – Peter Jombík, Peter Pištek
- *Web Applications of the Future* – Michal Holub, Dušan Zeleník
- *Learn about Life in your City* – Martin Hreha, Tomáš Kokolevský, František Kudlačák
- *Control the Presentation with Gestures!* – Matej Kvitkovič, Andrej Lezo, Peter Mačuga, Lenka Neslušanová, Marek Račev, Michal Ľilinčík
- *Bloodlezz* – Róbert Móro, Michal Poláčik, Ivan Srba
- *Make a Step for your Health* – Michal Barla, Peter Krátky, Štefan Mitrík, Michal Tomlein
- *OwnNet* – Ľuboš Demovič, Martin Konôpka, Marek Láni, Matúš Tomlein

#### 4.3 Publications

Results of our research were published in 158 publications. 141 scientific contributions were published in conference proceedings, 68 out of which were published in reviewed proceedings of international conferences. 16 scientific contributions were published in scientific journals and we have authors (co-authors or editors) of 1 books or book chapters.

FIIT STU is a co-publisher of the international scientific journal “Computing and Informatics“ (until 2001 Computers and Artificial Intelligence). Three faculty staff members, P. Návrat, V. Kvasnička and J. Pospíchal were active in the editorial team in 2012 – P. Návrat as an Associate Editor and V. Kvasnička, J. Pospíchal as members of Editorial Board. Moreover, the faculty participates in editorial boards of seven other scientific journals.

#### 4.4 Research Projects

Research projects constitute an important basis for research realization and research funding. Life cycle of a research project includes its preparation, submission, acceptance of the project followed by the project realization. Because these periods take often several years, activities in certain period influence significantly results in the following period.

<i>Number of publications in 2012</i>	UAPI <sup>3</sup>	UI SI	UPSS	FIIT
Books and parts of books published by international/national publisher	-/-	1/-	-/-	1/-
Scientific works published in international/national scientific journals	-/5	5/3	1/2	6/10
Scientific works published in international conference proceedings	7	39	22	68
Scientific works published in national or local conference proceedings	9	49	15	73
Conference proceedings editors	-	6	-	6
Published reviews	-	2	-	2

<i>Overview of other most significant activities in 2012</i>	UAPI	UI SI	UPSS	FIIT
Membership in editorial boards of scientific journals	6	6	4	16
Membership in programme committees of international scientific conferences	6	43	8	57
Membership in programme committees of national or local scientific conferences	1	26	11	38
Membership in steering committees of scientific conferences	0	7	2	9

Projects of the Scientific Grant Agency of the Ministry of Education and the Slovak Academy of Sciences (VEGA) and of the Slovak Research and Development Agency (APVV) formed an essential form of research organisation and scientific projects funding at the FIIT STU. In 2012

- eight VEGA projects were progressed and five new projects were prepared for funding in 2013-2016,
- two APVV projects were progressed, and two new projects were prepared for funding in 2013-2015,
- one project of the Cultural and Educational Grant Agency of the Ministry of Education of Slovak Republic (KEGA) were progressed and four projects were prepared for funding in 2013-2015 (one of them was prepared in cooperation with VŠVU).

Mentioned projects are described in reports of institutes presented in the following parts.

The Faculty under the leadership of I. Kotuliak participated in one international project.

<sup>3</sup> UAPI – Institute of Applied Informatics  
 UI SI – Institute of Informatics and Software Engineering  
 UPSS – Institute of Computer Systems and Networks

<i>Number of projects funded in 2012</i>	UAPI	UISI	UPSS
VEGA <sup>4</sup>	2*	3	4*
KEGA	1	-	-
APVV	-	2	-
European Structural Funds	-	2 <sup>†</sup>	1 <sup>†</sup>
International projects	-	-	1*
<b>FIIT STU</b>	<b>3</b>	<b>7</b>	<b>6</b>

<sup>††</sup> common projects

<i>Overview of funds (in Eur)</i>	UAPI	UISI	UPSS	SUM
VEGA	9 594	50 312	25 702	85 608
KEGA	3 210		-	3 210
APVV	-	57 116	-	57 116
European Structural Funds	-	111 541	-	111 541
<b>FIIT STU</b>	<b>12 804</b>	<b>218 969</b>	<b>25 702</b>	<b>257 475</b>

In 2012 two institutes of the Faculty (UPSS, UISI) together with six other institutes of the University, the Institute of Informatics Slovak Academy of Sciences and International Laser Centre progressed continuing project SMART II – Centre of Excellence for Smart Technologies, Systems and Services approved within the call of the Agency of the Ministry of Education for the Structural funds of the European Union (ERDF) under the Operational Programme Research and Development with overall budget approx. 2 214 thousands Eur.

Institute of Informatics and Software Engineering continued research project PerConIK – Research of methods for Acquisition, Analysis and Personalized Conveying of Information and Knowledge acquired in the Call of the ERDF Agency directed towards applied research in collaboration with industry. This project led by Gratex Ltd. was approved in 2010 for financing for period of 2011-2014.

The projects are realized in our research laboratories (description can be found in the parts devoted to individual institutes). In 2012 the following laboratories were operated:

- Laboratory of Database Technologies, manager: M. Galbavý,
- Intelligent Systems Laboratory, manager: P. Návrat,
- Advanced Software and Web Technologies Laboratory, manager: M. Bieliková,
- Computer Networks Laboratory I, II, manager: P. Čičák,
- Embedded Systems Laboratory, manager: T. Krajčovič,

<sup>4</sup> VEGA – Scientific Grant Agency of the Ministry of Education of Slovak Re-public and the Slovak Academy of Sciences,  
KEGA – Cultural and Educational Grand Agency of the Ministry of Education of Slovak Republic,  
APVV – Slovak Research and Development Agency

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- Mobile Computing Laboratory, managers: M. Čerňanský, V. Vranić, I. Kotuliak,
  - VLSI Design Laboratory, manager: J. Hudec,
  - Digital Systems Description and Design Laboratory, manager: K. Jelemenská,
  - Grid Computing Laboratory, manager: L. Hudec.

Assoc. Prof. Viera Rozinajová  
Vice-Dean for Research





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## 5 National and International Relations

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Cooperation of FIIT STU can be characterised from several viewpoints as cooperation with secondary schools, other higher education institutions, research institutes and cooperation with industry (a list of cooperating institutions can be found in the parts devoted to individual institutes).

### 5.1 Cooperation with Secondary Schools

Cooperation with secondary schools lies in preparation for study at the university especially at the FIIT STU, organising a programming contest ProFIIT, and in technical cooperation. Technical cooperation with secondary schools is achieved especially through the Networking Academy Programme. FIIT STU, as the Regional Networking Academy, guarantees publicity, programme quality, guidance of Local Academies, and regular technical training and consultations for teachers/instructors of secondary schools. In this way the Faculty leads, methodologically supervises and technically trains 24 secondary schools. Two very successful activities are yearly organised at the Faculty: TP CUP final in June and Open Day of the Faculty in December. Both events were organized also for students of secondary schools.

### 5.2 Cooperation with Industry

Cooperation with industry is oriented towards training and consultation activities and educational cooperation. One of the new activities of the year was establishing “The Week of the Faculty and Partner Companies Cooperation”.

#### Training and Consultation Activities

FIIT STU has been very successful in training and consultations in cooperation with the companies Cisco System Slovakia, GTEC and Microsoft Slovakia. In cooperation with Cisco the Faculty has been integrated into the world-wide academy programme oriented to training in network technologies. Nowadays FIIT STU Regional Networking Academy offers a full 4-semester programmes CCNA (Cisco Certified Networking Associate) and CCNP (Cisco Certified Networking Professional).

Except above mentioned programmes FIIT STU offers programmes for IP Telephony, WiFi Communication, Network Security and other special courses.

In co-operation with GTEC Common Training and Consultation Centre (CTCC) offers various programmes. The main purpose of this centre is to offer technical training for the non-academy sphere.

### **The Week of the Faculty and Partner Companies Cooperation**

With the aim of improving cooperation with praxis the Faculty continued in a new form of cooperation with partner companies established in 2009. We organized one week serial of special lessons provided by our industry partners for our students. The second annual set of this activity was successful especially thanks to the following companies:

- Alcatel-Lucent Slovakia, a. s.
- Cisco Systems Slovakia, spol. s. r. o.
- Hewlett-Packard Slovakia, s. r. o.
- Microsoft Slovakia, s. r. o.
- Oracle Slovensko, spol. s. r. o.
- Softec, spol. s. r. o.
- Soitron, a. s.
- Morgan Stanley, Budapest

### **Educational Cooperation**

In the field of education and other activities the Faculty has been cooperating with important Slovak companies for many years. Academy training programmes were developed thanks to the support of cooperation with Cisco Systems Slovakia, Soitron, Siemens Enterprise Communications, DITEC, DATALAN, ASSECO Slovakia, HP Slovakia, Goldstein Fuchs, Tempest, Morgan Stanley Budapest

Some of above mentioned companies have directly co-operated in Faculty education.

Other remarkable support the Faculty has obtained in cooperation with IBM Slovakia, Microsoft Slovakia, SIEMENS, GRATEX, ACCENTURE, Q-Products. Cooperation with the above mentioned companies is based on special agreements.

### **5.3 Mobility programmes**

FIIT STU is using the cooperation within the mobility programme LLP/Erasmus. In year 2012, this programme was contracted with these European universities (Erasmus code included):

- “Angel Kanchev” University of Ruse – BG ROUSSE01
- České vysoké učení technické v Praze – CZ PRAHA10
- Vysoké učení technické v Brně – CZ BRNO01
- Aarhus University School of Engineering – DK ARHUS01
- University of Southern Denmark – DK ODENSE01
- Tallinn University of Technology – EE TALLINN04
- Lahti University of Applied Sciences – SF LAHTI11

- North Karelia University of Applied Sciences – SF JOENSUU09
- Ecole Pour l'Informatique et les Techniques Avancées – F BICETRE02
- Institut Catholique de Paris – F PARIS052
- Telecom SudParis – F EVRY01
- University of the Aegean – G ATHINE41
- Polytechnic of Zagreb – HR ZAGREB05
- University of Zagreb – HR ZAGREB01
- Brandenburgische Technische Universität Cottbus – D COTTBUS01
- Hochschule für Telekommunikation Leipzig – D LEIPZIG10
- Jade University of Applied Sciences – D WILHELM02
- Technische Universität Darmstadt – D DARMSTA01
- Universität Leipzig – D LEIPZIG01
- University of Bergen – N BERGEN01
- Akademia Techniczno-Humanistyczna w Bielsku-Białej – PL BIELSKO02
- Maria Curie-Skłodowska University – PL LUBLIN01
- Technische Universität Wien – A WIEN02
- Univerza v Mariboru – SI MARIBOR01
- Mondragon Unibertsitatea – E MONDRAG01
- Universidad de Alcalá – E ALCAL-H01
- Universidad Politecnica de Madrid – E MADRID05
- Universitat Politècnica de Catalunya E BARCELO03
- Hogskolan Halmstad – S HALMSTA01
- Hogskolan Väst – S TROLLHA01
- Linnaeus university – S VAXJO03
- Università della Calabria – I COSENZA01
- Cukurova Üniversitesi – TR ADANA01

In 2012, 6 incoming Erasmus students have visited FIIT STU. In 2012, 13 students of our faculty were approved for Erasmus-mobility abroad for various destinations and one teacher have visited Norway and one CVUT Prague, Czech republic. Besides the LLP/Erasmus agreements, a special agreement of cooperation is established with the Institut Supérieur d'Electronique de Paris (ISEP).

Assoc. Prof. Ivan Kotuliak  
Vice-Dean for Public Relations

Juraj Štefanovič, PhD.  
Socrates Erasmus Coordinator



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## 6 Faculty Services

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### 6.1 Slovak Informatics Library

Academic Senate of the faculty approved on April 9, 2010 the incorporation of the Slovak Informatics Library in the organizational structure of the faculty as a faculty department. Dean subsequently established the Slovak Informatics Library using the certificate of incorporation with effect from May 1, 2010.

Slovak Informatics Library was established on at the Faculty of Informatics and Information Technologies, Slovak Technical University in Bratislava in response to the faculty needs for research and training of experts in the field of informatics and information technologies for knowledge-based economy and for building an inclusive information society in Slovak Republic. The library is the central library to work with the scientific and professional literature in computer science and information technologies in the Slovak Republic. This library extends the scope of previous library at FIIT STU from faculty level to nationwide level.

Library:

- stores and registers qualification theses,
- is a workplace for central evidence of faculty publications and their references,
- provides acquisition services, books lending services and interlibrary loans,
- provides consultations and search services for teaching staff, researchers, all-time and external students of faculty and for other professional public.

The library catalogue contains more than 8 000 items, which are freely available in the Library. The catalogue can be found on <http://olib.cvt.stuba.sk>. The Library purchased and acquired thanks to donation 36 titles of professional journals (mainly ACM, IEEE membership) in various languages (5 out of them are in Slovak). Journals are located in the Study Room.

Electronic services are available mainly through these databases: ACM Digital Library, IEEE/IET Electronic Library, Springer Link, Science Direct, Scopus, ISI Web of Knowledge, Wiley Online Library which are the part of a national project NISPEZ.

The Library cooperates with other faculty libraries of the Slovak Technical University, and with Slovak Centre of Scientific and Technical Information.

## **6.2 Computing and Communication Services**

The Centre for Computing and Communication Services at the Faculty of Informatics and Information Technologies provides the following services for educational and research purposes at FIIT STU:

- functioning of the faculty central servers and services,
- functioning of the faculty system and network infrastructure,
- functioning of the faculty information systems,
- new servers, computers, printers, scanners etc. installation,
- operating systems and specialized software installation,
- upgrading and maintenance of computers,
- services for faculty wire and wireless access points to the Internet,
- functioning of the camera security system,
- functioning of the IP telephony system,
- data-projectors installation.

The faculty computer network is based on a structured cable system and it is using 100 Mbps transfer speed. It consists of approximately 200 personal computers and notebooks of the faculty staff and PhD. students, 250 personal computers and workstations in the education and research laboratories and 30 specialized servers.

The Centre for Computing and Communication Services also provides full service for educational computer laboratories and full or partial service for research laboratories of the institutes.

Assoc. Prof. Tibor Krajčovič  
Head of Centre for Computing and Communication Services

Eubica Palatinusová  
Faculty Secretary

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## 7 Institute of Applied Informatics

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**E-mail:** uapi@fiit.stuba.sk  
**Web:** <http://www.uapi.fiit.stuba.sk/>  
**Tel:** +421 918 687 989  
**Fax:** +421 2 654 20 587

The scientific and professional activities of the institute concentrate mainly in the specific areas of computational intelligence, computer graphics and vision, parallel and mobile computing and computer, network and internet security.

In computational intelligence our researchers specialize in heuristics used in evolutionary optimization, machine learning and in adaptation of neural networks, which is mostly applied in artificial life, social systems and cognitive science modeling and simulations.

Activities related to mobile computing and mobile application development concentrate on research of new methods and approaches to the design, development and implementation of mobile computing applications in various application domains, most notably in public transportation.

In the field of computer graphics and vision the research and development involves computer vision applications (object detection, object recognition), computer graphics, visualization of the data, new methods of human-computer interaction (augmented reality).

Activities related to security cover the methods for analyze and modeling of security of network protocols, development of procedures for certificate based access control to resources in mobile ad-hoc network and procedures for computer system security level evaluation based on appropriate objective security metrics.

The institute is responsible for the following degree programme:

Applied informatics (doctoral degree).

### 7.1 Staff

#### Director

Ladislav Hudec, Assoc. Professor

#### Deputy Director

Vladimír Kvasnička, Professor (till September 2012)

Jiří Pospíchal, Professor (since September 2012)

**Administrative Department**

Katarína Pribišová

**Teaching Staff**

Vanda Benešová, PhD.

Michal Čerňanský, Assoc. Professor

Peter Drahoš, PhD.

Miroslav Galbavý

Ladislav Hudec, Assoc. Professor

Peter Kapec, PhD.

Vladimír Kvasnička, Professor

Matej Makula, PhD. (part time)

Jiří Pospíchal, Professor

Viliam Solčány, PhD. (part time)

Branislav Steinmüller (part time)

Juraj Štefanovič, PhD.

Peter Trebatický, PhD.

**Researchers**

Alena Kovárová, PhD. (till June 2012)

**Full time PhD Students**

Jakub Breier

Ladislav Clementis

Andrej Fogelton

David Chalupa

Michal Kottman

Ján Kvak

Miroslav Makýš

Peter Marko

Juraj Pálffy

Rastislav Szabó

Juraj Števek

Jakub Ukrop

Lubomír Varga

Peter Vilhan

**7.2 Teaching****Undergraduate Study (Bc.)**

Course	Semester	Credits	Lecturer
Algebra and Discrete Mathematics	Autumn	6	V. Kvasnička, J. Pospíchal
Human-Computer Interaction	Spring	6	V. Benešová
IT Security Management	Spring	5	O. Strnád
Mathematical Logic I	Spring	6	V. Kvasnička



Course	Semester	Credits	Lecturer
Operating Systems	Autumn	6	V. Solčány
Parallel Programming	Autumn	6	M. Čerňanský
Principles of Computer Graphics and Image Processing	Autumn	6	P. Drahoš
Basic Methods of Multimedial Content Development	Autumn	6	P. Kapec

### Master Study (Ing.)

Course	Semester	Credits	Lecturer
Cognitive Science	Spring	6	V. Kvasnička
Machine Learning	Autumn	6	J. Pospíchal
Evolutionary Algorithms	Spring	6	J. Pospíchal
Neural Networks	Autumn	6	M. Čerňanský
Architecture of Computer Systems	Autumn	6	L. Hudec
Security of Computer Systems	Autumn	6	L. Hudec
Computer Vision	Autumn	6	V. Benešová
Image Processing, Graphics and Multimedia	Spring	6	V. Benešová
Security in Internet	Spring	6	L. Hudec
Multimedia Computer Systems	Spring	6	V. Benešová
Security and Management of Information Systems	Autumn	5	O. Strnád
Advanced Methods of Computer Graphics	Autumn	6	P. Drahoš

## 7.3 Theses

### Bachelor (Bc.) Theses – graduates 2012

#### Study Programme Computer and Communication Systems and Networks

- Kružík, Vladimír: *Visualisation of DNS Operations*. Supervisor: L. Hudec
- Šulák, Viktor: *Visualization of Operation of Secure Mail System*. Supervisor: L. Hudec

#### Programme Computer Systems and Networks

- Minárik, Matúš: *Linux Security*. Supervisor: L. Hudec

#### Study Programme Informatics

- Antala, Ján: *Creation of Rich Internet Applications for Mobile Devices*. Supervisor: M. Čerňanský
- Bado, Dávid: *Web Service for Managing Audio Records*. Supervisor: J. Pálffy

- Červenka, Pavol: *Web Application for iPhone*. Supervisor: M. Čerňanský
- Geier, Martin: *Tool for Study of Foreign Language Texts*. Supervisor: V. Solčány
- Gyorgy, Adam: *3D Action Game Agent with Artificial Intelligence*. Supervisor: L. Varga
- Hirjak, Tibor: *Mobile Device as a Music Generator*. Supervisor: A. Kovárová
- Hrdlík, Martin: *Virtual Presentation of Place*. Supervisor: J. Štefanovič
- Hudák, Miroslav: *Human Motion Capture Using Kinect*. Supervisor: P. Drahoš
- Jašák, Jakub: *Application Using PKI for iPhone*. Supervisor: M. Čerňanský
- Kandráč, Ján: *Evolutionary Solving of the Eternity Puzzle*. Supervisor: J. Pospíchal
- Kucsera, Viktor: *Mobile Device as a Music Generator*. Supervisor: A. Kovárová
- Kuzmík, Ondrej: *System for Organizing Programming Marathons*. Supervisor: P. Trebatický
- Lenický, Maroš: *The Optimization of Control Laws in Problems of Multi-Parametric Programming*. Supervisor: J. Števek
- Loch, Lukáš: *Proposal of Adaptive Strategy in Games*. Supervisor: J. Pospíchal
- Lukáč, Branislav: *Support for the Creation of Timetable and Execution of Semester Timetables*. Supervisor: M. Galbavý
- Mikuda, Šimon: *Editor and Debugger for Programming Language Lua*. Supervisor: M. Kottman
- Muránsky, Juraj: *Improvement of System for Programmers Competition*. Supervisor: P. Trebatický
- Ondrejko, Matúš: *The Use of Elearning Tools in the Preparation, Creating and Editing Schedules*. Supervisor: M. Galbavý
- Pakan, Filip: *Automatic Object Recognition Using Smart Camera*. Supervisor: V. Benešová
- Paučo, Martin: *The Optimization of Control Laws in Problems of Multiparametric Programming*. Supervisor: J. Števek
- Pavla, Matej: *Motion Capture of Human Skeleton with Kinect Sensor*. Supervisor: P. Drahoš
- Petráš, Michal: *E-Learning System for Teaching Network Security*. Supervisor: J. Breier
- Pidanič, Pavol: *Methods of Mixed Integer Programming*. Supervisor: J. Števek
- Piták, Juraj: *Image Processing on Mobile Devices*. Supervisor: M. Kottman
- Račko, Michal: *Mobile Electronic Document Management*. Supervisor: M. Čerňanský
- Rais, Jaroslav: *The Agent Action Game with Artificial Intelligence*. Supervisor: L. Varga
- Rerko, Dominik: *Augmented Reality Application on Android Platform*. Supervisor: M. Kottman

