ANNUAL REPORT
2009

STU

SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA
Faculty of Informatics and Information Technologies

Contents

1   Message from the dean

In all previous Annual Reports of a short history of FIIT STU we have complained due to lack of space capacity for the staff as well as for the laboratories and that many activities have been slowed down or even stopped at all. The year 2009 was therefore for all academic staff of the Faculty as well as for all our students important as we have started to build the new building of the FIIT STU. Up to now we "go" down as you can see on photos in the new building photo gallery section (p. 123). However, you can see also how the building will look like when it will be finished.

Another important event of the year 2009 was "complex accreditation" of the STU which summarizes the results of the FIIT STU from its beginning. We were successful despite quite complicated working conditions.

The evaluation of the Long term strategy for the year 2009 showed that almost all goals for this year have been successfully achieved. We are proud that there is still a high interest among secondary schools students to study the study programmes we have prepared for them at our Faculty and that our graduates have no problem to find suitable job.

The Report shows the results achieved in research that is of high priority at 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 5th Student Research Conference IIT.SRC 2009 organised by the Faculty.

A long cooperation of the Faculty with prof. Brusilovsky led to his awarding by Dr.h.c. by our university. We utilized his stay at the Faculty for fruitful discussion not only with the staff members but with our students as well. He participated also on our Student Research Conference where students had another possibility to discuss their scientific problems what was appreciated not only by our students but by prof. Brusilovsky as well.

During the official visit of Slovakia, Assistant Director General of UNESCO and the Director of Information and Communication Sector of UNESCO, Mr. A.W. Khan visited also our Faculty. Except the lecture devoted to problems of knowledge society, meeting with students, we evaluated the current cooperation of the Faculty with UNESCO and discussed further possibilities of our cooperation.

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. We recommend reading also previous Annual reports to see a progress in education a research.

Prof. Ľudovít Molnár
Dean of the FIIT STU

2 Faculty Management Bodies

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 2009

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

> *Pavol Návrat, Professor*
> chair
> `chair@as.fiit.stuba.sk`
>
> *Milan Kolesár, Professor*
> chair of the faculty section
>
> *Ján Máté*
> chair 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

> Ladislav Hudec, Assoc. Professor
>
> Daniela Chudá
>
> Miroslav Galbavý (since October 2009)
>
> Katarína Jelemenská
>
> Ivan Kapustík (till October 2009)
>
> Milan Kolesár, Professor (till October 2009)
>
> Ivan Kotuliak (since October 2009)
>
> Alena Kovárová (since October 2009)
>
> Vladimír Kvasnička, Professor (till October 2009)
>
> Pavol Návrat, Professor
>
> Juraj Štefanovič

Members of the student section of the Academic Senate
students@as.fiit.stuba.sk

> Jaroslav Abaffy (since November 2009)
>
> Celestín Černák
>
> Eva Danillová
>
> Alojz Gomola (since November 2009)
>
> Andrej Folgeton (till August 2009)
>
> Ján Máté (till October 2009)

Activities of the Academic Senate of the Faculty in 2009

The Academic Senate of the Faculty of Informatics and Information Technologies in 2009

– discussed the proposal of Rules for forming study plans, conditions for continuation of study and for regular completion of study, and recommended study plans for each study programme presented by the Dean,

– approved new vice-dean (Tibor Krajčovič, Assoc. Professor), presented by the Dean,

– approved the proposal to fill vacancies in the Scientific Board (Elena Gramatová, Assoc. Professor), presented 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.

<div style="text-align: right">

Prof. Pavol Návrat
Chair Academic Senate FIIT STU

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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 19, 2007 and appointed by the Rector to his office on December 2, 2007 for a four year office term. Dean inauguration ceremony was held on March 11, 2008. New vice-deans were approved by the Academic Senate in January 2008.