- Ružička, Pavol: *Efficient Processing of Songs in Databases*. Supervisor: J. Pálffy
- Sámela, Richard: *Creating Applications for Mobile Devices Running on Android Operating System*. Supervisor: M. Čerňanský
- Sivák, Peter: *Interactive Graph Visualization in 3D Space*. Supervisor: P. Kapec
- Szilva, Bálint: *Mobile Poker Odds Application*. Supervisor: P. Marko
- Šiško, Daniel: *Implementation of Graph Drawing Algorithms on GPU*. Supervisor: P. Kapec
- Šrank, Marek: *System of Dependencies between Software Packages*. Supervisor: P. Drahoš
- Tomčo, Marek: *Photorealistic Visualization of Hair in Real Time*. Supervisor: P. Drahoš
- Uhrin, Martin: *Parallel Audio Data Processing*. Supervisor: J. Pálffy
- Ujhelyi, Matúš: *Application for Managing Udev Rules on Linux Platform*. Supervisor: P. Vilhan

### Master (Ing.) Theses – graduates 2012

#### Study Programme Computer and Communication Systems and Networks

- Gajdoš, Ján: *Security Aspects of Mobile Ad-Hoc Network (MANET)*. Supervisor: P. Vilhan
- Helebrandt, Pavol: *Forensic Tool for Collection of Digital Evidence in Linux Environment*. Supervisor: L. Hudec
- Klimo, Vladimír: *Virtualized Computer Classroom*. Supervisor: B. Steinmüller
- Mihalech, Matej: *Security of Web Servers*. Supervisor: L. Hudec
- Sloboda, Adam: *Forensic Tool for Digital Evidence Collection in Linux Environment*. Supervisor: L. Hudec

#### Study Programme Information Systems

- Baková, Lenka: *Visualization of Software Evolution*. Supervisor: P. Kapec
- Balát, Marcel: *Multiagent System for University Timetabling*. Supervisor: M. Galbavý
- Barát, Michal: *Augmented Reality as an Interface for Work with Solid Geometry*. Supervisor: A. Kovárová
- Beno, Miroslav: *Volume Data Rendering on Graphics Hardware*. Supervisor: O. Hirjak
- Budzel, Matej: *Interactive Assistance Desktop Work by Means of Augmented Reality*. Supervisor: J. Štefanovič
- Buch, Ondrej: *Evolution in Sequential Decision Making for Tetris*. Supervisor: J. Pospíchal
- Freml, Milan: *Neural Network Simulator on Massively Parallel Hardware*. Supervisor: M. Čerňanský

- Hlaváček, Filip: *Alternative Interaction Approaches in Three-Dimensional Environments on the Screens of Mobile Devices*. Supervisor: A. Kovárová
- Kosmeľ, Juraj: *Database Normalization Process Possibilities*. Supervisor: M. Galbavý
- Lukeš, Andrej: *Multi-Agent System for Monitoring Constraints in Timetabling*. Supervisor: M. Galbavý
- Marton, Jakub: *Simulation of Human Immune System*. Supervisor: V. Solčány
- Mihálik, Martin: *Interactive Catalogue of Architectural Structures*. Supervisor: J. Štefanovič
- Mihalovič, Martin: *Animik – a Tool for Interactive Animation of Humanoid Figures*. Supervisor: P. Drahoš
- Palček, Michal: *Framework for Virtual Building Tour with Mobile Devices*. Supervisor: M. Čerňanský
- Podstrelenec, Matej: *Interactive Document*. Supervisor: J. Štefanovič

#### *Study Programme Software Engineering*

- Barna, Jozef: *Parallel Computing of Algorithms from Artificial Intelligence with the Use of Graphical Processor Unit*. Supervisor: P. Trebatický
- Belica, Andrej: *Visualization of Deformable Objects*. Supervisor: P. Drahoš
- Brček, Adam: *Optimization of the Weights of Dynamic Reservoir in Echo State Networks*. Supervisor: M. Makula
- Hruška, Miroslav: *Local Search Stochastic Algorithm with Learning*. Supervisor: V. Kvasnička
- Jakabovič, Juraj: *Image Resolution Enhancement by Methods of Super-Resolution*. Supervisor: V. Benešová
- Kompánek, Matej: *Image Registration in an Application for Medical Data Fusion*. Supervisor: V. Benešová
- Kvak, Ján: *Museum Exhibiton Using Augmented Reality*. Supervisor: J. Štefanovič
- Mészáros, Roman: *Game Strategy Emergence Using Subsymbolic Methods of Artificial Intelligence*. Supervisor: V. Kvasnička
- Mikuláš, Miroslav: *Simulation of Deformable Objects*. Supervisor: P. Drahoš
- Ondruška, Peter: *Animation of Humanoid Figure*. Supervisor: P. Drahoš
- Pleško, Ivan: *Collaborative Virtual Environment for Data Visualization*. Supervisor: P. Kapec
- Polko, Ivan: *Optimization of Path Planning for Multiple Robots*. Supervisor: J. Pospíchal
- Práznovský, Martin: *Control of Augmented Reality Objects Using Game Controller*. Supervisor: J. Štefanovič
- Romaňák, Ján: *Meta-Heuristic Planning Approach*. Supervisor: J. Pospíchal
- Sobôtka, Marek: *Image Segmentation Using Methods of Distributed Agents to Obtain Information from Medical Images*. Supervisor: V. Benešová

- Šopinec, Róbert: *Solving Binary Optimization Problems Using Artificial Chemistry*. Supervisor: V. Kvasnička
- Takáč, Marek: *Mobile Device as an Intelligent User-Adapting Music Generator*. Supervisor: A. Kovárová

### Doctoral (PhD.) Theses

*Student name:* Juraj Števek  
*Degree program:* Applied Informatics  
*Thesis title:* *Intelligent Embedded Systems*  
*Supervisor:* Štefan Kozák, Professor  
*Defended on:* February 16, 2012  
*Annotation:* This thesis describes a modelling method for a non-linear system which is based on a multi-point linear approximation for a model predictive control purpose. The method is derived from artificial neural network techniques and exploits good properties of a Orthogonal Activation Function based Neural Network (OAF-NN). According to the proposed procedure, a software implementation is discussed in form of a Matlab toolbox. The Matlab toolbox serves as fast and user-friendly tool for identification, simulation and analysis of a static or a dynamic system. The proposed modelling procedure is characterized by fast training property and wide applicability in medical systems, automotive, power-electronics industry etc.

## 7.4 IIT.SRC Students' Papers

### Full papers

- Barát, Michal: *Augmented Reality as an Interface for Learning Solid Geometry*. Supervisor: A. Kovárová
- Breier, Jakub: *Information System Security Assessment Method Based on Security Mechanisms*. Supervisor: L. Hudec
- Clementis, Ladislav: *Appropriate State Evaluation in the Battleship Game Strategy*. Supervisor: V. Kvasnička
- Fogelton, Andrej: *Evaluation of Image Segmentation Based on Histograms*. Supervisor: V. Benešová
- Hlaváček, Filip: *Multi-Touch Interaction Technique Designed for Three-Dimensional Environments on the Screens of Mobile Devices*. Supervisor: A. Kovárová
- Kompánek, Matej: *Single Modality Medical Image Registration*. Supervisor: V. Benešová
- Kottman, Michal: *Performance Evaluation of Feature Descriptors for Visual Vocabulary Based Methods*. Supervisor: M. Šperka
- Kvak, Ján: *Planar Object Recognition for Augmented Reality*. Supervisor: J. Štefanovič

- Sobôtka, Marek: *Image Segmentation Using Methods of Distributed Agents to Obtain Information from Medical Images*. Supervisor: V. Benešová
- Takáč, Marek: *Mobile Device as an Intelligent User-Adapting Music Generator*. Supervisor: A. Kovárová
- Valalíková, Katarína: *Consistency in the Identity Management*. Supervisor: R. Semančík

#### Extended abstracts

- Helebrandt, Pavol: *Forensic Tool for Collection of Digital Evidence in Linux Environment*. Supervisor: L. Hudec
- Račko, Michal: *Mobile Document Management*. Supervisor: M. Čerňanský

#### TP CUP Competition

- Kvitkovič, Matej – Lezo, Andrej – Mačuga, Peter – Neslušanová, Lenka – Račev, Marek – Ťilinčík, Michal: *Digital Scene – Kinect Based Gesture Recognizer in a Task of Event Management*. Supervisor: V. Benešová
- Brath, Marek – Fejes, Adrián – Jendrej, Maroš – Krajčovič, Jozef – Staráček, Ľuboš – Turský, Lukáš: *TrollEdit – Different Approach in Editing of Source Code Using Graphic Elements*. Supervisor: P. Drahoš
- Aufricht, Igor – Forus, Samo – Kujan, Jozef – Poizl, Dušan – Škoda, Matej – Tóth, Juraj – Volentier, Juraj: *Mobile Navigation in Indoor Spaces Using QR Codes*. Supervisor: A. Kovárová

## 7.5 Research Laboratories

### Mobile Computing Laboratory

*Manager:* M. Čerňanský (UAPI), I. Kotuliak (UPSS), V. Vranić (UISI)

*Contact:* [michal.cernansky@stuba.sk](mailto:michal.cernansky@stuba.sk)

*Description:* The main purpose of the laboratory is to support research and teaching process related to mobile computing. Laboratory supports research and student projects from multiple domains that can greatly benefit from mobile computing technology such as computer vision, computer graphics, machine learning and augmented reality. Currently the laboratory equipment consists of several iOS mobile phone and tablet PC devices (Apple iPhone, Apple iPad) and computers used for development applications for mobile devices. In near future laboratory will be equipped with devices running Android (Google), Symbian OS (Nokia) and eventually other major mobile computing platforms (Windows Phone 7, RIM Blackberry, Samsung Bada).

### Grid Computing Laboratory

*Manager:* L. Hudec

*Contact:* [ladislav.hudec@stuba.sk](mailto:ladislav.hudec@stuba.sk)

*Description:* The research and teaching laboratory is devoted to teaching distributed processing and parallel programming graduate modules and exper-

imental lab for project on Grid Computing and its components. Grid consists of two independent parts. The first part is testing grid equipped 20 CPUs, 1Gb network interconnection, front-end server with UPS, Globus Toolkit software and VMWare software. The second part is production grid equipped 40 CPUs, 1Gb network connection, front-end server with UPS, Globus Toolkit software and VMWare software. Grid is connected to Internet and is going to be as a part of SlovakGrid national grid structure.

## 7.6 Research Projects

### **Security in distributed computer systems and mobile computer networks (VEGA, 1/0722/12)**

*Project leader:* L. Hudec  
*Members UAPI:* J. Breier, M. Galbavý, P. Marko, V. Solčány, J. Ukrop, P. Vilhan  
*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences  
*Duration:* January 2012 – December 2014  
*Description:* Project deals with new methods and tools development for security in distributed computer systems and mobile computer networks. Distributed system is presented by computing nodes interconnected by computer network. The project solves the methods for analyze and modeling of network protocols in order to discover the security weaknesses of protocol and possibility to use those protocols models in effective check of network traffic. Further the project solves the new methods development to override a covert communication in distributed systems throughout network protocols. The mobile computer network is presented by wireless mobile ad-hoc network. The project solves new procedures development based on certificates in access control to resources of mobile ad-hoc network. Further the project solves the development of new procedure for computer system security level evaluation by introducing appropriate objective security metrics.

### **Robust MPC for Hybrid Systems (RPHS) (VEGA 1/1105/11)**

*Project leader:* Š. Kozák  
*Members UAPI:* M. Čerňanský, M. Makýš, J. Števek  
*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences  
*Duration:* January 2011 – December 2013  
*Description:* The last five years are marked by an increased interest in development of new control methods for heterogeneous hybrid process that include continuous and discrete dynamics. Research in control methods for hybrid non linear dynamic systems represent a new evolution trend in development and application of control algorithms that help considerably improve performance of complex technological processes within a wide spectrum of applications (power industry, car industry, health care, biotechnologies, transportation, service industry). Those ad-

vanced methods apply principles and methods of prediction, robustness, optimality and embeddedness. The main objective of the project is research and development, algorithmization and implementation of robust predictive control methods for non linear hybrid processes using modern information, communication and control technologies and systems realized by embedded computer systems.

**New methods of reinforcement learning for cooperative multiagent systems (VEGA 1/0553/12)**

*Project leader:* J. Pospíchal

*Members UAPI:* L. Clementis, A. Fogelton, D. Chalupa, V. Kvasnička, J. Pálffy, P. Trebatický, Ľ. Varga

*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences

*Duration:* January 2012 – December 2014

*Description:* The goal of the proposed project is the development and application of new methods of reinforcement learning. As a new element in this learning, we will include the enhanced possibility of cooperation between agents, which should substantially increase the applicability of learning compared to the classical methods of reinforcement learning. The inclusion of cooperation in the reinforcement learning represents an important element of innovation that will extend opportunities for learning in multiagent systems towards emergence of division of labor, which should significantly increase the resulting effectiveness of agents.

**Integration of study of processing visual information and creating complex educational multimedia materials (KEGA 068UK-4/2011)**

*Project leader:* V. Benešová

*Supported by:* Cultural and Educational Grant Agency of the Slovak Republic (KEGA) Ministry of Education SR

*Duration:* January 2011 – December 2013

*Description:* The main goals of the project are: (i) redaction of all courses in the field of Visual Information Processing on both universities with the aim of conformity of their syllabus, (ii) new modern textbook in the Slovak language – this is the most important deliverable of this project. A teaching textbook for courses in the field of "Digital Image processing" and "Computer vision" is still missing in Slovak language, (iii) Multimedia teaching materials inclusive exercises on DVD and online platform, (iv) English-Slovak glossary of tech. terms in these fields, which currently lacks a frequently used English version dates.

## 7.7 Publications

### Journals

BREIER, J. – KLEJA, M.: On Practical Results of the Differential Power Analysis. In: *Journal of Electrical Engineering*. Vol. 63, No. 2 (2012), ISSN 1335-3632. pp. 125-129.



- BREIER, J. – HUDEC, L.: Security Mechanisms Role in Information Security Evaluation. In: *Information Technology Applications*. No. 1 (2012), ISSN 1338-6468. pp. 5-15.
- KAPEC, P.: Graph Visualization and Applications in Software Visualization. In: *Information Technology Applications*. No. 1 (2012), ISSN 1338-6468. pp. 16-25.
- KOTTMAN, M.: Performance Evaluation of Visual Vocabularies for Object Recognition. In: *Information Sciences and Technologies*. Bulletin of the ACM Slovakia. Vol. 4, No. 2 (2012), ISSN 1338-1237. pp. 38-42.
- ŠTEVEK, J.: Intelligent Embedded Systems. In: *Information Sciences and Technologies*. Bulletin of the ACM Slovakia. Vol. 4, No. 1 (2012), ISSN 1338-1237. pp. 20-28.

### International Conferences

- BENEŠOVÁ, V. – KOTTMAN, M. – SIDLA, Oliver: Hazardous Sign Detection for Safety Applications in Traffic Monitoring. In: *Proceedings of SPIE*. Vol. 8301: Intelligent Robots and Computer Vision XXIX: Algorithms and Techniques. Springfield 2012, pp. 1-6.
- BREIER, J. – HUDEC, L.: Towards a Security Evaluation Model Based on Security Metrics. In: *CompSysTech'12*. Computer Systems and Technologies, 13<sup>th</sup> International Conference, Ruse, Bulgaria 2012, New York ACM, pp. 87-94.
- CHALUPA, D.: On the Efficiency of an Order-based Representation in the Clique Covering Problem. In: *GECCO'12*. Proceedings of the Fourteenth International Conference on Genetic and Evolutionary Computation, Philadelphia, USA, 2012, New York : ACM, pp. 353-360.
- KAPEC, P. – PAPERČKA, M. – PAŤITNAJ, A.: Intelligent 3D Graph Exploration with Time-Travel Features. In: *Lecture Notes in Computer Science*. Vol. 7594, International Conference Computer Vision and Graphics, ICCVG 2012, Warsaw, Poland, Berlin - Springer, 2012, pp. 113-120.
- PÁLFY, J. – POSPÍCHAL, J.: Pattern Search in Dysfluent Speech. In: *MLSP 2012*. Proceedings of the IEEE International Workshop on Machine Learning for Signal Processing, Santander, Spain. IEEE, 2012, p. 6.
- SZÜCS, A. – KVASNICA, M. – ŠTEVEK, J. – FIKAR, M.: Optimal Fitting of Data by PWA Functions of Fixed Complexity. In: *CAPE Forum 2012*, Computer Aided Process Engineering, University of Pannonia, Veszprém 2012, p. 46.
- ŠTEVEK, J. – SZÜCS, A. – KVASNICA, M. – KOZÁK, Š. – FIKAR, M.: Smart Technique for Identifying Hybrid Systems. In: *SAMI 2012*, IEEE 10<sup>th</sup> Jubilee International Symposium on Applied Machine Intelligence and Informatics. Herľany, Slovakia, 2012, Budapest - Óbuda University, 2012, CD-ROM.
- VILHAN, P. – GAJDOŠ, J.: ADEUS: Tool for Rapid Acceleration of Network Simulation in OMNeT++. In: *Proceedings of the 14<sup>th</sup> International Conference on Modelling and Simulation*. Cambridge, United Kingdom. Los Alamitos - IEEE, 2012.
- VILHAN, P. – MARKO, P. – GRELLNETH, I.: Efficient Detection of Malicious Nodes Based on DNS and Statistical Methods. In: *SAMI 2012*. IEEE 10<sup>th</sup> Jubilee International

Symposium on Applied Machine Intelligence and Informatics. Herľany, Slovakia, 2012, Budapest - Óbuda University, 2012, CD-ROM.

### **Selected Local and National Conferences**

CLEMENTIS, L.: Current State Evaluation in the Battleship Game. In: *Cognition and Artificial Life XII*. Prague, Czech Republic, 2012, pp. 33-37. (in Slovak)

UKROP, J. – ČÍKOVÁ, Z. – KAPEC, P.: Visual Access to Graph Content Using Magic Lenses and Filtering. In: *Spring Conference on Computer Graphics SCCG 2012 in Cooperation with ACM and Eurographic*. Smolenice Castle, Slovakia, 2012. Bratislava - Comenius University, 2012. pp. 28-35.

## **7.8 Cooperation**

### **Cooperation in Slovakia**

- Faculty of Mathematics, Physics and Informatics, Comenius University Bratislava
- Faculty of Electrical Engineering, Technical University of Košice
- Ministry of Economy of the Slovak Republic
- Alfa Base Ltd., Bratislava
- Kybernetika Ltd., Košice
- Research Institute of Nuclear Power Engineering Inc., Trnava
- Schneider Electric Slovakia Ltd.
- Start Automation Ltd., Malacky
- Termoreg Ltd., Bratislava
- ui42, Bratislava

### **International Cooperation**

- University of Zagreb, Croatia
- Institute of Software Technology and Interactive Systems, Vienna University of Technology, Austria
- Institut Supérieur d'Électronique de Paris (I.S.E.P.), Paris, France
- Institute Central European Initiative in Cognitive Science Education (joining universities in Vienna, Budapest, Zagreb and Bratislava)
- Faculty of Philosophy and Science, Silesian University in Opava
- Faculty of Informatics, Humboldt University in Berlin
- Rockwell Automation – Allen Bradley, USA
- Schneider Electric Deutschland, Germany
- Brno University of Technology, Czech Republic
- Technical University of Liberec, Czech Republic
- Technical University of Ostrava, Czech Republic

- Morgan Stanley Hungary

### Visits of Staff Members

- *M. Kottman*: Electronic Imaging Conference, Burlingame, USA, January 21-29, 2012
- *M. Galbavý*: IS4V, Brno, Czech Republik, January 26, 2012
- *P. Vilhan*: UKSiM-AMSS 14<sup>th</sup> International Conference on Modelling and Simulation 2012, Cambridge, United Kingdom, March 27-30, 2012
- *J. Breier*: International Conference on Computer Systems and Technologies Compsystech'12, Ruse, Bulgaria, June 21-26, 2012
- *D. Chalupa*: GECCO: 2012 Genetic and Evolutionary Computation Conference, Philadelphia, USA, July 5-12, 2012
- *L. Clementis, D. Chalupa*: 7<sup>th</sup> International Conference on Soft Computing Models in Industrial and Environmental Applications SOCO 2012, Ostrava, September 4-7, 2012
- *J. Pálffy*: 2012 IEEE International Workshop on Machine Learning for Signal Processing MLSP, Santander, Spain, September 21-26, 2012
- *P. Kapec*: International Conference on Computer Vision and Graphics – ICCVG 2012, Warszawa, September 23-26, 2012
- *J. Breier*: The First International IEEE-AESS Conference in Europe about Space and Satellite Telecommunications 2012, Roma, Italy, October 1-6, 2012
- *D. Chalupa*: Institute of Informatics, Czech Academy of Sciences, Prague, Czech Republic, October 10-12, 2012
- *J. Pospíchal*: Brno University of Technology, Czech Republic, November 13-14, 2012
- *J. Pospíchal*: Technical University of Ostrava, Czech Republic, November 29-30, 2012
- *J. Štefanovič*: Morgan Stanley, Budapest, Hungary, December 5, 2012

## 7.9 Membership in Professional Organisations and Societies

### Slovak Professional Organisations and Societies

The whole institute is a collective member of Slovak Artificial Intelligence Society.

#### *Ladislav Hudec*

- Slovak Association for Information Security (member, since 1996; president since 1998, vice-president, since 2006)
- Slovak Centre of the IET (member, since 1996; vice-president 1996-1998)
- Slovak Chapter of the ISACA (member, since 2002)

#### *Vladimír Kvasnička*

- Slovak Academic Society (founding member, since 1997)
- Slovak Artificial Intelligence Society (chairman, since 2000)
- Slovak Computer Science Society (member, since 1996)

*Jiří Pospíchal*

- Slovak Artificial Intelligence Society (member, since 2000)
- Slovak Computer Science Society (member, since 1996)

**International Professional Organisations and Societies***Michal Čerňanský*

- INNS, International Neural Network Society (member, since 2006)

*Ladislav Hudec*

- Information Systems Audit and Control Association (member, since 1998)
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2006)
- IEEE Computer Society (member, since 2008)

*Jiří Pospíchal*

- EUROFUSE, EURO Working group on fuzzy sets (member, since 2007)

*Viliam Solčány*

- ACM, Association for Computing Machinery (member, since 2004)

*Peter Trebatický*

- IEEE, Institute of Electrical and Electronic Engineers (member, since 2007)
- IEEE Computer Intelligence Society (member, since 2008)

**7.10 Other Activities**

- Artificial Intelligence Seminar – V. Kvasnička (organizer)  
[www.fiit.stuba.sk/~kvasnicka/Seminar\\_of\\_AI](http://www.fiit.stuba.sk/~kvasnicka/Seminar_of_AI)
- Journal of Computing and Information Technology – V. Kvasnička (since 2005):  
members of advisory board
- Journal of Electrical Engineering – L. Hudec, editor
- MATCH Communications in Mathematical Chemistry – V. Kvasnička (since  
1998): member of advisory board
- Neural Network World – V. Kvasnička (since 2001): member of advisory board
- Croatica Chimica Acta – V. Kvasnička (since 2002): member of advisory board
- CompSysTech'12, International Conference on Computer Systems and  
Technologies, June 22-23, 2012, Ruse, Bulgaria – L. Hudec: member of programme  
committee
- CSSim 2012, 3<sup>rd</sup> International Conference on Computer Modelling and Simulation,  
September 3-5, 2012, Brno, Czech Republic – L. Hudec: member of programme  
committee
- Computing and Informatics (CAI) – V. Kvasnička, J. Pospíchal: members of edito-  
rial board
- Cognition and Artificial Life XII, May 22-25, 2012, Průhonice, Czech Republic –  
V. Kvasnička, J. Pospíchal: member of programme committee
- MENDEL 2012 – 18<sup>th</sup> International Conference on Soft Computing, Brno,  
Czech Republic – V. Kvasnička, J. Pospíchal: members of programme committee

- SAMI 2012 – 10<sup>th</sup> International Symposium on Applied Machine Intelligence and Informatics, January 26-28, 2012, Herľany, Slovakia – V. Kvasnička: member of programme committee
- Researchers' Night – A. Kovárová – presentations of research – September 28, 2012



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## 8 Institute of Computer Systems and Networks

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**E-mail:** upss@fiit.stuba.sk  
**Web:** <http://www.upss.fiit.stuba.sk/>  
**Tel:** + 421 2 210 22 506  
**Fax:** + 421 2 654 20 587

The Institute of Computer Systems and Networks offers undergraduate and graduate study programmes covering a broad range of courses in *Computer Engineering*. Our courses are built on sound theoretical fundamentals and are oriented towards developing independent creative thinking and ability to design solutions or to solve complex problems in the field of engineering expertise.

These courses cover basics and principles of mathematics, physics, basics of computing and programming, and concentrate mostly on the following domains: computer architecture, distributed systems and computer networks, design of digital systems, embedded systems.

The institute is responsible for education in the accredited degree programmes at two levels of university education:

- Computer and Communication Systems and Networks (bachelor degree),
- Computer and Communication Systems and Networks (master degree).

The institute has been active and successful in research and reflects in research the current development of computer engineering in the world. The dominant research interests of the institute include:

- design of digital systems and embedded systems, computer networks,
- creation of a novel effective formal specification tools, identification and implementation of automated engineering tasks in the area of HW/SW co-design of the mobile computing systems,
- development of new algorithms and methodology for providing reliability and fault tolerance,
- development of new approaches and methods for security enforcement in distributed systems, and
- elaboration of new methodology for VLSI system design and testing at the functional level that is applicable for integrating into ASIC and PLD design.

## 8.1 Staff

### Director

Pavel Čičák, Assoc. Professor (till March 2012)  
Katarína Jelemenská, PhD. (since March 2012)

### Deputy Director

Katarína Jelemenská, PhD. (till March 2012)  
Elena Gramatová, Assoc. Professor

### Administrative Department

Katarína Pribišová

### Teaching Staff

Pavel Čičák, Assoc. Professor  
Boris Dado  
Jana Flochová, PhD.  
Elena Gramatová, Assoc. Professor  
Igor Grellneth, PhD. (till August 2012)  
Pavol Horváth, Professor (part time)  
Ján Hudec  
Katarína Jelemenská, PhD.  
Margaréta Kotočová, Assoc. Professor  
Ivan Kotuliak, Assoc. Professor  
Tomáš Kováčik, PhD. (since July 2012)  
Tibor Krajčovič, Assoc. Professor  
Jana Parízková (part time)  
Mária Pohronská, PhD. (part time, since July 2012)  
Elena Tomalová (part time)  
Peter Trúchly, PhD.

### Researchers

Dušan Bernát  
Mária Pohronská, PhD. (till June 2012)  
Tomáš Kováčik, PhD. (till June 2012)

### External Lecturers

Peter Palúch, PhD.

### Full time PhD Students

Jaroslav Abaffy  
Ján Balaža  
Andrej Binder  
Roman Broniš  
Maroš Ďuríček  
Pavol Helebrandt  
Martin Hrubý  
Matej Jurikovič  
Peter Jombík  
Štefan Krištofik



Michal Kudlačák  
 Dominik Macko  
 Peter Magula (till November 2012)  
 Ján Murányi  
 Martin Nagy  
 Michal Olšovský  
 Miroslav Siebert  
 Peter Pištek  
 Martin Vojtko

## 8.2 Teaching

### Undergraduate Study (Bc.)

Course	Semester	Credits	Lecturer
Computer Engineering Principles	Autumn	6	J. Flochová
Computer Application Design	Spring	6	P. Čičák
Computer and Communication Networks	Spring	6	M. Kotočová
Convergence of Mobile and Wired Networks	Autumn	6	I. Kotuliak
Digital Systems Description	Autumn	6	K. Jelemenská
Final Bachelor Project I-II	Autumn Spring	3-9	P. Čičák
Logic Circuits	Autumn	6 6	J. Hudec
Machine Level Programming	Spring	6	P. Čičák
Microcomputers	Spring	7	T. Krajčovič
Peripheral Devices	Autumn	6	P. Horváth
Principles of Communication Systems	Autumn	6	P. Trúchly
Switching and routing in IP networks	Autumn	6	P. Palúch
WAN Technologies	Spring	6	I. Grellneth

### Master Study (Ing.)

Course	Semester	Credits	Lecturer
Communication Services and Networks	Autumn	6	M. Kotočová
Computing Systems Research	Autumn	2	E. Gramatová
Reliability of Digital Systems	Spring	6	E. Gramatová
Digital Systems Design	Spring	6	K. Jelemenská
Digital Systems Testing	Autumn	6	E. Gramatová
Diploma Project I-III (Computer and Communication Systems and Networks)	Autumn Spring	8-12-20	P. Čičák
Distributed Computer Systems	Autumn	6	D. Bernát
Embedded Systems	Autumn	6	T. Krajčovič

Course	Semester	Credits	Lecturer
NGN Networks, Services and Protocols	Spring	6	I. Kotuliak
Reconfigurable Digital Systems	Spring	6	J. Flochová
Satellite Systems	Spring	6	P. Trúchly
Systems on Chip Design	Autumn	6	M. Balát
Team Project I-II (Computer and Communication Systems and Networks)	Autumn Spring	7-5	J. Hudec
Wireless Communication Systems	Autumn	6	I. Kotuliak

### 8.3 Theses

#### Bachelor (Bc.) Theses – graduates 2012

##### *Study Programme Computer and Communication Systems and Networks*

- Barlog, Ivan: *Applications for Chosen Mobile Platform*. Supervisor: I. Kotuliak
- Bencel, Rastislav: *Simulations of Wireless Networks from the Transport Layer Point of View*. Supervisor: M. Olšovský
- Briatka, Martin: *Voice Transmission in Frame Relay Networks*. Supervisor: M. Hrubý
- Bystrický, Michal: *Solution for Streaming Audio over the Internet*. Supervisor: I. Kotuliak
- Čechvala, Martin: *Server for Log Processing*. Supervisor: D. Bernát
- Čerňan, Tomáš: *Test System for Petri Nets*. Supervisor: K. Jelemenská
- Filipek, Jozef: *Simulation of Wired Networks on Transport Layer*. Supervisor: M. Olšovský
- Herda, Tomáš: *System for Assessment of Student Projects Based on Performance Indicators*. Supervisor: J. Hudec
- Hucková, Ivana: *Voice over Frame Relay*. Supervisor: M. Hrubý
- Chrást, Lukáš: *Monitoring System of Environment Based on Programmable Hardware*. Supervisor: M. Pohronská
- Chropeň, Matúš: *Qos on MPLS Networks*. Supervisor: M. Hrubý
- Ignáčák, Miroslav: *Design of the Functional Environment for the Digital System-On-Chip (Soc)*. Supervisor: M. Balát
- Kachman, Ondrej: *Simulation of Computer's Register Transfers*. Supervisor: Š. Krištofik
- Kincel, Andrej: *Design of Architecture for Low Power Processor Testing*. Supervisor: M. Balát
- Knaperek, Jozef: *Monitoring of Network Service Availability*. Supervisor: D. Bernát
- Kovalčík, Marek: *Automatic Detection of Web-Based Attacks*. Supervisor: P. Magula

- Krajči, Peter: *Automatic Solving Problem of Covering with Petrick's Method II*. Supervisor: M. Kolesár
- Láni, Lukáš: *Proof of Concept Ipv6 Testbed Setup SIP Interworking*. Supervisor: S. Schumann
- Lidák, Michal: *Multimedia Application with Use of the Voip Architecture*. Supervisor: I. Kotuliak
- Maruniak, Marián: *Optimization of Binary Decision Diagrams Based on Multiplexers, Principles*. Supervisor: P. Pištek
- Maťo, Ján: *Extending the IP Multimedia Subsystem*. Supervisor: T. Kováčik
- Mazag, Ján: *Logical Design of IP Networks*. Supervisor: M. Kotočová
- Medvec, Maroš: *EPRM Emulator*. Supervisor: T. Krajčovič
- Miša, Martin: *Support Management Assignments in the Subject Description of Digital Systems*. Supervisor: K. Jelemenská
- Obetko, Jakub: *Ipv6 and Security*. Supervisor: M. Kotočová
- Roštecký, Richard: *Application for Chosen Mobile Platform*. Supervisor: I. Kotuliak
- Sekeráš, Marián: *Monitoring System of Environment Based on Programmable Hardware*. Supervisor: M. Pohronská
- Skalný, Ján: *Software Switch Model*. Supervisor: I. Grellneth
- Šiplák, Šimon: *Security of DNS System*. Supervisor: P. Magula
- Škriečka, Tomáš: *Simulation of Sensor Networks*. Supervisor: P. Trúchly
- Števko, Adam: *Ipv6 and Security*. Supervisor: M. Kotočová
- Šubín, Juraj: *Debugger for Systems On the Base of 80386EX*. Supervisor: T. Krajčovič
- Zelenaj, Roman: *Qos in MPLS Networks*. Supervisor: M. Hrubý
- Zeleňanský, Ondrej: *Design and Simulation of Hierarchical Petri Nets*. Supervisor: M. Jurikovič

#### Study Programme Informatics

- Balga, Peter: *A Software System for Supporting Education in Subjects LO and PPI*. Supervisor: Š. Krištofik
- Dukát, Marek: *EPRM Emulator*. Supervisor: T. Krajčovič
- Karabín, Andrej: *VHDL Code Compare Algorithm*. Supervisor: E. Tomalová
- Kundis, Tomáš: *Reduction of Binary Decision Trees*. Supervisor: P. Pištek
- Pivarník, Martin: *Proof of Concept Ipv6 Testbed Setup SIP Interworking*. Supervisor: S. Schumann
- Pôbiš, Anton: *Multimedia Application Using Voip Architecture*. Supervisor: I. Kotuliak
- Vangel, Máté: *Transport Protocol for Satellite Systems*. Supervisor: P. Trúchly

**Master (Ing.) Theses – Graduates 2012***Study Programme Computer and Communication Systems and Networks*

- Babiš, Miroslav: *Public Key Infrastructure in Mobile Ad Hoc Networks*. Supervisor: P. Magula
- Baumann, Martin: *Adaptive Network Filtration*. Supervisor: D. Bernát
- Bednár, Marian: *Automatic Test Generator for Sequential Circuits Using ATPG ATALANTA*. Supervisor: E. Gramatová
- Behúň, Michal: *Interactive System for Allocating Requirements for Taxi Service*. Supervisor: P. Pišteck
- Bíro, Matúš: *Quality of Services in TCP/IP Networks*. Supervisor: M. Kotočová
- Broniš, Roman: *Multimedia Platform with Innovative Functions*. Supervisor: T. Kováčik
- Dúcky, Michal: *Support of Interaction in Presentation Systems*. Supervisor: K. Jelemenská
- Ďuriček, Maroš: *Securing System with Multiple FPGA Hardware Watchdogs*. Supervisor: M. Pohronská
- Ferenčík, Jozef: *Functional Test Generator for VLSI Circuits*. Supervisor: J. Hudec
- Gaťík, Michal: *Automated Assessment of HDL Models*. Supervisor: K. Jelemenská
- Herko, Martin: *System for Testing Knowledge with Graphic Input*. Supervisor: B. Dado
- Hlatký, Matej: *Interactive Presentation System*. Supervisor: K. Jelemenská
- Humený, Lukáš: *Graphical User Interface for Network Simulator Ns-2*. Supervisor: P. Trúchly
- Hvizdoš, Radek: *Passive USB Packet Acquisition and Analysis*. Supervisor: T. Krajčovič
- Chovan, Adrián: *Modern Concepts in IP/MPLS Networks*. Supervisor: I. Grellneth
- Chytil, Róbert: *System to Prevent the Drivers' Drowsiness*. Supervisor: M. Jurikovič
- Jánoš, Martin: *Application of GPS Device as a Tourist Guide*. Supervisor: P. Pišteck
- Jarkovský, Michal: *Testing Functionality of Icmpv6 Protocol*. Supervisor: I. Grellneth
- Jurík, Peter: *Distributed Swap Space of Virtual Memory*. Supervisor: D. Bernát
- Kozemčák, Andrej: *Measuring in IP Network*. Supervisor: T. Kováčik
- Kubanda, Peter: *Implementation of a System Modelled by Colored Petri Nets*. Supervisor: J. Flochová
- Kurtý, Michal: *Modelling and Diagnostics Using Coloured Petri Nets*. Supervisor: J. Flochová
- Lőrincz, Tomáš: *Interactive Educational Tool for Satellite Systems*. Supervisor: P. Trúchly

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- Malovec, Ján: *Experimental Musical Instrument on Reconfigurable Computing Hardware*. Supervisor: M. Pohronská
  - Marcinčin, Roman: *Application for IMS Network Environment*. Supervisor: I. Kotuliak
  - Martinek, Valter: *Extension of Interaction Support for Presentation System*. Supervisor: K. Jelemenská
  - Masaryk, Tomáš: *System for Automatic Digital Circuit Analysis for Optimal Consumption during Testing*. Supervisor: M. Baláž
  - Morvay, Peter: *Traffic Engineering in MPLS Networks*. Supervisor: M. Hrubý
  - Nagy, Martin: *Security in Wireless Networks*. Supervisor: M. Kotočová
  - Nováková, Katarína: *Real Time Position Monitoring of Object by GPS*. Supervisor: T. Krajčovič
  - Olejník, Štefan: *RC Car Controlled by Bluetooth*. Supervisor: T. Krajčovič
  - Ondrášek, Maroš: *Programmatic Support for Management of Technical Resources*. Supervisor: P. Čičák
  - Oros, Dávid: *DNS and Security*. Supervisor: P. Magula
  - Palaj, Tomáš: *Application of IEEE Standard 1149.1 for Testing of Digital Circuits*. Supervisor: E. Gramatová
  - Panenka, Roman: *Ipv6 Mobility*. Supervisor: I. Grellneth
  - Petrik, Matej: *Critical Processes Modeling in Energetics with Artificial Neural Networks*. Supervisor: Š. Kozák
  - Pirháč, Martin: *Congestion Control in IP Networks*. Supervisor: M. Kotočová
  - Písařovič, Michal: *Services in the IMS*. Supervisor: T. Kováčik
  - Polák, Jakub: *Optimization of Multiplexer Trees*. Supervisor: P. Pištek
  - Sebník, Juraj: *Usage of Coloured Petri Nets in Field of Computer Systems and Networks Security*. Supervisor: J. Flochova
  - Severínová, Hana: *Control-Flow Checking*. Supervisor: J. Abaffy
  - Svetlík, Martin: *Tool Aiding Development of Network Applications*. Supervisor: M. Hrubý
  - Takács, Tomáš: *Routing Protocols in Sensor and Ad-Hoc Networks*. Supervisor: I. Kotuliak
  - Václavík, Jozef: *Simulation of Access Methods in Sensor Networks*. Supervisor: P. Trúchly
  - Virkler, Róbert: *Parking Assistant*. Supervisor: M. Jurikovič
  - Vojtko, Martin: *Modular Embedded Operating System*. Supervisor: T. Krajčovič

**Doctoral (PhD.) Theses**

- Student name:* Tomáš Kováčik  
*Degree program:* Applied Informatics  
*Thesis title:* *IMS Service Provisioning Improvement*  
*Supervisor:* Ivan Kotuliak, Associate Professor  
*Defended on:* April 19, 2012  
*Annotation:* The aim of the work is to propose new philosophy of communication services providers to services and customers as operators are not able to react on customers' requirements and become only Internet connection providers. Author in the work proposes new approach of operator to customer which is based on offering as many services as possible to customer. Author in presented work focuses on concept of opening communication networks based on IP Multimedia Subsystem (IMS) to 3rd party service providers. He proposes supplement of IMS architecture without necessity of any change in defined standards. Service Sharing System collects information about available services from partners of operator, their processing and providing them to customers in a list of services shown directly on end device. Presented work also presents technical proposal of mentioned system in form of definition of logical roles and relationships among operators, placement of the element extending architecture of IMS, definition of parts and blocks from which the supplement is built as well as communication among elements. Author also gives evaluation of different situations in which the system can appear.
- Student name:* Mária Pohronská  
*Degree program:* Applied Informatics  
*Thesis title:* *Implementing Embedded Expert Systems via Programmable Hardware*  
*Supervisor:* Tibor Krajčovič, Associate Professor  
*Defended on:* May 22, 2012  
*Annotation:* The work deals with the problem of applications of expert systems in embedded systems' architectures. We design architectures suitable for implementation of embedded expert systems and devise a universal representation for knowledge bases of embedded expert systems. We devise two methods of hardware acceleration of inference in embedded expert systems. One of the devised methods we experimentally evaluate and claim its remarkable contribution to inference process of expert systems and its suitability for utilization in embedded expert systems. Based on the performed experiments and acquired experience we synthesize a set of rules for implementation of expert systems in embedded architectures. The devised method for hardware accelerated inference enables implementation of expert systems even in embedded architectures where it has not been possible with the current state of art, thus facilitating further adoption of intelligent embedded systems.

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<i>Student name:</i>	Peter Magula
<i>Degree program:</i>	Applied Informatics
<i>Thesis title:</i>	<i>Quality of Service in Mobile Ad-hoc Networks</i>
<i>Supervisor:</i>	Margaréta Kotočová, Associate Professor
<i>Defended on:</i>	November 29, 2012
<i>Annotation:</i>	This work is a contribution in the field of quality of service models in mobile ad hoc networks. The work provides the state of the art in quality of service field, it describes specific features of mobile ad hoc networks and quality of service provisioning in this kind of networks. The proposed new quality of service model, called QMMAC, is oriented at admission control with network parameters estimation and implementation need only in communication endpoints. The work contains the model architecture description and the process of determining recommended parameters of the model by means of simulation experiments. Finally, the evaluation of the proposed model is presented and its comparison with the model without any admission control scheme based on simulation experiments in network simulator environment.