> *Ľudovít Molnár, Professor*
> Dean
> `dean@fiit.stuba.sk`
>
> *Mária Bieliková, Professor*
> Vice-Dean for Research and Human Resources
> `vicedean_research@fiit.stuba.sk`
>
> *Pavel Čičák, Assoc. Professor*
> Vice-Dean for National and International Relations and for Public Relations
> `vicedean_cooperation@fiit.stuba.sk`
>
> *Margaréta Kotočová, Assoc. Professor*
> Vice-Dean for Education
> `vicedean_education@fiit.stuba.sk`
>
> *Štefan Kozák, Professor* (till August 2009)
> Vice-Dean for New Building and Material Resources
> `vicedean_development@fiit.stuba.sk`
>
> *Tibor Krajčovič, Assoc. Professor* (since September 2009)
> Vice-Dean for New Building and Material Resources
> `vicedean_development@fiit.stuba.sk`

2.3 Scientific Board of the Faculty

Members of the Scientific Board in 2009

Chair of the Scientific Board
> Ľudovít Molnár, Professor

Deputy chair of the Scientific Board
> Mária Bieliková, Professor

Members from the academic community of the Slovak University of Technology
> Mária Bieliková, Professor
>
> Pavel Čičák, Assoc. Professor
>
> Peter Farkaš, Professor
>
> Elena Gramatová, Assoc. Professor (since September 2009)
>
> Pavol Horváth, Professor
>
> Ladislav Hudec, Assoc. Professor
>
> Margaréta Kotočová, Assoc. Professor
>
> Štefan Kozák, Professor

Tibor Krajčovič, Assoc. Professor

Ľudovít Molnár, Professor

Oliver Moravčík, Professor

Ján Murgaš, Professor

Pavol Návrat, Professor

Jiří Pospíchal, Professor

Gregor Rozinaj, Assoc. Professor

Vladimír Vojtek, Professor (deceased)

Peter Volauf, Assoc. Professor

External members

Milan Češka, Professor – Brno University of Technology

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

Ivan Kalaš, Professor – Comenius University in Bratislava

Josef Kolář, Assoc. Professor – Czech Technical University in Prague

Karol Matiaško, Professor – University of Žilina

Jaroslav Šušol, Assoc. Professor – Comenius University in Bratislava

Jiří Šafařík, Professor – University of West Bohemia in Pilsen

Liberius Vokorokos, Professor – Technical University in Košice

Honourable members

Milan Kolesár, Professor

Vladimír Kvasnička, Professor

Activities of the Scientific Board of the Faculty in 2009

The Scientific Board of the Faculty of Informatics and Information Technologies in 2009:

- discussed an update of the long-term strategy of the Faculty development for the 2009 prepared in accordance with the long-term strategy of the Slovak University of Technology in Bratislava,

- 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 2009/10 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 guarantees of the study programmes,

- endorsed supervisors for doctoral study programmes (in accordance with the University Code),

- conferred Wolfgang Kempelen Medal for momentous contribution to research and development in informatics and information technologies in connection to the Slovak University of Technology in Bratislava to:

  - Abdul Waheed Khan,

- conferred the academic degree "philosophie doctor" to:

  - Erik Csókás (Computer Hardware and Systems)
  - Matej Makula (Applied Informatics)
  - Peter Trhan (Applied Informatics)
  - Radovan Semančík (Computer Hardware and Systems).

Prof. Ľudovít Molnár
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 2009

Chair of the Disciplinary Commission of the Faculty for Students

Ladislav Hudec, Assoc. Professor

Members of the Disciplinary Commission of the Faculty for Students

Juraj Štefanovič, PhD.

Ivan Kapustík

Peter Vojtek – student of the doctoral degree programme

Vladimnír Michalec – student of the master degree programme

Valéria Harvanová – student of the bachelor degree programme

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

3 Study

3.1 Undergraduate Study (Bc)

In 2009 two accredited study programmes with regular length three years were offered:

- *Informatics*,
- *Computer Systems and Networks* (as an orientation in Computer Engineering) substituted by *Computer and Communication Systems and Networks* (as an orientation in Computer Engineering), since academic year 2009/10.

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

Numbers of the full-time bachelor programme students

		1st year	2nd year	3rd year	4th year[1]
Academic year	2003/2004[1]	150	103	123	134
	2004/2005	333 (216/117)	112 (60/52)	95[1]	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)	-

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 4 overseas students.

In June 2009 the students in the both study programmes defended their bachelor theses and passed the final examination. The number of all graduates was 205. From it, there were 143 in study programme Informatics and 62 in study programme Computer Systems and Networks.