## 8.4 IIT.SRC Students' Papers

### Full papers

- Babiš, Miroslav: *NetLogo – an Alternative Way of Simulating Mobile Ad Hoc Networks*. Supervisor: P. Magula
- Hlatký, Matej – Martinek, Valter: *A New Electronic Presentation System for Design and Test*. Supervisor: E. Gramatová
- Hrubý, Martin – Olšovský, Michal: *New Approach for Determining a VoIP Backbone*. Supervisor: M. Kotočová
- Jánoš, Martin: *Application of GPS Device as a Tourist Guide*. Supervisor: P. Pištek
- Jombík, Peter: *Wireless Remote Controller for Power Source Based on Embedded System*. Supervisor: T. Krajčovič
- Krištofik, Štefan: *Repair Analysis for Embedded Memories Using Block-Based Redundancy Architecture*. Supervisor: E. Gramatová
- Kudlačák, František: *Variometer with GPS Logger*. Supervisor: M. Pohronská
- Kudlačák, Michal: *Evolution of Asynchronous Sequential Circuits*. Supervisor: P. Čičák
- Macko, Dominik: *Contribution to Visualization of HDL Model Simulation Results*. Supervisor: K. Jelemenská
- Nagy, Martin: *A Security Threat to IP Devices in Mobile Cellular Networks*. Supervisor: M. Kotočová
- Polák, Jakub – Masaryk, Tomáš – Behúň, Michal: *Digital Circuit Design and Simulation System Using Gesture Recognition*. Supervisor: K. Jelemenská
- Severínová, Hana: *Control-flow Checking Using Software Signatures*. Supervisor: J. Abaffy

**Extended Abstracts**

- Behúň, Michal: *Interactive Allocation of Taxi Customers for Taxi Services*. Supervisor: P. Pišteň
- Bystrický, Michal: *Automatic Control of Internet Radio*. Supervisor: I. Kotuliak
- Polák, Jakub: *Environment for Low-power Optimization of Multiplexer Trees*. Supervisor: P. Pišteň

**8.5 Research Laboratories****Computer Networks Laboratory I**

*Manager:* P. Čičák

*Contact:* pavel.cicak@stuba.sk

*Description:* The research and teaching laboratory is predefined for teaching Computer networks I and Computer networks II to undergraduates in the study programme Computer and Communication systems and networks. The students are to show their practical and theoretical skills. They are involved in design, implementation and verification of applications for computer networks. They are trained to install, configure and operate local and wide-area networks. The laboratory is equipped with computers connected to the Internet and modern network components and respective software tools necessary to gain practical skills in the area of computer networks.

**Computer Networks Laboratory II**

*Manager:* P. Čičák

*Contact:* pavel.cicak@stuba.sk

*Description:* This research and teaching laboratory is dedicated for teaching WAN technologies to undergraduates, communication services and networks and distributed computer systems to graduates in the study programme Computer and communication systems and networks. Students gain and prove their practical and theoretical skills. The skills are developed that enable students to design, implement, and troubleshoot scalable local and wide-area networks, create and deploy a global intranet, using routers and switches for multiprotocol client hosts and services. Students are also involved in design, implementation and verification of applications for computer networks and parallel processing. The laboratory is equipped with computers, Internet connection, newest modern network components and necessary software tools.

**Embedded Systems Laboratory**

*Manager:* T. Krajčovič

*Contact:* tiber.krajcovic@stuba.sk

*Description:* The research and teaching laboratory is predefined for teaching embedded systems, microprocessors and microcomputers, computer interfacing and digital equipment construction to undergraduates in the study programme Computer and Communication Systems and Networks, orientation in Computer Engineering. The students are to prove practical and theoretical skills. They are involved in design, imple-



mentation and verification of the applications for microprocessors and other digital devices in real-time applications. The laboratory is equipped with modern computers with internet connection and other hardware and software components and tools (digital oscilloscopes, logic analyzers, in-circuit emulators, Intel Atom and PXA based embedded system development kits) necessary for practical teaching.

### **VLSI Design Laboratory**

*Manager:* J. Hudec

*Contact:* jan.hudec@stuba.sk

*Description:* The VLSI design laboratory is predefined for teaching of programmable logic devices in graduate study of Computer and Communication systems and networks, orientation in Computer engineering. The students are targeted for proving practical and theoretical skills. They are involved in design, implementation and verification of applications for programmable logic and gate arrays. The laboratory is equipped with computers with internet connection and other hardware and software components and tools (XILINX ISE WebPack, MODELSIM) for programmable circuits CPLD and FPGA practical teaching.

### **Digital Systems Description and Design Laboratory**

*Manager:* K. Jelemenská

*Contact:* katarina.jelemenska@stuba.sk

*Description:* The research and teaching laboratory is predefined for teaching digital system description to undergraduates and digital systems design, testing, diagnostics and reliability and reconfigurable digital systems to graduates in the study programme Computer and Communication systems and networks. Students are to prove their practical and theoretical skills. They are involved in design, description, implementation and verification of small to medium digital systems. Laboratory is equipped with Internet connected computers, RC10 FPGA boards and necessary software tools to gain practical skills in the area of digital systems design – FPGA Advantage and DK Design Suite.

### **Mobile Computing Laboratory**

*Manager:* I. Kotuliak (UPSS), V. Vranić (UISI), M. Čerňanský (UAPI)

*Contact:* ivan.kotuliak@stuba.sk

*Description:* The main purpose of the laboratory is to support research and teaching process related to mobile computing. Laboratory supports research and student projects from multiple domains that can greatly benefit from mobile computing technology such as computer vision, computer graphics, machine learning and augmented reality. Currently the laboratory equipment consists of several iOS mobile phone and tablet PC devices (Apple iPhone, Apple iPad) and computers used for development applications for mobile devices. In near future laboratory will be equipped with devices running Android (Google), Symbian OS (Nokia) and eventually other major mobile computing platforms (Windows Phone 7, RIM Blackberry, Samsung Bada).

## 8.6 Research projects

### **Robust MPC for Hybrid Systems (RPHS) (VEGA 1/1105/11)**

*Project leader:* T. Krajčovič for UPSS  
*Members:* M. Pohronská  
*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences  
*Duration:* January 2011 – December 2013  
*Description:* The last five years are marked by an increased interest in development of new control methods for heterogeneous hybrid process that include continuous and discrete dynamics. Research in control methods for hybrid non linear dynamic systems represent a new evolution trend in development and application of control algorithms that help considerably improve performance of complex technological processes within a wide spectrum of applications (power industry, car industry, health care, biotechnologies, transportation, service industry). Those advanced methods apply principles and methods of prediction, robustness, optimality and embeddedness. The main objective of the project is research and development, algorithmization and implementation of robust predictive control methods for non linear hybrid processes using modern information, communication and control technologies and systems realized by embedded computer systems.

### **Support of Building a Center of Excellence for Smart Technologies, Systems, and Services II (ITMS 26240120029)**

*Project leader:* T. Krajčovič for UPSS  
*Members UPSS:* I. Kotuliak  
*Supported by:* European Structural Fund  
*Duration:* January 2010 – January 2013  
*Description:* The objective is to improve, build further, and put into operation the technological infrastructure that would enable to sustain the center of excellence of research and development for enterprise information source processing and presentation with the application of advanced distributed architectures for parallel processing of extensive sources of semistructured data and high performance computing for complex applications.

### **Design optimization of low-power digital and mixed integrated systems (VEGA 1/1008/12)**

*Project leader:* E. Gramatová  
*Members:* K. Jelemenská, T. Krajčovič, J. Hudec, P. Pištek, M. Pohronská, D. Macko, Š. Krištofík, P. Jombík, M. Kudlačák, M. Jurikovič, J. Abaffy  
*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences  
*Duration:* January 2012 – December 2015  
*Description:* The project is focused on basic research and technologies in low-power digital and mixed system design methods and algorithms optimized for low-power electronic device applications. The power supply

consumption is important parameter in nowadays battery-operated mobile electronic devices. This aspect has to be taken into account during the whole design process, in using design for testability and reliability techniques as well. The main project target is to develop methods, techniques and algorithms for top-down design of digital and mixed circuits integrated into a single chip using accessible CMOS technologies while focusing on the low-power parameter.

### **Network architectures for multimedia services delivery with QoS guarantee (VEGA 1/0676/12)**

- Project leader:* I. Kotuliak  
*Members:* T. Krajčovič, M. Kotočová, J. Flochová, B. Dado, P. Trúchly, I. Grellneth, D. Bermát, M. Olšovský, J. Balaža, T. Kováčik, A. Binder, M. Hrubý, P. Magula, J. Murányi  
*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences  
*Duration:* January 2012 – December 2014  
*Description:* This project aims to follow up the FP7 HBB-Next project goals and with regard to the designs for the Future Generation Internet in three areas:
- i) accelerating the roaming in WiFi networks to enable effective provision of multimedia services as well as to address routing problems in the case of ad-hoc networks
  - ii) improving the provision of quality services by streamlining routing, message queues in nodes and modifications of fourth layer protocols for BIC, CUBIC networks
  - iii) modification of existing architectures for providing multimedia services and sharing between operators and providers, effective delivery through clouds and content distribution through the hybrid technologies

### **FP7 HBB Next project: FP7-287848 HBB-NEXT**

- Project leader:* I. Kotuliak for UPSS  
*Members:* T. Kováčik, R. Broniš  
*Supported by:* EC Seventh Framework Programme (FP7/2007-2013) under Grant Agreement n° 287848  
*Duration:* October 2011 – March 2014  
*Description:* The project will deliver a web-based framework for device-independent applications that can syndicate content from multiple sources for real-time content composition. Content may also be distributed across users in geographically distinct areas. HBB-NEXT seeks to facilitate the marriage of the broadcast and Internet world by researching user-centred technologies for enriching the TV-viewing experience: Multi-user tailored content recommendations and seamless access to content via multiple devices are centre stage while social media features or user generated content round off the picture.

## 8.7 Publications

### Journals

- POHRONSKÁ, M.: Implementing Embedded Expert Systems via Programmable Hardware. In: *Information Sciences and Technologies*. Bulletin of the ACM Slovakia, Vol. 4, No. 2 (2012), ISSN 1338-1237. pp.10-19.
- ŠTRBA, A.: Wireless Embedded Systems Powered by Energy Harvesting. In: *Information Sciences and Technologies*. Bulletin of the ACM Slovakia, Vol. 4, No. 1 (2012), ISSN 1338-1237. pp. 1-13.

### International Conferences

- BABIŠ, M. – MAGULA, P.: NetLogo – an Alternative Way of Simulating Mobile Ad Hoc Networks. In: *Proceedings of 2012 5<sup>th</sup> Joint IFIP Wireless and Mobile Networking Conference*. Bratislava, Slovakia, 2012, Piscataway-IEEE, 2012. pp. 122-125.
- BALAŤIA, J. – KOTULIAK, I.: Seamless Handover in 802.11 Networks. In: *Proceedings of 2012 5<sup>th</sup> Joint IFIP Wireless and Mobile Networking Conference*. Bratislava, Slovakia, 2012, Piscataway-IEEE, 2012. pp. 126- 128.
- ČIČÁK, P. – DÚCKY, M. – JELEMENSKÁ, K.: Interaction Support in Presentation System. In: *ICETA 2012*. IEEE 10<sup>th</sup> International Conference on Emerging eLearning Technologies and Applications, Stará Lesná, The High Tatras, Slovakia. Piscataway - IEEE, 2012, pp. 63-66.
- ĎURÍČEK, M. – POHRONSKÁ, M. – KRAJČOVIČ, T.: Functional Prototype of Multiple Watchdog System Implemented in FPGA. In: *Applied Electronics 2012*. International Conference on Applied Electronics. Pilsen, Czech Republic, Plzeň - University of West Bohemia, 2012. pp. 75-78.
- GRAMATOVÁ, E. – HLATKÝ, M. – MARTINEK, V.: A New Electronic Presentation System for Interactive Teacher's Work with Students. In: *E-Learn 2012*. World Conference on E-learning in Corporate, Government, Helthcare, & Higher Education, Montréal, Québec. Chesapeake - AACE, 2012, pp. 598-603.
- HLATKÝ, M. – MARTINEK, V. – GRAMATOVÁ, E.: D&T Presenter - Electronic Interactive System for Design and Test Education. In: *DDECS 2012*. IEEE 15<sup>th</sup> International Symposium on Design and Diagnostics of Electronic Circuits and Systems. Tallinn, Estonia, Tallinn - University of Technology, 2012. pp. 175-178.
- HRUBÝ, M. – OLŠOVSKÝ, M. – KOTOČOVÁ, M.: Analytical Multiparameter Notification System for TCP Congestion Avoidance. In: *Advances in Information Technologies and Communication 2012*. Proceedings of Joint International Conferences on ICT, CIT, PECS and EMIE, Amsterdam, Netherlands, Amsterdam - ACEEE, 2012, pp. 112-117.
- HRUBÝ, M. – OLŠOVSKÝ, M. – KOTOČOVÁ, M.: An Iterative Statistical Method for Congestion Prevention in Transit Networks. In: *SAMI 2012*. IEEE 10<sup>th</sup> Jubilee International Symposium on Aplied Machine Intelligence and Informatics. Herľany, Slovakia, Budapest : Óbuda University, 2012, CD-ROM.
- HRUBÝ, M. – OLŠOVSKÝ, M. – KOTOČOVÁ, M.: Methodology for Optimal Link Selection using Multivariant Normal Distribution. In: *MIPRO 2012*. Proceedings of the 35<sup>th</sup>

- International Convention on Information and Communication Technology, Electronics and Microelectronics, Opatija - Adriatic Coast, Croatia. Rijeka - Croatian Society for Information and Communication Technology, Electronics and Microelectronics - MIPRO, 2012. pp. 577-582.
- HRUBÝ, M. – OLŠOVSKÝ, M. – KOTOČOVÁ, M.: Routing VoIP traffic in Large Networks. In: *WCE 2012*. World Congress on Engineering, Vol. II, London, U.K, Hong Kong - International Association of Engineers, 2012. pp. 798-803.
- HUDEČ, J.: An Effective Technique for Automatic Processor Functional Testing using Genetic Algorithm Properties. In: *ITI 2012*. Proceedings of the 34<sup>th</sup> International Conference on Information Technology Interfaces, Dubrovnik, Croatia, Zagreb - SRCE Univ.Computing Centre, 2012. pp. 1-2.
- JELEMENSKÁ, K. – ČIČÁK, P.: Improved Assignments Management in Moodle Environment. In: *INTED 2012*. International Technology, Education and Development Conference. 6<sup>th</sup> Edition, Valencia, Spain, 2012. Valencia - IATED, 2012. pp. 1809-1817.
- JELEMENSKÁ, K.: Integration of ICT and Unconventional Teaching Approaches into the Digital Systems Design Education towards its Efficiency Enhancement. In: *ICETA 2012*. IEEE 10<sup>th</sup> International Conference on Emerging eLearning Technologies and Applications, Stará Lesná, The High Tatras, Slovakia 2012, Piscataway - IEEE, 2012. pp. 173-178.
- JELEMENSKÁ, K. – POLÁK, J. – MASARYK, T. – BEHÚŇ, M. – ČIČÁK, P.: Intuitive Digital Circuit Design and Simulation. In: *E-Learn 2012*. World Conference on E-learning in Corporate, Government, Helthcare, & Higher Education, Montréal, Québec. Chesapeake - AACE, 2012. pp. 2027-2035.
- JELEMENSKÁ, K. – ČIČÁK, P.: Touch Screen Input Shapes Recognition in PN Designer. In: *ED-MEDIA 2012*. World Conference on Educational Media & Technology, Denver, Colorado. Chesapeake - AACE, 2012. pp. 1418-1423.
- KOVÁČIK, T. – BRONIŠ, R. – KOTULIAK, I.: HBB Platform for E-learning Improvement. In: *ICETA 2012*. IEEE 10<sup>th</sup> International Conference on Emerging eLearning Technologies and Applications, Stará Lesná, The High Tatras, Slovakia. Piscataway - IEEE, 2012. pp. 207-211.
- KOVÁČIK, T. – BRONIŠ, R. – KOTULIAK, I. – TRÚCHLY, P.: Innovative Broadcasting Architecture for E-learning Improvement. In: *ED-MEDIA 2012*. World Conference on Educational Media & Technology, Denver, Colorado. Chesapeake - AACE, 2012. pp. 1589-1594.
- KOVÁČIK, T. – FLOCHOVÁ, J. – HOLLÝ, J.: Modeling IMS Service Sharing System Using Petri Nets. In: *Proceedings ELMAR-2012*. 54<sup>th</sup> Symposium ELMAR-2012, Zadar, Croatia. Zadar - Croatian Society Electronics in Marine, 2012. pp. 157-160.
- KOZEMČÁK, A. – KOVÁČIK, T.: Different Network Traffic Measurement Techniques - Possibilities and Results. In: *Proceedings ELMAR-2012*. 54<sup>th</sup> Symposium ELMAR-2012, Zadar, Croatia. Zadar - Croatian Society Electronics in Marine, 2012. pp. 93-96.
- KRIŠTOFÍK, Š. – GRAMATOVÁ, E.: Repair Analysis for Embedded Memories Using Block-Based Redundancy Architecture. In: *WCE 2012 World Congress on Engineering*.

- Vol. II, London, U.K, Hong Kong - International Association of Engineers, 2012. pp. 906-910.
- LEVY, D. – KOTULIAK, I.: WLAN Power Consumption Analytical Model. In: *Proceedings of 2012 5<sup>th</sup> Joint IFIP Wireless and Mobile Networking Conference*. Bratislava, Slovakia. Piscataway - IEEE, 2012. pp. 101-106.
- MACKO, D. – JELEMENSKÁ, K.: HDL Model Verification Based on Visualization and Simulation. In: *WCE 2012 World Congress on Engineering*. Vol. II. London, U.K, Hong Kong - International Association of Engineers, 2012. pp. 1095-1100.
- MACKO, D. – JELEMENSKÁ, K.: VHDL Visualizer: HDL Model Visualization with Simulation-Based Verification. In: *DDECS 2012*. IEEE 15<sup>th</sup> International Symposium on Design and Diagnostics of Electronic Circuits and Systems. Tallinn, Estonia, Tallinn - University of Technology, 2012, pp. 199-200.
- NAGY, M. – KOTOČOVÁ, M.: An IP Based Security Threat in Mobile NETWORKS. In: *MI-PRO 2012*. Proceedings of the 35<sup>th</sup> International Convention on Information and Communication Technology, Electronics and Microelectronics, Opatija - Adriatic Coast, Croatia. Rijeka - Croatian Society for Information and Communication Technology, Electronics and Microelectronics, pp. 780-783.
- TRÚCHLY, P. – VANGEL, M.: Performance of Multilayered Satellite Networks. In: *Proceedings ELMAR-2012*. 54<sup>th</sup> Symposium ELMAR-2012, Zadar, Croatia. Zadar - Croatian Society Electronics in Marine, 2012. pp. 113-116.
- VILHAN, P. – MARKO, P. – GRELLNETH, I.: Efficient Detection of Malicious Nodes Based on DNS and Statistical Methods. In: *SAMI 2012*. IEEE 10<sup>th</sup> Jubilee International Symposium on Applied Machine Intelligence and Informatics. Herľany, Slovakia, Budapest - Óbuda University, 2012. CD-ROM.

### **Selected Local and National Conferences**

- ĎURÍČEK, M.: Testing the Prototype of Multiple Hardware Watchdog System. In: *Computer Architecture and Diagnostics 2012*. Workshop for PhD Students. Milovy ve Ťďárských vrších, Czech Republic, Praha ČVUT, 2012. pp. 17-22.
- ĎURÍČEK, M. – POHRONSKÁ, M. – KRAJČOVIČ, T.: A Hardware Reset Implementation in Multiple GPGA Watchdog System. In: *Cybernetics and Informatics 2012*. International Conference. Skalka pri Kremnici, Slovakia, 2012. Bratislava – STU, 2012. pp. 71-72.
- KOVÁČIK, T. – BRONIŠ, R. – KOTULIAK, I.: Towards Novel HBB Application Platform: Experimental Testbed. In: *Proceedings of 2012 5<sup>th</sup> Joint IFIP Wireless and Mobile Networking Conference*. Bratislava, Slovakia. Piscataway - IEEE, 2012. pp. 133-137.
- KRIŠTOFÍK, Š.: Repair Analysis Algorithm for Embedded Memories with Block-Based Redundancy Architecture. In: *Computer Architecture and Diagnostics 2012*. Workshop for PhD Students. Milovy ve Ťďárských vrších, Czech Republic, Praha - ČVUT, 2012. pp. 103-108. (in Slovak)
- MACKO, D.: Functional Verification of the Digital System Design. In: *Computer Architecture and Diagnostics 2012*. Workshop for PhD Students. Milovy ve Ťďárských vrších, Czech Republic, Praha - ČVUT, 2012. pp. 61-66.

POHRONSKÁ, M. – KRAJČOVIČ, T.: Hardware-accelerated Rule-based Systems for Embedded Platforms. In: *Cybernetics and Informatics 2012*. International Conference. Skalka pri Kremnici, Slovakia, Bratislava - STU, 2012. pp. 69-70.

VOJTKO, M.: Modular Embedded Operating Systems. In: *Computer Architecture and Diagnostics 2012*. Workshop for PhD Students. Milovy ve Tďarských vršich, Czech Republic, Praha - ČVUT, 2012. pp. 23-27. (in Slovak)

### Books

GRAMATOVÁ, E. – JELEMENSKÁ, K.: *Testing, Diagnostics and Verification of Digital Systems*. Bratislava - STU, 2012, ISBN 978-80-227-3797-5, 276 p. (in Slovak)

## 8.8 Cooperation

### Cooperation in Slovakia

- Institute of Informatics, Slovak Academy of Sciences, Bratislava
- Faculty of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava
- Faculty of Electrical Engineering and Informatics, Technical University of Košice
- Regional Cisco Networking Academy, Faculty of Electrical Engineering and Informatics, Technical University of Košice
- Faculty of Natural Sciences, Matej Bel University in Banská Bystrica
- Faculty of Management Science and Informatics, University of Ťilina
- Faculty of Electrical Engineering, University of Ťilina
- Regional Cisco Networking Academy, Faculty of Management Science and Informatics, University of Ťilina
- Faculty of Informatics, Paneuropean University, Bratislava
- Abonus Ltd.
- Asseco Slovakia
- CISCO Systems Slovakia Ltd.
- Datalan
- GTEC Ltd.
- Hewlett-Packard Slovakia Ltd.
- IBM Slovakia Ltd.
- Molpir Ltd.
- Siemens Enterprise Communications Ltd.
- Soitron
- Spinet Ltd.
- Telekom
- Tempest
- MAINDATA, spol. s. r.o.

### International Cooperation

- Department of Computers, Faculty of Electrical Engineering, Czech Technical University in Prague, Czech Republic
- Faculty of Information Technologies, Brno University of Technology, Czech Republic
- Department of Computer Science and Engineering, Faculty of Applied Science, University of West Bohemia in Pilsen, Czech Republic
- Faculty of Computer Systems and Control, Technical University in Sofia, Bulgaria
- Hochschule für Telekommunikation Leipzig
- INRIA, Grenoble, France
- Institut Supérieur D'Electronique de Paris, France
- University of Maribor, Maribor, Slovenia
- Heinz Nixdorf Institute, University of Paderborn, Germany
- Microelectronic Systems Institute, TU Darmstadt, Germany
- Fraunhofer Institute for Integrated Circuits, Dresden, Germany
- TNO, Netherlands
- Universidad Carlos III de Madrid, Madrid, Spain
- Rundfunk Berlin-Brandenburg, Germany
- Institut für Rundfunktechnik GmbH, Germany
- NEC Europe Ltd.
- Nederlandse Organisatie voor Tögepast Natuurwetenschappelijk Onderzoek, Netherlands
- Katholieke Universiteit Leuven, Belgium
- Technische Hochschule Mittelhessen, Germany
- TARA Systems Systementwicklung GmbH, Germany

### Visits of Staff Members

- *E. Gramatová*: Faculty of Informatics, Czech Technical University in Prague, Czech Republic, January 9, 2012
- *E. Gramatová*: Program Committee meeting of the 15<sup>th</sup> IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, DDECS 2012, Cottbus, Germany, February 16-17, 2012
- *K. Jelemenská*: 6<sup>th</sup> International Technology, Education and Development Conference, Valencia, Spain, March 4-8, 2012
- *I. Kotuliak*: HBB-Next project meeting, Munchen, Germany, March 6-8, 2012
- *I. Kotuliak, A. Binder*: Paris, France, March 26-30, 2012
- *P. Čičák*: Brno University of Technology, Czech Republic, March 20, 2012
- *M. Pohronská*: Brno University of Technology, Czech Republic, March 20, 2012



- *E. Gramatová, P. Čičák*: Brno University of Technology, Czech Republic, April 24, 2012
- *D. Macko, V. Martinek*: 15<sup>th</sup> IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, DDECS 2012, Tallin, Estonia, April, 17-21, 2012
- *K. Jelemenská*: INSODE, World Conference on Innovation and Computer Sciences 2012, Izmir, Turkey, May 9-15, 2012
- *P. Čičák*: European Business Centre + Microsoft Innovation Center, Brussels, Belgium, May 8-9, 2012
- *M. Hrubý, M. Nagy, M. Olšovský*: MIPRO 2012, Opatija, Croatia, May 20-26, 2012
- *I. Kotuliak*: Erasmus mobility, Prague, Czech Republik, May 20-24, 2012
- *E. Gramatová*: Brno University of Technology, Czech Republic, June 18, June 26, 2012
- *J. Hudec*: ITI 2012, 34<sup>th</sup> International Conference on Information Technology Interfaces, Dubrovnik, Croatia, June 24-28, 2012
- *D. Macko, M. Hrubý, Š. Křištofik, M. Olšovský*: World Congress of Engineering 2012, London, United Kingdom, July 3-7, 2012
- *T. Krajčovič, M. Ďuriček*: 2012 International Conference on Applied Electronics, Pilsen, Czech Republic, September 4-7, 2012
- *P. Čičák, K. Jelemenská, E. Gramatová, J. Flochová, Š. Křištofik, M. Kudlačák, M. Ďuriček, M. Vojtko, D. Macko*: PAD 2012, Milovy, Czech Republik, September 10-12, 2012
- *P. Trúchly, T. Kováčik*: ELMAR 2012, Zagreb, Croatia, September 11-14, 2012
- *E. Gramatová, Š. Křištofik*: Technical University of Liberec, Czech Republic, September 20-22, 2012
- *K. Jelemenská*: World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education E-Learn 2012, Montreal, Canada, October 4-16, 2012
- *P. Čičák*: IBM, CERN, Geneva, Zürich, Switzerland, November 4-6, 2012
- *M. Hrubý, M. Olšovský*: International Conference on Advances in Information and Communication Technologies ICT 2012, Amsterdam, The Netherlands, November 11-25, 2012
- *I. Kotuliak*: Project Meeting, Delft, The Netherlands, November 21-25, 2012
- *I. Kotuliak*: EIT ICT Labs, Helsinki, Finland, December 5, 2012
- *E. Gramatová*: IT4 Innovation project meeting, Technical University of Ostrava, Czech Republic, December 11, 2012
- *P. Čičák*: Czech Technical University in Prague, Czech Republic, December 13, 2012

## 8.9 Membership in Professional Organisations and Societies

### Slovak Professional Organisations and Societies

*Pavel Čičák*

- Slovak Centre of the IEE (member, since 1999)

### International Professional Organisations and Societies

*Pavel Čičák*

- IET, Institute of Engineering and Technology (fellow, since 2000)
- ECUK, Engineering Council UK (Chartered Engineer, since 2000)

*Jana Flochová*

- IEEE, Institute of Electrical and Electronic Engineers (member, since 1998)

*Elena Gramatová*

- TTTC, Test Technical Technology Council (contact person for SR, since 1996)

*Igor Grellneth*

- CEE CCNP RAIC – Central and Eastern Europe Cisco Certified Networking Professional Regional Academy Instructor Community (member, since 2006)

*Ján Hudec*

- New York Academy of Sciences, member (member, since 1997)

*Tibor Krajčovič*

- Slovak Commission for UNESCO. Informatics, Information and Communication Technologies (member, since 1994)

## 8.10 Other Activities

- Newsletter of Cisco Networking academy in Slovakia – P. Čičák, I. Grellneth: members of editorial board
- Working Group of the Accreditation Commission of Slovakia for Information Sciences and Technologies – E. Gramatová, member
- Scientific Board of IT4 Innovation project – E. Gramatová, member
- WMNC 2012 – 5<sup>th</sup> Joint IFIP Wireless and Mobile Networking Conference, Bratislava, Slovakia, September 19-20, 2012 – T. Kováčik: event organiser, I. Kotuliak: event organiser, member of programme committee
- 4<sup>th</sup> ngnlab.eu 2012 workshop – T. Kováčik, I. Kotuliak: event organisers
- HBB-Next project meeting – T. Kováčik, I. Kotuliak: event organisers
- IJMIT – International Journal of Managing Information Technology – K. Jelemenská, J. Abaffy: editorial board members
- DDECS 2012 – 15<sup>th</sup> IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, April 2012, Tallinn, Estonia – E. Gramatová: member of pro-

- gramme and steering committees, K. Jelemenská: member of programme committee
- eGSSN – 12, International Workshop on Trust, Security and Privacy in e-Government, e-Systems & Social Networking in conjunction with 11<sup>th</sup> IEEE International Conference on Trust, Security and Privacy in Computing and Communications, June 25-27, 2012, Liverpool – I. Kotuliak: member of programme committee
  - ETS 2012 – 17<sup>th</sup> IEEE European Test Symposium, May 2012, Anecy, France – E. Gramatová: member of programme committee
  - ICETA 2012 – 10<sup>th</sup> International Conference on Emerging E-Learning Technologies and Applications, October, 2012, Stará Lesná, Slovak Republic – P. Čičák, E. Gramatová, K. Jelemenská: members of programme committee
  - IIT.SRC 2012 – Informatics and Information Technologies Student Research Conference – P. Čičák, E. Gramatová, P. Horváth, K. Jelemenská, M. Kotočová, I. Kotuliak, T. Krajčovič: members of programme committee
  - PAD 2012 – Czech and Slovak Seminar on Computer Architectures and Diagnostics, September 10-12, 2012, Milovy ve Třábských vrších, Czech Republic – E. Gramatová: member of steering committee, P. Čičák, J. Flochová, E. Gramatová, K. Jelemenská: members of programme committee



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## 9 Institute of Informatics and Software Engineering

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**E-mail:** uisi@fiit.stuba.sk  
**Web:** <http://www.uisi.fiit.stuba.sk/>  
**Tel:** + 421 918 687 990  
**Fax:** + 421 2 654 205 87

The main mission of the Institute of Informatics and Software Engineering is to contribute to the mission of Slovak University of Technology and to the mission of the Faculty of Informatics and Information Technologies in the range of its competencies, in areas bounded by and related to informatics, information systems and software engineering. Among the related areas, it is oriented especially to artificial intelligence in research of knowledge approaches in solving problems of informatics, information systems and software engineering, and to information systems respecting their close relation to typical problem domains in software engineering.

Within the mission, the institute especially

- contributes through its research to development of knowledge in the areas of science and technologies belonging to the mentioned areas,
- provides successful and high-quality study programmes in areas of its competencies at each of the three levels of university education, in which
  - graduates with the first degree will be excellently prepared for both the national and international labour market and will be able to take care of themselves in their own business and also to create employment opportunities to others,
  - graduates with the second degree will have acquired competencies and abilities to be leaders of specialist teams with deep expert knowledge and ability of high creativity,
  - doctoral study graduates will be able to bring new original and innovative solutions of complex problems.

The institute is responsible for education in the following accredited degree programmes:

- Informatics (bachelor degree),
- Information Systems (master degree),

- Software Engineering (master degree),
- Software Systems (doctoral degree).

The Institute of Informatics and Software Engineering fulfils the mission through the research activities relevant both in a national and international context and by extending, deepening and improving the offer of courses provided to students at all the three levels of university studies.

The Institute endeavours actively to cooperate. It includes interdisciplinary research and studies at other similar institutes, institutions and departments of its Faculty, its University, in Slovakia, in Europe and throughout the world. In particular, in 2007 the Institute was invited to join the international consortium of research institutions devoted to *Web Intelligence*. The Institute represents Slovakia in the consortium and contributes to promoting research in Web Intelligence worldwide. In 2009 the Institute has become partner of *European Network of Excellence on Aspect-Oriented Software Development, AOSD-Europe*, which integrates and coordinates research, education and dissemination activities of its members in the area of aspect oriented development of software. Originally, it has been a 7<sup>th</sup> Framework Programme project.

The Institute aims at becoming the leading Slovak institution in the areas of its competencies with ambitions to positively influence their development. The Institute is conscious of its high responsibility to the public and it provides expert services to it, thus improving life of the town, the region, the country and the mankind. The Institute looks for synergies with industry and enterprise community, and jointly tries to raise research and education quality in the areas of informatics and information technologies.

## 9.1 Staff

### Director

Pavol Návrat, Professor

### Deputy Director

Mária Bieliková, Professor

Viera Rozinajová, Assoc. Professor

### Administrative Department

Zuzana Macková

Alexandra Zakálová

### Teaching Staff

Nadeřda Andrejčíková, PhD. (part time)

Michal Barla, PhD.

Mária Bieliková, Professor

Anna Bou Ezzeddine, PhD.

Peter Brusilovsky, visiting Professor (part time)

Ivana Budinská, PhD. (part time)

Andrej Danko, PhD. (part time)

Iveta Dekýšová

Pavol Frič, PhD. (part time)

Ján Genči, Assoc. Professor (part time)

Marta Gnipová (part time)

Daniela Chudá, Assoc. Professor  
Ivan Kapustík  
Alena Kovárová, PhD. (since July 2012)  
Gabriela Kosková, PhD.  
Rastislav Královič, Assoc. Professor (part time)  
Peter Lacko, PhD.  
Michal Laclavík, PhD. (part time)  
Ján Lang, PhD.  
Marián Lekavý PhD. (part time)  
Eva Letovancová, Assoc. Professor (part time)  
Mária Lucká, Assoc. Professor  
Ľubomír Majtás, PhD. (part time)  
Pavol Mederly, PhD. (part time)  
Vladimír Mlynarovič, Assoc. Professor (part time)  
Ľudovít Molnár, Professor  
Pavol Návrat, Professor  
Jozef Papula, Professor (part time)  
Ivan Polášek, PhD.  
Anna Považanová (part time)  
Viera Rozinajová, Assoc. Professor  
Jiří Šafařík, Professor (part time)  
Petr Šaloun, Assoc. Professor (part time)  
Ľubor Šešera, PhD. (part time)  
Marián Šimko, PhD. (since April 2012)  
Marián Šuráb, Assoc. Professor (part time)  
Peter Tiňo, PhD. (part time)  
Jozef Tvarožek, PhD.  
Michal Tvarožek, PhD. (till February 2012)  
Valentino Vranić, Assoc. Professor  
Michal Winczer, PhD. (part time)

#### **External Lecturers**

Martin Marko  
Danica Šoltéssová, PhD.

#### **Full-Time PhD Students**

Zoltán Harsányi  
Michal Holub  
Peter Kajsa  
Michal Kasan  
Michal Kompan  
Tomáš Kramár  
Tomáš Kučečka  
Eduard Kuric  
Tomáš Kuzár  
Martin Labaj  
Jakub Mařgut

Róbert Móro  
 Aurel Paulovič  
 Karol Rástočný  
 Štefan Sabo  
 Ivan Srba  
 Matúš Svrček  
 Mária Šajgalík  
 Roman Šelmeci  
 Jakub Šimko  
 Marián Šimko (till March 2012)  
 Dušan Zeleník

## 9.2 Teaching

### Undergraduate Study (Bc.)

Course	Semester	Credits	Lecturer
Artificial Intelligence	Spring	6	P. Návrat
Basics of Procedural Programming	Autumn	6	G. Kosková
Communication in Culture History	Spring	3	D. Šoltésová
Construction of Effective Algorithms	Spring	6	R. Královič
Database Systems	Spring	6	M. Barla
Data Structures and Algorithms	Autumn	6	P. Návrat
Entrepreneurship and Management	Autumn	5	J. Papula
Final Bachelor Project 0–II	Autumn Spring	3-3-9	P. Návrat
Functional and Logic Programming	Spring	6	M. Bieliková
Information and Communication Technologies Law	Spring	5	I. Dekýšová
Introduction to Foundations of Mathematic	Autumn	6	M. Lucká
Management of Social Systems	Spring	3	E. Letovancová
Managerial Economics	Autumn	5	V. Mlynarovič
Object-Oriented Programming	Spring	6	V. Vranič
Program Development for Java Platform	Spring	6	M. Marko
Programming Languages and Compilation	Autumn	6	L. Molnár
Principles of Information Systems	Autumn	5	V. Rozinajová
Principles of Software Engineering	Spring	7	M. Bieliková
Procedural Programming	Autumn	6	A. Bou Ezzeddine
Procedural Programming Seminar	Autumn	0	G. Kosková
Research Seminar I-IV	Autumn Spring	0-3-3-3	M. Bieliková
Seminar of Mathematic	Autumn	3	M. Lucká



Course	Semester	Credits	Lecturer
Software Systems Development	Spring	3	M. Bieliková
Specification Methods and Tools	Spring	5	V. Vranić
Social Connotations of Informatics and Information and Communication Technologies	Spring	3	M. Winczer
Theoretical Foundations of Informatics	Spring	6	D. Chudá
Web Publishing	Spring	6	P. Šaloun

**Master Study (Ing.)**

Course	Semester	Credits	Lecturer
Advanced Database Systems	Autumn	6	J. Genči
Architecture of Information Systems	Autumn	4	V. Rozinajová
Architecture of Software Systems	Autumn	4	I. Polášek
Application Architectures of Software Systems	Spring	6	L. Šešera
Aspect-Oriented Software Development	Autumn	6	V. Vranić
Design of Compilers	Autumn	6	L. Molnár
Diploma Project I–III (Information Systems)	Autumn Spring	8-12-20	P. Návrat
Diploma Project I–III (Software Engineering)	Autumn Spring	8-12-20	M. Bieliková
Distributed Software Systems	Autumn	6	P. Lacko
E-communication of Business and Administrative Processes	Spring	6	P. Frič
History of Design	Autumn	5	D. Šoltéssová
Industry Project	Spring	5	I. Polášek
Information Search	Autumn	5	M. Laclavík
Knowledge Discovery	Autumn	6	G. Kosková
Knowledge-Based Systems	Autumn	5	I. Kapustík
Law – Selected Problems	Autumn	5	I. Dekýšová
Management of Software and Information System Projects	Spring	6	M. Bieliková
Object-Oriented Analysis and Design	Autumn	6	I. Polášek
Quality of Program and Information Systems	Spring	6	D. Chudá
Research of Information Systems	Autumn	2	P. Návrat
Research of Software Systems	Autumn	2	M. Bieliková
Rhetoric	Autumn	5	M. Šuráb
Team Project I-II (Information Systems, Software Engineering)	Autumn Spring	7-5	M. Bieliková

### 9.3 Theses

#### Bachelor (Bc.) Theses – graduates 2012

##### *Study Programme Informatics*

- Adda, Michal: *Automated Second Language Teacher*. Supervisor: J. Tvarožek
- Arpáš, Jozef: *Enrichment of Bibliographic Records*. Supervisor: N. Andrejčíková
- Biroš, Michal: *Monuments on Maps*. Supervisor: N. Andrejčíková
- Blšták, Miroslav: *WIKI Guide of Java*. Supervisor: A. Považanov á
- Bohunická, Ivana: *Visualization of Similarity of Texts Groups*. Supervisor: D. Chudá
- Borgul'a, Robert: *Artificial Intelligence in Games Based on Multi-Agent Approach*. Supervisor: M. Lekavý
- Branišová, Jana: *Clustering in Text Documents*. Supervisor: A. Bou Ezzeddine
- Britvík, Andrej: *Software Development Support in Current Development Tools*. Supervisor: L. Majtás
- Caban, Tomáš: *Creating Mashup Applications*. Supervisor: M. Kasan
- Časár, Richard: *Statistical Machine Translator*. Supervisor: M. Laclavík
- Čertek, Martin: *Legal Protection of Computer Programs*. Supervisor: I. Dekyšová
- Čík, Juraj: *Development of an Integration Solution for A CMS, Based on the Principles of SOA*. Supervisor: P. Perec
- Čulák, Matej: *Game Artificial Inteligence Based on Multiagents*. Supervisor: M. Lekavý
- Demovič, Luboš: *Innovative Application within an International Competition*. Supervisor: M. Barla
- Dorner, Michal: *Shared Address Book Based on Web Technology and Carddav Protocol*. Supervisor: J. Máté
- Dulačka, Peter: *Metadata and Semantics Acquirement via Games with a Purpose*. Supervisor: J. Šimko
- Dupal', Martin: *Dissemination of Information in Social Networks*. Supervisor: P. Návrát
- Filčák, Tomáš: *WIKI Java Guide*. Supervisor: A. Považanová
- Fritscher, Eduard: *Educational Content Recommendation Based on Collaborative Filtering*. Supervisor: M. Šimko
- Gajdoš, Jozef: *Attacks on the Detection of Plagiarism in the Programming Codes*. Supervisor: D. Chudá
- Gomola, Matej: *Impact of Comparing the Similarity of Documents*. Supervisor: T. Kučečka
- Gondár, Jakub: *Electronic Voting*. Supervisor: I. Dekyšová
- Gregor, Martin: *Social Web Search*. Supervisor: T. Kramár

- Greguš, Peter: *Knowledge Discovery in Text Documents*.  
Supervisor: A. Bou Ezzeddine
- Greppel, Ján: *Present State of Software Development Tools and its Integration*.  
Supervisor: L. Majtás
- Grman, Ondrej: *Application to Search for Musical Notation*.  
Supervisor: N. Hrušková
- Igaz, Michal: *Development of Information Systems Due to Principles of Service Oriented Architecture*. Supervisor: V. Rozinajová
- Jendek, Tomáš: *Collection Information on User's Environment*.  
Supervisor: D. Zeleník
- Kasala, Štefan: *Processing of Large Datasets Using Mapreduce Programming Model*. Supervisor: P. Lacko
- Kaššák, Ondrej: *Named Entity Recognition for Slovak Language*.  
Supervisor: M. Kompan
- Kišš, Marek: *Metadata and Semantics Acquisition via Games with a Purpose*.  
Supervisor: J. Šimko
- Kollár, Adrián: *Attendance System*. Supervisor: A. Považanová
- Konôpka, Martin: *Innovative Application within an International Competition*.  
Supervisor: M. Barla
- Korec, Tomáš: *Use Simulation of Business Processes to More Effective Their*.  
Supervisor: V. Rozinajová
- Kostolanský, Juraj: *Processing of Large Datasets Using Mapreduce Programming Model*. Supervisor: P. Lacko
- Kováč, Tomáš: *The Protection of Personal Data*. Supervisor: I. Dekyšová
- Kříž, Jakub: *Collecting Implicit Feedback for the Needs of a Search Engine*.  
Supervisor: T. Kramár
- Kunka, Tomáš: *Monuments on Maps*. Supervisor: N. Andrejčíková
- Kyžňanský, Michal: *Crowd Simulation*. Supervisor: P. Lacko
- Láni, Marek: *Innovative Application within an International Competition*.  
Supervisor: M. Barla
- Lekeň, Tomáš: *Digital Library*. Supervisor: N. Andrejčíková
- Lihocký, Michal: *Legal Protection for Computer Programs*.  
Supervisor: I. Dekyšová
- Lipták, Martin: *Automated Public Data Refining*. Supervisor: J. Suchal
- Lóderer, Marek: *Enrichment of Bibliographic Records*.  
Supervisor: N. Andrejčíková
- Mančík, Gabriel: *Impact of Creation Method of Documents Fingerprints for Their Resemblance*. Supervisor: T. Kučečka
- Martinkovič, Milan: *Attendance System*. Supervisor: A. Považanová

- Michalco, Jaroslav: *Spread of Information in Social Networks*. Supervisor: P. Návrat
- Michalec, Peter: *Gaming Artificial Intelligence Based on Multiagent Approach*. Supervisor: M. Lekavý
- Michalko, Matúš: *Application of Technologies of Web 3.0 in Commercial Sphere*. Supervisor: M. Líška
- Milošovič, Matej: *Development by Model Driven Architecture*. Supervisor: Ľ. Majtás
- Ogurčák, Filip: *Extraction of Events from Email Communication and Integration into Calendar*. Supervisor: M. Laclavík
- Ort, Miroslav: *Attacks on the Detection of Plagiarism in the Text*. Supervisor: D. Chudá
- Ošvát, Michal: *Polyphony Music Notation*. Supervisor: N. Hrušková
- Palát, Peter: *Mobile E-Learning*. Supervisor: J. Lang
- Plank, Martin: *Distributed Recommendation and Personalization*. Supervisor: T. Kuzár
- Proksa, Ondrej: *Automated Cleaning of Public Data*. Supervisor: J. Suchal
- Puckallér, Róbert: *Utilization of Mobile Devices Sensors*. Supervisor: V. Vranič
- Rešetár, Jozef: *Crowd Simulation*. Supervisor: P. Lacko
- Roško, Bohuš: *The Sharing of Book Reviews*. Supervisor: G. Kosková
- Roško, Michal: *Support for the Creation of Data Transformations in Integration Solutions*. Supervisor: P. Mederly
- Staňo, Filip: *Application for Searching of Musical Notation*. Supervisor: N. Hrušková
- Sudor, Vladimír: *Development Mashup Applications*. Supervisor: M. Kasan
- Sucháč, Filip: *Social-Based Recommendations on the Web*. Supervisor: M. Barla
- Svinčiak, Jaroslav: *Determining the Similarity of Texts Using String Blurring*. Supervisor: D. Chudá
- Šinský, Peter: *Exploitation of Mobile Devices Sensors*. Supervisor: V. Vranič
- Šteňová, Andrea: *Feedback Acquisition from Webpage Visitors*. Supervisor: M. Bieliková
- Šurek, Marek: *Application of Technologies of Web 3.0 in Commercial Sphere*. Supervisor: M. Líška
- Tomlein, Matúš: *Innovative Application within an International Competition*. Supervisor: M. Barla
- Trebuľa, Ján: *Group Recommendation Based on Voting*. Supervisor: M. Kompan
- Tuhý, Filip: *Similarity in Digital Libraries*. Supervisor: P. Návrat
- Ujhelyiová, Zuzana: *Information Space of Social Networks*. Supervisor: P. Návrat
- Urbančok, Maroš: *Mobile E-Learning*. Supervisor: J. Lang

- Vandlíková, Diana: *Support of Academic Writing*. Supervisor: J. Tvarožek
- Višňovský, Juraj: *Discovering Rituals of the Web User*. Supervisor: D. Zeleník
- Zboja, Tomáš: *Electronic Voting*. Supervisor: I. Dekyšová

### Master Theses – graduates 2012

#### *Study Programme Information Systems*

- Bahno, Juraj: *Automatization of the Development of Integration Solutions in Mule ESB*. Supervisor: P. Mederly
- Belianský, Michal: *Motivational Specifics E-Learning Systems*. Supervisor: J. Lang
- Bugáň, Peter: *Gathering Information from the Web*. Supervisor: A. Bou Ezzeddine
- Bystričan, Marián: *Analysis of Use of Enterprise Service Bus for Applications Integration*. Supervisor: P. Mederly
- Drahoň, Daniel: *RDF Storage for Conceptual Models in Object Database*. Supervisor: N. Andrejčíková
- Duchoň, Gabriel: *MIDI File Analysis and Melody Recognition*. Supervisor: N. Hrušková
- Dulačka, Michal: *Design of Support for Aspect-Oriented Change Realization*. Supervisor: V. Vranić
- Florek, Marian: *Information Retrieval Based on Document Context*. Supervisor: P. Návrat
- Háber, Tomáš: *Recommendation Using Temporally Valid User Information*. Supervisor: J. Suchal
- Hrdina, Michal: *Using Methods of Business Intelligence in Mashup Applications*. Supervisor: V. Rozinajová
- Hrubý, Michal: *Security in E-Learning Systems*. Supervisor: D. Chudá
- Hudec, Ján: *Motor Skills of a Simulated Robotic Soccer Player*. Supervisor: I. Kapustík
- Janík, Ján: *Complex Event Processing in Reactive Distributed Systems*. Supervisor: J. Lang
- Juhász, Vojtech: *Management of Email Communication*. Supervisor: M. Laclavík
- Lendvay, András: *Model of Musical Representation and its Purpose for Music Information Retrieval*. Supervisor: N. Hrušková
- Lučanský, Milan: *Searching and Acquiring Metadata of the Websites*. Supervisor: M. Šimko
- Majchrák, Metod: *Exploring of Knowledge in Digital Libraries Using Conceptual*. Supervisor: N. Andrejčíková
- Mego, Marek: *Integration of Information Systems Used at STU*. Supervisor: A. Považanová
- Pagáč, Adam: *Collaborative Work Using Web Technologies*. Supervisor: J. Tvarožek

- Palo, Martin: *Analysis and Design of Models of Web Data Relations*. Supervisor: T. Kuzár
- Polerecká, Marcela: *Music Score for the Purposes of Musical Information Retrieval*. Supervisor: N. Hrušková
- Sabo, Matej: *Simulated Robotic Player in 2D Environment*. Supervisor: I. Kapustík
- Soha, Miroslav: *Possible Applications of Bee Hive Model for Information Retrieval*. Supervisor: P. Návrat
- Topoľský, Ondrej: *Automatized Normalization of Database*. Supervisor: I. Budinská

#### *Study Programme Software Engineering*

- Auder, Miloš: *Skills of 3D Simulated Robotic Football Player*. Supervisor: I. Kapustík
- Bednár, Maroš: *Motivational Specificities of Information System To Support Self Study*. Supervisor: J. Lang
- Benčíč, Anton: *Information Recommendation Using Context in a Specific Domain*. Supervisor: M. Bielíková
- Čorba, Miroslav: *Context-Based Recommendation for Web Search*. Supervisor: P. Návrat
- Hetteš, Miroslav: *Collaborative Filtering for Articles Based on Implicit Feedback*. Supervisor: J. Suchal
- Chlpek, Ján: *Similarity of Slovak Texts*. Supervisor: D. Chudá
- Ivanko, František: *Processing Large Volumes of Text Data Using a Computational Model Mapreduce*. Supervisor: P. Lacko
- Janovic, Ivan: *Email Event Extraction and Calendar Integration*. Supervisor: M. Laclavík
- Kajan, Peter: *Discovering Keyword Relations*. Supervisor: M. Barla
- Kanta, Marcel: *Microblog User Modelling*. Supervisor: M. Šimko
- Kmeľko, Ján: *Scalable Architecture for Business Applications Based on Distributed Data Storages*. Supervisor: I. Mihalik
- Korenek, Peter: *Identifying Personal Characteristics Using Microblog*. Supervisor: M. Šimko
- Kováč, Roman: *Method for User Modelling By a Written Communication*. Supervisor: J. Tvarožek
- Krajník, Peter: *The Combined Usermodel for User Identification*. Supervisor: D. Chudá
- Kumor, Andrej: *Use of Morphology for Slovak Text Similarity Determination*. Supervisor: D. Chudá
- Laslop, Milan: *Aspects and Roles in Software Modeling*. Supervisor: V. Vranič
- Lazarčík, Lukáš: *Knowledge Retrieval Using Kohonen Neural Network and Ontologies*. Supervisor: I. Polášek

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- Lipka, Lukáš: *Using Social Relationships for Search and Recommendation of Results*. Supervisor: P. Návrat
  - Lipták, Matej: *Modelling Aspect-Oriented Design Patterns*. Supervisor: V. Vranić
  - Molnár, Martin: *Analysis of Topics in Large Text Corpora Using Mapreduce*. Supervisor: P. Lacko
  - Móro, Róbert: *Personalized Text Summarization*. Supervisor: M. Bieliková
  - Nágl, Pavol: *Solving Integration Problem Using Data Schema Similarities*. Supervisor: A. Považanová
  - Novotný, Matúš: *Use of Metadata Schemas for Cultural Heritage Data Representation*. Supervisor: V. Rozinajová
  - Paššák, Martin: *Interaction between Player and the Ball in 3D Simulated Robotic Soccer*. Supervisor: I. Kapustík
  - Petriľák, Peter: *Search Using the Person Specified Context*. Supervisor: P. Návrat
  - Prokop, Jaroslav: *Extending the Method of Schedule Shortening for Schedule Simulation*. Supervisor: M. Lekavý
  - Repka, Igor: *Representation of Web Services and User Requirements in the Context of Web Services Composition*. Supervisor: M. Kasan
  - Sivulka, Ján: *Improvement of Access to Information*. Supervisor: T. Kuzár
  - Snopko, Samuel: *Automatization of the Bad Smells Search Using the Rule Based Systems*. Supervisor: I. Polášek
  - Srba, Ivan: *Encouragement of Collaborative Learning Based on Dynamic Groups*. Supervisor: M. Bieliková
  - Svorada, Peter: *Modeling a Tutor for E-Learning Support*. Supervisor: J. Tvarožek
  - Šajgalík, Mária: *Decentralised User Modelling and Personalisation*. Supervisor: M. Barla
  - Šimulčík, Miroslav: *Temporal Databases*. Supervisor: J. Máté
  - Uherčík, Tomáš: *Acquiring Metadata about Content and Relations on the Web*. Supervisor: M. Šimko
  - Uhlár, Marek: *Discovering Usable Knowledge in Software Project and its Graphical Representation*. Supervisor: I. Polášek
  - Unčík, Maroš: *Web-Oriented User Modeling Support for Education*. Supervisor: M. Bieliková
  - Urban, Ondrej: *Usage of Active Conceptual Modeling for Content Creation*. Supervisor: J. Lang
  - Valalíková, Katarína: *Consistency in the Identity Management*. Supervisor: R. Semančík
  - Valenčík, Ivan: *Recognition of Semantically Related Articles in Wikipedia*. Supervisor: P. Lacko
  - Zbořoň, Lukáš: *Solution Quality in Context of Web Service Composition*. Supervisor: M. Kasan

**Doctoral (PhD.) Theses**

- Student name:* Marián Šimko  
*Degree program:* Software Engineering  
*Thesis title:* *Automated Acquisition of Domain Model for Adaptive Collaborative Web-based Learning*  
*Supervisor:* Mária Bieliková, Professor  
*Defended on:* March 30, 2012  
*Annotation:* The presented work deals with issues related to domain modeling in adaptive educational web-based systems. Significant effort is required for initial creation and maintenance, especially when considering Web 2.0-induced paradigm shift in learning. We proposed a domain model, which clearly separates between educational content and domain conceptualization, explicitly supports collaborative interactive learning and it is proposed with regard to its automated creation and enrichment. The proposed domain model forms a basis of Adaptive Learning Framework ALEF, which showed suitability of the domain model. Along we propose a novel approach to domain model automated creation based on processing heterogeneous sources of information utilizing various statistical, linguistic and graph-based methods. We evaluate the proposed approach on real world data that emerged as a result of education at the Slovak University of Technology in Bratislava.
- Student name:* Jakub Maťgut  
*Degree program:* Applied Informatics  
*Thesis title:* *Generalized Multilinear Model for Dimensionality Reduction of Binary Tensors*  
*Supervisor:* Peter Tiňo  
*Defended on:* August 30, 2012  
*Annotation:* Current data processing tasks often involve manipulation of multi-dimensional objects – tensors. In many real world applications such as gait recognition, document analysis or graph mining (with graphs represented by adjacency tensors), the tensors can be constrained to binary values only. To the best of our knowledge at present there is no principled systematic framework for decomposition of binary tensors. To close this gap we propose a generalized multilinear model for dimensionality reduction of binary tensors (GMM-DR-BT). We derived an iterative scheme for estimation of the model parameters via maximum likelihood. We evaluate and compare the proposed GMM-DR-BT technique with existing real-valued and nonnegative tensor decomposition methods in two scenarios: (1) in a series of controlled experiments exploring the amount of preserved information in the lower rank approximations involving synthetic and real data sets; (2) on a real world biological data set of DNA sub-sequences from different functional regions, with sequences represented by binary tensors. The experiments suggest that the GMM-DR-BT model is better suited for modeling binary tensors than its real-valued and nonnegative counterparts. Furthermore, we extended our GMM-DR-BT model to the semi-supervised setting by forcing the model to search for a natu-



ral parameter subspace that represents a user specified compromise between the modelling quality and the degree of class separation.

## 9.4 IIT.SRC Students' Papers

### Full papers

- Benčíč, Anton: *Action Recommendation Based on Situation Rules*. Supervisor: M. Bieliková
- Bielik, Pavol: *Using Wi-Fi Mobility Classification on a Mobile Phone for Energy Efficient Activity Tracking*. Supervisor: M. Barla
- Demovič, Ľuboš – Konôpka, Martin – Láni, Marek – Tomlein, Matúš: *Enhancing Web Surfing Experience in Conditions of Slow and Intermittent Internet Connection*. Supervisor: M. Barla
- Dulačka, Peter: *Validation of Music Metadata via Game with a Purpose*. Supervisor: J. Šimko
- Gomola, Alojz: *Aspect-Oriented Solution for Mutual Exclusion in Embedded Systems*. Supervisor: V. Vranić
- Gregor, Martin: *Social Web Search*. Supervisor: T. Kramár
- Holub, Michal: *Filtering Long Lists of Web Objects Using Automatically Generated Facets*. Supervisor: M. Bieliková
- Hruška, Miroslav: *Preprocessor for Aspect-Oriented Programming in Haskell*. Supervisor: J. Lang
- Janovic, Ivan – Oguřčák, Filip: *Email Events: Extracting and Adding to Calendar*. Supervisor: M. Laclavik
- Kajan, Peter: *Discovering Keyword Relations*. Supervisor: M. Barla
- Kanta, Marcel: *Trend-Aware User Modelling with Location-Aware Trends*. Supervisor: M. Šimko
- Kaššák, Ondrej: *Named Entity Recognition for Slovak and Related Languages*. Supervisor: M. Kompan
- Kišš, Marek: *Building Domain Model via Game with a Purpose*. Supervisor: J. Šimko
- Kompan, Michal: *Exploring Group Recommendation for Single-User Recommendation Tasks*. Supervisor: M. Bieliková
- Korenek, Peter: *Emotion Classification of Microblogs Based on Appraisal Theory*. Supervisor: M. Šimko
- Kramár, Tomáš: *Analysing Temporal Dynamics in Search Intent*. Supervisor: M. Bieliková
- Kříř, Jakub: *Keyword Extraction Based on Implicit Feedback*. Supervisor: T. Kramár
- Kučecčka, Tomáš: *Topic Extraction in Text Documents Based on Word Position Analyses*. Supervisor: D. Chudá

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- Kuric, Eduard: *Search in Source Code Based on Identifying Popular Fragments*. Supervisor: M. Bieliková
  - Labaj, Martin: *Tracking of Parallel Browsing Behaviour*. Supervisor: M. Bieliková
  - Lipták, Martin: *Using Trainable Duplicate Detection for Automated Public Data Refining*. Supervisor: J. Suchal
  - Lipták, Matej: *Modelling Aspect-Oriented Design Patterns*. Supervisor: V. Vranić
  - Lučanský, Milan: *Acquiring Web Site Metadata by Heterogeneous Information Sources Processing*. Supervisor: M. Šimko
  - Michalco, Jaroslav – Liška, Martin: *Using Social Media to Facilitate Face-to-Face Meetings*. Supervisor: P. Návrat
  - Molnár, Martin: *Identifying Hidden Topics and their Relations over Time in News Corpus*. Supervisor: P. Lacko
  - Móro, Róbert: *Personalized Text Summarization*. Supervisor: M. Bieliková
  - Novotný, Matúš: *Achieving Interoperability Among Heterogeneous Data Sources in Cultural Heritage Domain*. Supervisor: V. Rozinajová
  - Plank, Martin: *Tag Recommendation System*. Supervisor: T. Kuzár
  - Prokop, Jaroslav: *Extending the Method of Schedule Shortening for Schedule Simulation*. Supervisor: M. Lekavý
  - Rástočný, Karol: *Maintenance of Knowledge Tags in Heterogeneous Web Content: The Repository*. Supervisor: M. Bieliková
  - Sabo, Štefan: *Beehive Metaphor Inspired Web Crawler*. Supervisor: P. Návrat
  - Sivulka, Ján: *Adaptation of Web Contents Browsed in Mobile Devices*. Supervisor: T. Kuzár
  - Srba, Ivan: *Encouragement of Collaborative Learning Based on Dynamic Groups*. Supervisor: M. Bieliková
  - Svorada, Peter: *Modeling a Tutor for E-Learning Support*. Supervisor: J. Tvarožek
  - Šajgalík, Mária: *Decentralised User Modelling and Personalisation*. Supervisor: M. Barla
  - Šelmeci, Roman: *An Approach to Partial Formalization of SOA Design Patterns Using Production Rules*. Supervisor: V. Rozinajová
  - Šimko, Jakub: *Exploiting of Motivation and Player-Specific Expertises in Image Annotation*. Supervisor: M. Bieliková
  - Šteňová, Andrea: *Feedback Acquisition in Web-Based Learning*. Supervisor: M. Bieliková
  - Šurek, Marek: *An Evaluation of Individual Matching with TRREE Reasoner And SPARQL Based Inference*. Supervisor: M. Liška
  - Uherčík, Tomáš: *Acquiring Metadata about Web Content Based on Microblog Analysis*. Supervisor: M. Šimko
  - Unčik, Maroš: *Vizualization of User Model in Educational Domain*. Supervisor: M. Bieliková

- Valenčík, Ivan: *Recognition of Semantically Related Articles in Wikipedia*. Supervisor: P. Lacko
- Višňovský, Juraj: *Association Rules Mining from Context-Enriched Server Logs*. Supervisor: D. Zeleník
- Zeleník, Dušan: *Context Inference Using Correlation in Behaviour*. Supervisor: M. Bieliková

### Extended abstracts

- Duchoň, Gabriel: *Music Melody Retrieval and Analysis*. Supervisor: N. Hrušková
- Jendek, Tomáš: *Gathering Information on User Environment*. Supervisor: D. Zeleník
- Juhász, Vojtech: *Full-Text Search in Email Archives Using Social Evaluation, Attached and Linked Resources*. Supervisor: M. Laclavik
- Michalko, Matúš: *Visual Based Query Construction to RDF Graph*. Supervisor: M. Líška
- Palát, Peter: *Software Evaluation Driven Tool for Mobile Device*. Supervisor: J. Lang
- Urban, Ondrej: *Active Conceptual Modelling of Learning Content*. Supervisor: J. Lang
- Zboroň, Lukáš: *Solution Quality in Context of Web Service Composition*. Supervisor: M. Kasan

### TP CUP Competition

- Bielik, Pavol – Krátky, Peter – Mitrík, Štefan – Tomlein, Michal: *Motivating People to Increase Physical Activity*. Supervisor: M. Barla
- Burger, Roman – Džúr, Martin – Meliško, Peter – Nagy, Balázs: *Motivating People to Healthy Lifestyle via Mobile Game*. Supervisor: J. Šimko
- Cádrik, Michal – Detko, Martin – Mihalik, Matej – Slotík, Igor – Ševcech, Jakub – Mydla, Ludovít: *Recommendation as a service*. Supervisor: M. Kompan
- Fejes, Máté – Gelányi, Ľuboš – Masný, Ľuboš – Mäsiar, Juraj – Mihalik, Adam – Pszota, Dávid: *An Intelligent Game for Smart Phones*. Supervisor: M. Tomša
- Fornádel, Michal – Hlaváč, Marek – Košický, Martin – Pavlech, Lukáš – Petráš, Daniel – Pomothy, Adam: *Crowd Simulation*. Supervisor: P. Lacko
- Franta, Martin – Gajdoš, Martin – Habdák, Martin – Kocian, Róbert – Vrablecová, Petra – Zimová, Zuzana: *Management of Lightweight Semantic Content for an Adaptive Web-based (Learning) Portal*. Supervisor: M. Šimko
- Horváth, Róbert – Jurčík, Peter – Macko, Peter – Ruman, Vladimír – Sládeček, Peter – Ubreŕi, Maroš – Vacula, Matúš: *Statistical Supervisor: Text Machine Translation*. Supervisor: D. Zeleník
- Ivanec, Peter – Šalmík, Jakub – Polakovič, Patrik – Chylik, Michal – Szórád, Anton: *Knowledge and Skills of Students*. Supervisor: M. Holub
- Lačný, Jozef – Maršálek, Maroš – Michalko, Pavel – Súkeník, Ján: *Plagiarism Detection on the Web*. Supervisor: D. Chudá

## 9.5 Research Laboratories

### Intelligent Systems Laboratory

*Manager:* P. Návrat

*Contact:* pavol.navrat@stuba.sk

*Description:* The laboratory is used for research of a wide spectrum of problems that fall into the field of program and information systems mainly in the scope of artificial intelligence. The projects solved are concerned with the methods of knowledge system development with a special focus on multi-agent systems and their collaboration, as well as intelligent search, delivery, and presentation of heterogeneous information in a distributed environment such as Internet, including categorisation and recommendation of the information. The laboratory is equipped with fairly powerful computer systems and advanced software tools that correspond to the demands of the projects being solved. The equipment is regularly renewed thanks mainly to continuous success in grants including international ones.

### Advanced Software and Web Technologies Laboratory

*Manager:* M. Bieliková

*Contact:* maria.bielikova@stuba.sk

*Description:* The laboratory is used for research of a wide spectrum of problems that fall into the field of program and information systems mainly in the scope of software engineering. The projects being solved were concerned with the methods and tools of software system development with a special focus on the structure design of component-based and structure and presentation design of hypermedia systems. The laboratory is used also for research projects in the field of advanced software technologies for master degree students. The laboratory is equipped with fairly powerful computer systems and advanced CASE tools. The equipment is regularly renewed thanks mainly to continuous success in grants including international ones.

### Mobile Computing Laboratory

*Manager:* V. Vranić (UISI), M. Čerňanský (UAPI), I. Kotuliak (UPSS)

*Contact:* valentino.vranic@stuba.sk

*Description:* The main purpose of the laboratory is to support research and teaching process related to mobile computing. Laboratory supports research and student projects from multiple domains that can greatly benefit from mobile computing technology such as computer vision, computer graphics, machine learning and augmented reality. Currently the laboratory equipment consists of several iOS mobile phone and tablet PC devices (Apple iPhone, Apple iPad) and computers used for development applications for mobile devices. In near future laboratory will be equipped with devices running Android (Google), Symbian OS (Nokia) and eventually other major mobile computing platforms (Windows Phone 7, RIM Blackberry, Samsung Bada).

## 9.6 Research Projects

### **Contextual information search and navigation in the social web (VEGA, 1/0675/11)**

*Project leader:* M. Bieliková

*Members UIIS:* M. Barla, L. Borčenský, M. Holub, I. Kapustík, M. Kasan, M. Kompan, T. Kramár, P. Lacko, P. Michlík, P. Návrat, V. Rozinajová, J. Šimko, M. Šimko, J. Tvaroček, M. Tvaroček, V. Vranić, D. Zeleník

*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences

*Duration:* January 2011 – December 2014

*Description:* Considering today's information overload, caused by mass and dynamics of the accessible information, effective information search and navigation becomes an important and crucial task during activities with information needs. Project focuses on research of methods and techniques for information searching and navigation and on ways of their realization in the milieu of adaptive and social web with semantics with regard to problem-related software architectures (esp. service oriented architectures) methods of distributed processing of extensive data sources and to model-driven development of software including post-object paradigms.

### **Acquiring, processing and visualization of textual information based on analysis of similarity relations (VEGA, 1/0971/11)**

*Project leader:* D. Chudá

*Members UIIS:* N. Andrejčíková, M. Bieliková, A. Bou Ezzeddine, R. Čapla, P. Kajsa, G. Kosková, T. Kučečka, T. Kuzár, J. Lang, L. Majtás, P. Mederly, P. Návrat, I. Polášek, J. Suchal, R. Šelmeci

*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences

*Duration:* January 2011 – December 2014

*Description:* Web data acquisition is a highly topical task and despite several well-known methods, users struggle with poor quality (accuracy, relevance, and coverage) responses. The problem is to find methods to obtain relevant information on an issue that has a dynamic character, i.e. evolves over time. Acquired documents can be mined for more information. In particular, new approaches (neural networks, swarm intelligence) are being researched. Attention is drawn to methods which process Slovak texts. Recommendations of relevant or interesting information are studied together with non-standard versions of similarity. Relationships between the versions, originality, authorship, and originality are being evaluated. Methods take into account that the user can be a part of social networks. The proposed methods will be used in various systems of information processing including e-learning. Software structures which support interoperability of such systems and composition of provided services are being designed.

**Advanced Methods in Software Evolution: Variants, Composition, and Integration (VEGA, 1/1221/12)**

*Project leader:* V. Vranić

*Members UI SI:* Z. Harsányi, P. Kajsa, M. Kasan, J. Lang, Ľ. Majtás, P. Mederly, P. Návrat, I. Polášek, V. Rozinajová, R. Šelmeči

*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences

*Duration:* January 2012 – December 2015

*Description:* Software evolution embraces initial software development and its recurring modifications. What is characteristic for software evolution is an emphasis on maintenance, the longest phase in software development life cycle. Sometimes, the whole software development process can be perceived as maintenance because the development of what is considered as a new software is most often based on the existing code or models. Software maintenance can be perceived as naturally agile: oriented on the product and customer. The project aims at the research of advanced methods in software evolution both at the programming and modeling level. A special attention is paid to the use of advanced composition mechanisms and explicit and early dealing with variability. Specific project objectives include the support of aspect-oriented (AO) change realization process, using AO approaches to deal with variability, proposal of advanced approaches to integration and composition, and using AO approach in information content modeling.

**Virtual and constructive modelling, training and simulation of crowd behaviour in urban environment (APVV-0233-10)**

*Project leader:* P. Lacko for FIIT STU

*Members UI SI:* I. Kapustík, P. Mederly, A. Paulovič, M. Svrček, V. Vranić

*Supported by:* Slovak Research and Development Agency

*Duration:* May 2011 – October 2014

*Description:* Project objective is to develop a virtual training and simulation environment for the training and multi-agent simulation of security forces and crowds in urban environment. Users will be able to create new or adapt the existing models of human behaviour in line with the latest findings of psychology and sociology. Project is aimed to enhance the safety at public events by the realistic simulation of the employment of modern equipment Božen a-Riot meant for crowd management and riot control (primarily by the police, but also by the army), which is developed and produced in Slovakia by the project partner Way Industries. Though the primary application area is security and crowd-management, the mul-agent simulation components are universal and can also be used in educational, economical, sociological or epidemiological modelling.

**Cognitive traveling in digital space of the Web and digital libraries supported by personalized services and social networks (APVV-0208-10)**

*Project leader:* P. Návrat  
*Members UIIS:* N. Andrejčíková, M. Barla, M. Bieliková, P. Bartalos, A. Bou Ezzeddine, D. Chudá, G. Kosková, T. Kuzár, P. Lacko, V. Rozinajová, J. Suchal, M. Šimko, J. Tvarožek, M. Tvarožek  
*Supported by:* Slovak Research and Development Agency  
*Duration:* May 2011 – October 2014  
*Description:* Analyzing new phenomena connected with using web and digital libraries (esp. social networking) to improve information acquisition. Devising and verifying: - new models of information domains, documents and users facilitating expressing and working with at least partial descriptions of their semantics - new methods of targeted and exploratory information search that take into account personalization, common interests of different groups, suitable presentation and visualization.

**Support of Building a Center of Excellence for Smart Technologies, Systems, and Services II (ITMS 26240120029)**

*Project leader:* M. Bieliková for FIIT STU  
*Members UIIS:* P. Návrat  
*Supported by:* European Structural Fund  
*Duration:* January 2010 – January 2013  
*Description:* The objective is to improve, build further, and put into operation the technological infrastructure that would enable to sustain the center of excellence of research and development for enterprise information source processing and presentation with the application of advanced distributed architectures for parallel processing of extensive sources of semistructured data and high performance computing for complex applications.

**Research of methods for acquisition, analysis and personalized conveying of information and knowledge (ITMS: 26240220039)**

*Project leader:* M. Bieliková for FIIT STU  
*Members UIIS:* M. Barla, M. Bieliková, A. Bou Ezzeddine, D. Chudá, M. Holub, M. Kompan, G. Kosková, T. Kramár, T. Kučečka, P. Lacko, P. Mederly, P. Návrat, I. Polášek, V. Rozinajová, J. Suchal, R. Šelmeci, J. Šimko, M. Šimko, J. Tvarožek, M. Tvarožek, V. Vranić, D. Zeleník  
*Supported by:* European Structural Fund  
*Duration:* January 2011 – January 2014  
*Description:* The purpose of the project is to develop new methods of acquisition, search, and recommendation of information and knowledge. The need for such methods comes from a huge range of the data available in different domains when their manual search for a human is not possible. Contemporary methods have enabled a remarkable move in this field, but they still do not enable to effective information providing so that this would include the context: the user, his or her goals, properties,

and capabilities, as well as parameters of the environment in which information processing takes part (time, place, and technical resources).

## 9.7 Publications

### Journals

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- ZELENÍK, D. – BIELIKOVÁ, M.: Tagging the Code with Context Labels. In: *WIKT 2012. 7<sup>th</sup> Workshop on Intelligent and Knowledge Oriented Technologies Proceedings*, Smolenice, Slovakia. Bratislava - STU, 2012. pp. 53-56. (in Slovak)

#### **Books, Parts of Books**

- BARTALOS, P. – BIELIKOVÁ, M.: Effective QoS Aware Service Composition Based on Forward Chaining with Service Space Restriction Chapter 1. In: *Semantic Web Services, Advancement through Evaluation*. Berlín – Springer, 2012. ISBN 978-3-642-28734-3. pp. 313-328.
- BIELIKOVÁ, M. – NÁVRAT, P. – BARLA, M. – POLÁŠEK, I. – CHUDÁ, D. – TVAROŤEK, J. – ŠIMKO, M. et al.: *PerConIK – Personalized Conveying of Information and Knowledge*. Studies in Informatics and Information Technologies. Bratislava – STU, 2012. ISBN 978-80-227-3813-2.

#### **Book Editors**

- BIELIKOVÁ, M. – NÁVRAT, P. – BARLA, M. – ŠIMKO, M. – TVAROŤEK, J.: *Personalized Web - Science, Technologies and Engineering*. 11<sup>th</sup> Spring PeWe Workshop Modra-Piesok, Slovakia, 2012 Proceedings. Bratislava - STU, 2012. 97 p.
- BIELIKOVÁ, M. – FRIEDRICH, G. – GOTTLÖB, G. – KATZENBEISSER, S. – TURÁN, G.: *SOFSEM 2012: 38<sup>th</sup> Conference on Theory and Practice of Computer Science*. Špindlerův Mlýn, Czech Republic, 2012 Proceedings. Lecture Notes in Computer Science, Vol. 7147, Heidelberg : Springer, 647 p.
- BIELIKOVÁ, M. – FRIEDRICH, G. – GOTTLÖB, G. – KATZENBEISSER, S. – ŠPÁNEK, R. – TURÁN, G.: *SOFSEM 2012: 38<sup>th</sup> Conference on Theory and Practice of Computer Science*. Špindlerův Mlýn, Czech Republic 2012 Proceedings, Vol. II. Prague, Institute of Computer Science AS CR, 2012. 113 p.
- BIELIKOVÁ, M.: *Student Research Conference 2012*. 8<sup>th</sup> Student Research Conference in Informatics and Information Technologies Bratislava, 2012 Proceedings. Bratislava - STU, Vol. 1 - 295 p., Vol. 2 – 2013p.
- BIELIKOVÁ, M. – ŠIMKO, M.: *WIKT 2012 – 7<sup>th</sup> Workshop on Intelligent and Knowledge Oriented Technologies Proceedings*, 2012 Smolenice, Slovakia. Bratislava - STU, 2012.

**Textbooks**

LÁCLAVÍK, M. – ŠELENG, O.: *Information Retrieval*. STU Press, 2012. (in Slovak)

VAŤAN, P. – JUROVATÁ, D. – KRIŤANOVÁ, G. – BUDINSKÁ, I. – LUPTÁK, V. – ŠKAMLA, M. – HAMERNÍK, P.: *Systems Modeling and Simulation*. Simulator Witness. Lab guides. Trnava AlumniPress, 2012. ISBN 978-80-8096-160-2, 173 p. (in Slovak)

**Reviews published in Journals**

BIELIKOVÁ, M. [rec]: Hay M., Miklau G., Jensen D., Towsley D., Li C.: Resisting Structural Re-identification in Anonymized Social Networks. In: *Computing Reviews*. Vol. 53, No. 2 (2012), ISSN 0010-4884, pp. 116.

BIELIKOVÁ, M. [rec]: Russell M.: Mining the social Web: analyzing data from Facebook, Twitter, LinkedIn, and other social media sites, O'Reilly Media, 2011. In: *Computing Reviews*. Vol. 53, No. 7 (2012), ISSN 0010-4884.

NÁVRAT, P. [rec]: Web Data Management. In: *Computing Reviews*. Vol. 53 (2012), ISSN 0010-4884. on-line. <http://www.computingreviews.com>

**9.8 Cooperation****Cooperation in Slovakia**

- Institute of Informatics, Slovak Academy of Sciences, Bratislava
- Institute of Informatics, Faculty of Science, Pavol Jozef Šafárik University in Košice
- Faculty of Electrical Engineering and Information Technologies Technical University of Košice
- Faculty of Management Science and Informatics, University of Ľilina
- Asseco
- Ditec
- Datalan
- Gratex International
- GBSW
- Hewlett-Packard Slovakia
- IBM Slovakia
- Microsoft Slovakia
- Nokia Slovakia
- Oracle Slovakia
- PosAm
- Siemens
- SOFTEC
- Soitron
- Slovak Telecom

- Tempest
- Unicorn

**International Cooperation**

- MIR Labs, Machine Intelligence Research Labs, global not-for-profit academic consortium oriented to innovation and research in various areas of machine intelligence. The Institute is part of the MIR Labs Network with Pavol Návrát serving as coordinator for Slovakia
- WIC, Web Intelligence Consortium, an international not-for-profit organisation devoted to scientific research and industry development in the area of web intelligence. The Institute plays a role of Slovak Research Centre of the Consortium.
- AOSD-Europe, integrates and coordinates research, education and dissemination activities of its members in the area of aspect oriented development of software. Originally, it has been a 7. Framework Programme project.
- School of Information Sciences, University of Pittsburgh, Pittsburgh, USA
- Institute of Software Technology and Interactive Systems, Faculty of Informatics, Vienna University of Technology
- Department of Information Systems, Faculty of Informatics, Eötvös Loránd University, Budapest
- Department of Software Technology and Methodology, Faculty of Informatics, Eötvös Loránd University, Budapest
- Department of Computers, Faculty of Electrical Engineering, Czech Technical University in Prague, Czech Republic
- Institute of Information Systems, Faculty of Information Technologies, Brno University of Technology, Czech Republic
- Institute of Intelligent Systems, Faculty of Information Technologies, Brno University of Technology, Czech Republic
- Department of Computers, Faculty of Applied Science, University of West Bohemia in Pilsen, Czech Republic
- Department of Computer Science, Faculty of Electrical Engineering and Computer Science, Technical University of Ostrava, Czech Republic
- Faculty of Informatics, Masaryk University, Brno, Czech Republic
- Department of Software Engineering, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic
- UNESCO–Division of Information and Informatics, Paris, France
- University of Maribor, Slovenia
- Division of Computer Science, National Technical University of Athens, Greece
- Department of Information and Communication Systems Engineering, University of the Aegean, Greece
- University of Hannover, L3S Research Center, Hannover, Germany



- Institute of Computer Science, Faculty of Philosophy and Natural Sciences, Silesian University in Opava, Czech Republic
- Lancaster University, United Kingdom
- Faculty of Electrical and Electronic Engineering and Automation, University of Rousse, Bulgaria
- Faculty of Sciences, University of Novi Sad, Serbia

### Visits of Staff Members

- *M. Bieliková, J. Tvarožek, M. Šimko, P. Kajsa*: SOFSEM 2012, Špindlerův Mlýn, Czech Republic, January 21-25, 2012
- *M. Bieliková, P. Bielik*: IHI 2012 – 2<sup>nd</sup> ACM SIGHIT International Health Informatics Symposium, Miami, USA, January 26-February 2, 2012
- *T. Kramár*: ACM International Conference on Web Search and Data Mining WSDM 2012, Seattle, USA, February 7-13, 2012
- *M. Tomlein*: HEALTHINF 2012, Vilamoura, Portugal, January 31-February 5, 2012
- *E. Molnár*: 189<sup>th</sup> session of the Executive Board, UNESCO, Paris, France, February 26-March 8, 2012
- *M. Bieliková*: Special Evaluation Committee, Limassol, Cyprus, March 23-25, 2012
- *V. Vranić*: AOSD 2012, NEMARA 2012 Workshop, Potsdam, Germany, March 24-30, 2012
- *E. Molnár*: Intergovernmental Council for the Information for All Programme (7<sup>th</sup> session), Unesco, Paris, France, April 1-4, 2012
- *M. Bieliková*, Brno University of Technology, Czech Republic, April 2, 2012
- *P. Návrat*: Brno University of Technology, Czech Republic, April 25, 2012
- *M. Bieliková, P. Návrat, Š. Sabo, J. Šimko, D. Zeleník*: The World Wide Web Conference, Lyon, France, April 16-29, 2012
- *E. Kuric, K. Rástočný*: Innovate4Good, Microsoft Innovation Center, Brussels, Belgium, May 2-3, 2012
- *V. Vranić*: CSM Certified ScrumMaster course, Beograd, Serbia, May 16-19, 2012
- *M. Bieliková*: Trinity College, Dublin, Ireland, May 17-20, 2012
- *M. Bieliková*: IFIP meeting, Prague, Czech Republic, May 29-30, 2012
- *M. Lucká*: University of Bergen, Erasmus mobility, Bergen, Norway, June 12-17, 2012
- *I. Polásek*: IEEE 16<sup>th</sup> International Conference on Intelligent Engineering Systems INES 2012, Lisbon, Portugal, June 12-16, 2012
- *D. Chudá, P. Návrat, V. Vranić*: Brno University of Technology, Czech Republic, June 18, 2012
- *M. Bieliková*: Web Science 2012 Conference, Evanston, USA, June 20-27, 2012
- *M. Bieliková, M. Barla, L. Demovič, M. Konôpka, M. Tomlein, M. Láni*: Imagine Cup, Sydney, Australia, July 3-16, 2012

- *K. Rástočný*: 12<sup>th</sup> International Conference on Web Engineering ICWE 2012, Berlin, Germany, July 23-27, 2012
- *G. Kosková*: University of Malta, Evaluation committee, Malta, July 29-31, 2012
- *I. Polášek*: IEEE 10<sup>th</sup> Jubilee Symposium on Intelligent Systems and Informatics-SISY 2012, Subotica, Serbia, August 19-22, 2012
- *M. Šimko*: The 11<sup>th</sup> International Conference on Web-based Learning ICWL 2012, Sinaia, Romania, September 1-5, 2012
- *K. Rástočný*: Reasoning Web 2012 Summer School, Vienna, Austria, September 2-9, 2012
- *R. Móro*: 9<sup>th</sup> International workshop on Text-based Information Retrieval TIR 2012, Vienna, Austria, September 3-7, 2012
- *J. Šimko, P. Dulačka*: I-Semantics 2012, Graz, Austria, September 4-8, 2012
- *M. Kompan, T. Kramár, D. Zeleník*: ACM Recommender Systems RecSys 2012, Dublin, Ireland, September 7-14, 2012
- *R. Šelmeci*: Federated Conference on Computer Science and Information Systems FCCSIS 2012, Wrocław, Poland, September 9-12, 2012
- *M. Bieliková*: RecSys 2012, Dublin, Ireland, September 12-14, 2012
- *A. Paulovič, Z. Harsányi*: 16<sup>th</sup> East-European Conference on Advances on Databases and Information Systems, ADBIS 2012, Poznan, Poland, September 16-22, 2012
- *I. Srba*: 7<sup>th</sup> European Conference on Technology Enhanced Learning, EC-TEL 2012, Saarbrücken, Germany, September 17-22, 2012
- *D. Chudá*, Brno University of Technology, Czech Republic, September 18, 2012
- *P. Návrat, V. Rozinajová*: The 22<sup>nd</sup> IFIP World Computer Congress WCC 2012, Amsterdam, September 23-26, 2012
- *M. Lucká*: The 19<sup>th</sup> EuroMPI Conference, Vienna, Austria, September 24-26, 2012
- *L. Molnár*: 190<sup>th</sup> session of the Executive Board, Unesco, Paris, France, October 3-15, 2012
- *M. Bieliková, M. Kompan, T. Kučečka, K. Rástočný, D. Zeleník*: Datakon, Mikulov, Czech Republic, October 14-16, 2012
- *P. Návrat, J. Šimko, M. Holub*: Znalosti 2012, Mikulov, Czech Republic, October 14-16, 2012
- *M. Bieliková*: 31<sup>st</sup> International Conference on Conceptual Modelling ER 2012, Florence, Italy, October 15-19, 2012
- *J. Ševcech*: IADIS WWW/Internet 2012 Conference, Madrid, Spain, October 17-22, 2012
- *M. Bieliková, I. Srba*: ACM SPY 2012, Prague, Czech Republic, October 25-26, 2012
- *Z. Harsányi*: 4<sup>th</sup> International Conference Euromed 2012, Limassol, Cyprus, October 29-November 4, 2012

- *J. Tvarožek, M. Šajgalík, O. Proksa, L. Gallay, T. Ťuffa, A. Kollár, F. Pakan, J. Krňt*: CERC 2012, Krakow, Poland, November 15-18, 2012
- *P. Návrat*: European Computer Science Summit 2012, Barcelona, Spain, November 18-21, 2012
- *P. Návrat, V. Rozinajová*: Diplomarbeitpräsentation, Vienna, Austria, November 29, 2012
- *M. Bieliková, M. Šimko, D. Zeleník*: 7<sup>th</sup> International Workshop on Semantic and Social Media Adaptation and Personalization SMAP 2012, Luxembourg, December 1-4, 2012
- *V. Rozinajová*: EIT ICT Labs, Helsinki, Finland, December 10-12, 2012
- *P. Návrat, V. Rozinajová*: Budapest, Hungary, December 18, 2012

## 9.9 Membership in Professional Organisations and Societies

### Slovak Professional Organisations and Societies

#### *Michal Barla*

- Slovak Society for Computer Science (member, since 2007)

#### *Mária Bieliková*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
- Slovak Artificial Intelligence Association (member, since 2000)
- Slovak Centre of the IET (member, since 1998)
- Slovak Society for Computer Science (member, since 1998; member of the executive committee, since 2000)

#### *Daniela Chudá*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
- Slovak Society for Computer Science (member, since 2012)

#### *Michal Kompan*

- Slovak Society for Computer Science (member, since 2012)

#### *Tomáš Kramár*

- Slovak Society for Computer Science (member, since 2012)

#### *Eduard Kuric*

- Slovak Society for Computer Science (member, since 2012)

#### *Martin Labaj*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2011)
- Slovak Society for Computer Science (member, since 2012)

#### *Peter Lacko*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2011)

*Marián Lekavý*

- Slovak Society for Computer Science (member, since 2007)

*Mária Lucká*

- Slovak Society for Computer Science (member, since 2012)

*Pavol Mederly*

- Slovak Society for Computer Science (member, since 1996)

*Eudovít Molnár*

- Working Group of the Accreditation Commission of Slovakia for Information Sciences and Technologies (member, since 2003)
- Slovak Commission for UNESCO (member since 1993, chair, since 1996)
- Slovak Society for Computer Science (member, since 1992)
- Technical Standardization Committee (member, since 1992)

*Pavol Návrat*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
- Working Group of the Accreditation Commission of Slovakia for Information Sciences and Technologies (member, since 1999)
- Slovak Artificial Intelligence Association (since 2000), member of the executive committee and vice chairman (since 2000)
- Slovak Association of Mathematicians and Physicists (member, since 1982)
- Slovak Centre of the IET (member, since 1996; chair, since 1997)
- Slovak Society for Computer Science (member, since 1992)

*Karol Rástočný*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2011)
- Slovak Society for Computer Science (member, since 2012)

*Ivan Polášek*

- Gratex IT Institute (supervisory board member, since 2008)

*Viera Rozinajová*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
- Slovak Society for Computer Science (member, since 2012; member of the executive committee, since 2012)

*Jakub Šimko*

- Slovak Society for Computer Science (member, since 2012)

*Marián Šimko*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
- Slovak Society for Computer Science (member, since 2012)

*Michal Tvarožek*

- Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
- Slovak Society for Computer Science (member, since 2007)

*Valentino Vranič*

- Slovak Society for Computer Science (member, since 2001)

*Dušan Zeleník*

- Slovak Society for Computer Science (member, since 2012)

**International Professional Organisations and Societies***Mária Bielíková*

- IEEE, Institute of Electrical and Electronic Engineers (member, since 1998; senior member since 2003)
- IEEE Computer Society (member, since 1997)
- IET, Institution of Engineering and Technology (member, since 1998)
- ECUK, Engineering Council UK (registered Chartered Engineer, since 1998)
- ACM, Association for Computing Machinery (member, since 1998; senior member since 2009)
- ACM SIGWEB, Special Interest Group on Hypertext the Web (member, since 2007)
- IFIP, International Federation for Data Processing (member of Technical Committee TC2 – Software: Theory and Practice, since 2008)
- ISWE, International Society for Web Engineering (member, since 2007)
- CaSTB, Czech and Slovak Testing Board, a member of ISTQB, International Software Testing Qualifications Board (member, since 2006)
- SOFSEM – Annual Conference on Current Trends in Theory and Practice of Informatics Series, standing Steering Committee (member, since 2002)
- Datakon – Annual Conference on the Current Trends in Databases and Information Systems Series, standing Steering Committee (member, since 2003)
- CEE-SET – Central and East European Conference on Software Engineering Techniques Series, standing Steering Committee (member, since 2007)
- SMAP – International Workshop on Semantic Media Adaptation and Personalization, standing Steering Committee (member since 2011)

*Michal Holub*

- ACM, Association for Computing Machinery (member, since 2010)

*Daniela Chudá*

- ACM, Association for Computing Machinery (member, since 2009)

*Martin Labaj*

- ACM, Association for Computing Machinery (member, since 2009)
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2007)
- IEEE Computer Society (member, since 2007)

*Peter Lacko*

- IEEE, Institute of Electrical and Electronic Engineers (member, since 2008)

- IEEE Computer Intelligence Society (member, since 2008)
- ACM, Association for Computing Machinery (member, since 2010)
- ACM SIGHPC, Special Interest Group on High Performance Computing (member, since 2010)

*Eudovít Molnár*

- IEEE, Institute of Electrical and Electronic Engineers (member, since 1991)
- ACM, Association for Computing Machinery (member, since 1991)
- UNESCO (Slovak Commission: member of bureau –1993-96, chair – since 1996, Informatics section – chair since 1993. HQ Paris: IIP – member of bureau –1996-98, chair – 1998-2001, IFAP – member of bureau – since 2001. Executive Board – member – since 2001)
- ICETA, member of honorary committee

*Pavol Návrat*

- AAAI, Association for the Advancement of Artificial Intelligence (member, since 1993)
- AACE, Association for Advancement of Computers in Education (member, since 1998)
- IEEE, Institute of Electrical and Electronic Engineers (member, since 1996; senior member, since 1998)
- IEEE Computer Society (member, since 1996)
- ACM, Association for Computing Machinery (member, since 1998; senior member since 2009)
- IFIP, International Federation for Data Processing (member of Technical Committee TC12 – Artificial Intelligence, since 1998)
- IET, Institution of Engineering and Technology (member, since 1998; fellow, since 1998)
- ECUK, Engineering Council UK (registered Chartered Engineer, since 1998)
- JCKBSE, Joint Conference on Knowledge-Based Software Engineering Series, standing Steering Committee (member, since 1998)
- ADBIS, Advances in Databases and Information Systems Conference Series, standing Steering Committee (member, since 1998)
- Znalosti Conference Series, standing Steering Committee (member, since 2006)

*Karol Rástočný*

- ACM, Association for Computing Machinery (member, since 2011)

*Viera Rozinajová*

- ACM, Association for Computing Machinery (member, since 2009)

*Marián Šimko*

- ACM, Association for Computing Machinery (member, since 2009)

*Michal Tvarožek*

- ACM, Association for Computing Machinery (member, since 2009)

*Valentino Vranić*

- IEEE, Institute of Electrical and Electronic Engineers (member, since 2011)
- IEEE Computer Society (member, since 2011)

- AOSD-Europe, European Network of Excellence on Aspect-Oriented Software Development (contact person at STU, since 2009)

### 9.10 Other Activities

- ACM SPY 2012 – Czech ACM Chapter & Slovak ACM Chapter Student Project of the Year competition, M. Bieliková: chair of reviewers board, P. Návrat: member of reviewers board  
<http://www.acm-spy.sk>, <http://www.acm-spy.cz>
- ACM SPY 2012 – 5<sup>th</sup> place (M. Bieliková: supervisor)
- ACM International Collegiate Programming Contest 2012 – Slovak University of Technology Contest – A. Považanov: event organiser  
<http://www.fiit.stuba.sk/acm/>
- FIITApixel – photography competition – J. Lang: competition director,  
<http://foto.fiit.stuba.sk>
- GraFIIT Foundation – book edition support – I. Polášek, P. Návrat: organisers
- IIT.SRC 2012 – Informatics and Information Technologies Student Research Conference, April 24, 2012 – M. Bieliková: programme committee chair, M. Barla, A. Bou Ezzeddine, D. Chudá, G. Kosková, P. Lacko, M. Laclavík, J. Lang, M. Lekavý, P. Mederly, Ľ. Molnár, P. Návrat, I. Polášek, V. Rozinajová, P. Šaloun, J. Tvarožek, M. Tvarožek, V. Vranič: members of programme committee,  
<http://www.fiit.stuba.sk/iit-src/>
- IIT.SRC 2012 Nokia Lab Presentation Spot – V. Vranič: organizer
- TP Cup 2012 student competition – M. Bieliková: event organiser  
<http://www.fiit.stuba.sk/tp-cup/>
- International Journal of Intelligent Information and Database Systems – M. Bieliková: member of the editorial board
- Journal of Web Engineering – M. Bieliková: member of the editorial board
- Information Sciences and Technologies Bulletin of the ACM Slovakia – P. Návrat: Editor-in-Chief, M. Bieliková: Associate Editor-in-Chief
- Informatika, An International Journal of Computing and Informatics – P. Návrat: member of the editorial board
- Computing and Informatics – P. Návrat: associate editor
- Personalized Web (PeWe) Group seminar organization – M. Bieliková: group coordinator; <http://www.fiit.stuba.sk/research/pewe/>
- ProFIIT 2012 – secondary school programming competition – I. Dekýšová: event organiser, <http://www.fiit.stuba.sk/profiit>
- RoboCup at FIIT 2012 – Soccer Simulation League, Regional Tournament in Bratislava – I. Kapustík and M. Lekavý: event organisers  
<http://www.fiit.stuba.sk/robocup/>
- (Co)-organizing workshop WIKT 2012
- (Co)-organizing annual conference Znalosti 2012

- ABIS 2012 – 19<sup>th</sup> International Workshop on Personalization and Recommendation on the Web and Beyond, September 9-12, 2012, Konstanz, Germany – M. Bieliková: member of programme committee
- ACIIDS 2012 – 4<sup>th</sup> Asian Conference on Intelligent Information and Database Systems, March 19-20, 2012, Kaohsiung, Taiwan – M. Bieliková: member of programme committee
- ADBIS 2012 – 16<sup>th</sup> East-European Conference on Advances in Databases and Information Systems, September 18-21, 2012, Poznan, Poland – M. Bieliková, P. Návrat: member of programme committee, P. Návrat: member of steering committee
- ASEA 2012 – International Conference on Advanced Software Engineering & Its Applications, November 28-30, 2012, Jeju Island, Korea – M. Bieliková: member of programme committee
- ASONAM 2012 – International Conference on Advances in Social Networks Analysis and Mining, August 26-29, 2012, Istanbul, Turkey – M. Bieliková: member of programme committee
- Baltic DB&IS 2012 – Tenth International Baltic Conference on Databases and Information Systems, July 8-11, 2012, Vilnius, Lithuania – M. Bieliková: member of programme committee
- BCI 2012 – 5<sup>th</sup> Balkan Conference in Informatics, September 16-20, 2012, Novi Sad, Serbia – M. Bieliková, P. Návrat, V. Vranić: member of programme committee
- CASoN 2012 – 4<sup>th</sup> International Conference on Computational Aspects of Social Networks, November 21-23, 2012, Sao Carlos, Brazil – M. Bieliková: member of programme committee
- CompSysTech'12 – International Conference on Computer Systems and Technologies, June 22-23, 2012, Ruse, Bulgaria – P. Návrat: member of programme committee
- CSE 2012 – International Scientific Conference on Computer Science and Engineering, October 3-5, 2012, Stará Lesná, High Tatras, Slovakia – M. Bieliková, P. Návrat: member of programme committee
- CSSim 2012 – 3<sup>rd</sup> International Conference on Computer Modelling and Simulation, September 3-5, 2012, Brno, Czech Republic – M. Bieliková: member of programme committee
- Datakon 2012 – Annual Conference on Current Trends in Databases and Information Systems, October 14-16, 2012, Mikulov, Czech Republic – M. Bieliková: member of steering committee, member of programme committee
- EIDWT 2012 – Web Science and Business Intelligence Track – 3<sup>rd</sup> International Conference on Emerging Intelligent Data and Web Technologies, September 19-21, 2012, Bucharest, Romania – M. Bieliková: member of programme committee
- EJC 2012 – 22<sup>st</sup> European Japanese Conference on Information Modelling and Knowledge Bases, June 4-9, 2012, Prague, Czech Republic – M. Bieliková: member of programme committee



- ENASE 2012 – 7<sup>th</sup> International Working Conference of Evaluation on Novel Approaches to Software Engineering, June 28-July 1, 2012, Wrocław, Poland – M. Bieliková: member of programme committee
- FedCSIS Multiconference – 2<sup>nd</sup> Workshop on Model Driven Approaches in System Development (MDASD), Wrocław, Poland, September 9-12, 2012 – P. Návrát: member of programme committee
- HT 2012 – 23<sup>rd</sup> ACM Conference on Hypertext and Hypermedia, June 25-28, 2012, Milwaukee, WI, USA – M. Bieliková: member of programme committee
- ICCCI 2012 – 4<sup>th</sup> International Conference on Collective Intelligence Technologies and Applications, November 28-30, 2012, Ho Chi Minh City, Vietnam – M. Bieliková: member of programme committee
- ICETA 2012 – 10<sup>th</sup> International Conference on Emerging e-learning Technologies and Applications, November 8-9, 2012, Stará Lesná, High Tatras, Slovakia – M. Bieliková: member of programme committee
- ICWE 2012 – 12<sup>th</sup> International Conference on Web Engineering, July 23-27, 2012, Berlin, Germany – M. Bieliková: member of programme committee
- ICWL 2012 – 11<sup>th</sup> International Conference on Web-based Learning, September 2-4, 2012, Sinaia, Romania – M. Bieliková: member of programme committee
- ISMIS 2012 – 20<sup>th</sup> International Symposium on Methodologies for Intelligent Systems, December 4-7 2012, Macau, China – M. Bieliková: member of programme committee
- ITAT 2012 – Workshop on Information Technologies - Applications and Theory, September 17-21, 2012, Magura, Slovakia – M. Bieliková: member of programme committee
- ITS 2012 – 11<sup>th</sup> International Conference on Intelligent Tutoring Systems, June 14-18, 2012, Chania, Crete – M. Bieliková: member of programme committee
- JCKBSE 2012, 10<sup>th</sup> Joint Conference on Knowledge-Based Software Engineering, August 23-26, 2012, Rhodes, Greece – P. Návrát: member of steering committee
- MCCIS-ISA 2012 – IADIS Intelligent Systems and Agents, July 17-23, 2012, Lisbon, Portugal – M. Bieliková: member of programme committee
- NWESP 2012 – 8<sup>th</sup> International Conference on Next Generation Web Services Practices, November 21-23, 2012, Sao Carlos, Brazil – M. Bieliková: member of programme committee
- SCLIT 2012 – Symposium on Computer Languages, Implementations, and Tools, September 19-25, 2012, Kos, Greece – V. Vranić: member of programme committee
- SLE2012ds – Doctoral Symposium of the 5<sup>th</sup> International Conference on Software Language Engineering – V. Vranić: member of programme committee
- SERA 2012 – 10<sup>th</sup> International Conference on Software Engineering Research, Management and Applications, April 16-18, 2012, Kunming, China – M. Bieliková: member of programme committee

- SMAP 2012 – 7<sup>th</sup> International Workshop on Semantic Media Adaptation and Personalization, December 3-4, 2012, Luxembourg city, Luxembourg – M. Bieliková: member of programme committee, member of steering committee
- SNAA 2012 – 2<sup>nd</sup> Workshop on Social Network Analysis and Applications at Int. Conf. on Advances in Social Networks and Mining (ASONAM 2012), August 26-29, 2012, Istanbul, Turkey – M. Bieliková: member of programme committee
- SNPD 2012 – 13<sup>th</sup> International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, August 8-10, 2012, Kyoto, Japan – M. Bieliková: member of programme committee
- SOFSEM 2012 – 38<sup>th</sup> International Conference on Current Trends in Theory and Practice of Informatics, January 21-27, 2012, Špindlerlův Mlýn, Czech Republic – M. Bieliková: programme co-chair, member of steering committee, P. Návrat, V. Vranić: member of programme committee
- UMAP 2012 – 20<sup>th</sup> International Conference on User Modelling, Adaptation and Personalization, July 16-20, 2012, Montreal, Canada, – M. Bieliková: member of programme committee
- WEBIST 2012 – 8<sup>th</sup> International Conference on Web Information Systems and Technologies, April 18-21, 2012, Porto, Portugal – M. Bieliková: member of programme committee
- WIKT 2012 – 7<sup>th</sup> Workshop on Intelligent and Knowledge oriented Technologies, November 22-23, 2012, Smolenice, Slovakia – M. Šimko: organizing committee chair, M. Holub, M. Kompan, A. Zakálová: organizing committee members, M. Bieliková: programme committee chair, D. Chudá, P. Návrat, V. Rozinajová: programme committee members
- WIRSS 2012 – 5<sup>th</sup> International Workshop on Web Information Retrieval Support Systems, 2012 IEEE/WIC/ACM International Conference on Web Intelligence, December 4, 2012, Macau, China – P. Návrat: member of programme committee
- WWW 2012 – Web Engineering Track – 21<sup>st</sup> International World Wide Web Conference, April 16-20, 2012, Lyon, France – M. Bieliková: member of programme committee
- WWW/Internet 2012 – IADIS International Conference on WWW/Internet, October 18-21, 2012, Madrid, Spain – M. Bieliková: member of programme committee
- Znalosti 2012 – Annual Conference on Knowledge Acquisition, Discovery, Accessing and Exploitation, October 14-16, 2012, Mikulov, Czech Republic – M. Bieliková, D. Chudá, V. Rozinajová: member of programme committee, P. Návrat: member of programme committee, member of steering committee

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## 10 Networking Academy

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**E-mail:** [info@cisco.fiit.stuba.sk](mailto:info@cisco.fiit.stuba.sk)  
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In 2011 the former Regional Networking Academy (RCNA FIIT STU) was transformed into the Networking Academy (NA FIIT STU) and the Instructor Training Center (ITC FIIT STU) was established. This centre consists of three multipurpose research and pedagogical laboratory facilities designated for education in the field of computer networks at two degrees of study programme Computer and Communication Systems and Networks and for education of subjects related to Computer Networking of the study programme Informatics.

Except filling study programs Networking Academy provides complete courses and study programs in the field of computer networks as a part of Cisco Networking Academy Program – NetAcad. Throughout these courses students gain the necessary knowledge and practical skills to successfully pass Cisco Certified Networking Associate (CCNA) and Cisco Certified Networking Professional (CCNP) certification exams. These exams are well known and highly recognized by the industry. Education that is part of the Academy offers complete spectrum of courses, starting with basic principles of how computer networks work and continuing with modern networking technologies such as IP Telephony and Wireless Communication based on IEEE 802.11 standards (WiFi). Laboratory facilities are equipped with modern communication technology including hardware routers, hardware switches, hardware firewalls, PCs with connection to the Internet and other necessary components for the purpose of practical education in the field of computer networks.

NA FIIT STU offers technological environment for research in the field of modern methods of communication in the computer networks. It creates quality conditions for solving research grants in the field of methods and resources for creating security and management of communication and mobile computer systems. Pedagogical process is greatly enhanced by providing the necessary support for practical learning during the education of courses related to computer networking throughout the two degrees of study program Computer and Communication Systems and Networks. Within the education process ITC FIIT STU prepares instructor trainings and prepares students for CCNA and CCNP certification exams.

## 10.1 Staff

### Director

Pavel Čičák, Associate Professor, CCNA, CCAI

### Administrative Department

Marušincová Zuzana

### Instructor Staff

Andrej Binder, CCNA, CCNP

Martin Čechvala, CCNP

Boris Dado

Igor Grellneth, PhD., CCNP, CCAI-CCNA

Pavol Helebrandt

Martin Hrubý, CCNA, CCNP

Adrián Chovan, CCNA, CCNP

Katarína Jelemenská, PhD.

Margaréta Kotočová, Associate Professor, CCNA, CCAI

Dominik Macko

Peter Mesjar, CCNA, CCNP, CCAI, CCIE

Ján Skalný, CCNA, CCAI-CCNA, CCNA Security

Rastislav Szabó

Peter Vilhan, CCNA, CCAI-CCNA

### Engineering Staff

Dušan Bernát

Roman Stovíček, PhD.

## 10.2 Study programmes

- Study program for preparation for certification exam CCNA
- Study program for preparation for certification exam CCNP
- Study program for preparation for certification exam WLSS
- Study program for preparation for certification exam Cisco Firewall Specialist
- Study program for preparation of specialists in the field of IP Telephony

## 10.3 Cooperation

### Cooperation in Slovakia

- Regional Networking Academy, Faculty of Electrical Engineering and Information Technology, Technical University in Košice
- Regional Networking Academy, Faculty of Management Science and Informatics, University of Ľilina
- CISCO Systems Slovakia, Ltd.
- GTEC, Ltd.
- SOITRON, Ltd.

- DITEC Ltd.
- Tempest, Ltd.
- Hewlett-Packard Slovakia Ltd.
- IBM Slovakia Ltd.
- Microsoft Slovakia Ltd.
- Siemens Enterprise Communications Ltd.

**International Cooperation**

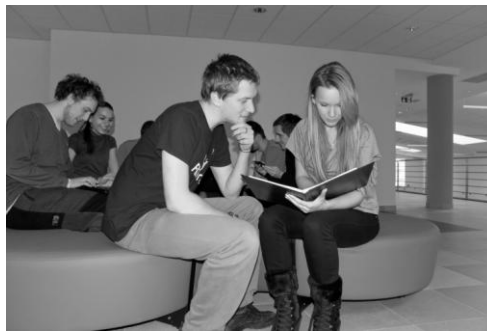
- Regional Cisco Networking Academy, Czech University of Technology, Prague, Czech Republic
- Regional Cisco Networking Academy, Faculty of Information Technologies, Technical University in Brno, Czech Republic
- Regional Cisco Networking Academy, Department of Computers, University of West Bohemia in Pilsen, Czech Republic
- Regional Cisco Networking Academy, Technical University in Ostrava, Czech Republic
- CATC Vienna, Austria
- CATC Birmingham, UK



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## 11 Photo Gallery

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## 12 FIIT Personnel

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