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

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[1] Only the students in study programme Informatics.

- *"Magna cum laude"*: Peter Abelovský, Peter Ertl, Peter Havrila, Andrej Hopko, Ondrej Kallo, Matej Krchniak, Martin Labaj, Dominik Macko, Adrián Rakovský, Karol Rástočný, Miroslav Siebert, Jakub Ukrop

- *Dean's Award for Excellent Bachelor Thesis*: Peter Abelovský, Martin Labaj, Dominik Macko

- *Dean's Commendatory Letter for Bachelor Thesis:* Peter Abelovský, Marek Dian, Ľubomír Eľko, Peter Havrila, Miroslav Hetteš, Peter Jombík, Ondrej Kallo, Miroslav Kanianský, Klaudia Konôpková, Michal Kožuch, Martin Labaj, Peter Líška, Michal Lohnický, Branislav Lukáč, Dominik Macko, Tomáš Mičko, Lukáš Ondriga, Adrián Rakovský, Martin Sadauskas, Miroslav Siebert, Rastislav Szabó, Ján Šugarek, Daniel Švoňava, Jakub Ukrop

779 applicants took part in the entrance examination to bachelor study programmes (557 applicants for study programme Informatics, 222 applicants for study programme Computer and Communication Systems and Networks). 552 applicants were offered admission (373 Informatics, 179 Computer Systems and Networks), 291 out of them actually made use of it and were enrolled (189 Informatics, 102 Computer Systems and Networks).

3.2 Master Study (Ing)

In 2009, FIIT STU offered three accredited study programmes:

- *Software Engineering (SI):* regular length two or three years[2],

- *Computer Systems and Networks* (CSN) (as an orientation in Computer Engineering): regular length two or three years, substituted by *Computer and Communication Systems and Networks* (CCSN) (as an orientation in Computer Engineering, since academic year 2009/10), regular length two or three years,

- *Information Systems (IS):* regular length two or three years.

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

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

		all	SI	CSN (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	-

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

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[2] Three years for students who have not obtained their first degree in related field.

On the course we have one overseas student.

In these study programmes 112 students graduated in spring semester 2008/09 and 24 students in autumn semester 2009/10:

- 57 graduates in Software Engineering,
- 44 graduates in Computer Systems and Networks/Computer and Communication Systems and Networks and
- 35 graduates in Information Systems.

The following students were conferred awards for their excellent results[3]:

- "*Summa cum laude*": Marko Divéky, Lenka Litvová
- *"Cum laude":* Lucia Jastrzembská, Katarína Kostková, Bianka Kováčová, Andrej Letkovský, Peter Magula, Juraj Michalák, Pavel Paroulek, Tomáš Pulai, Alexander Šimko
- *Dean′s Award for Excellent Master Thesis*: Marko Divéky, Juraj Michalák
- *Slovak Academy of Sciences Award for Excellent Master Thesis*: Bianka Kováčová, Pavel Paroulek
- *Institute of Inf., Slovak Academy of Sciences Award for Excellent Master Thesis*: Matej Jurikovič, Peter Kajsa
- *Tatra Bank Award for Excellent Master Thesis*: Lenka Litvová
- *Dean's Commendatory Letter for Master Thesis*: Marko Divéky, Adam Hamšík, Lucia Jastrzembská, Matej Jurikovič, Peter Kajsa, Bianka Kováčová, Andrej Letkovský, Lenka Litvová, Peter Magula, Juraj Michalák, Stanislav Ochotnický, Pavel Paroulek, Tomáš Pulai, Alexander Šimko

260 applicants took part in an entrance examination on July 2009 as a prerequisite to the master programmes. 210 students were offered admission (73 Software Engineering, 76 Computer and Communication Systems and Networks, 61 Information Systems), 193 out of whom were enrolled.

3.3 Doctoral Study (PhD)

Quality and number of doctoral students significantly influence the results obtained in research. We observe an insufficient number of 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 now. The number of full-time doctoral students is on an increase.

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

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[3] Several awards are conferred once per academic year – the selection is made according to proposals from graduates after each semester.

Year	2002	2003	2004	2005	2006	2007	2008	2009
Number of students	11	16	22	22	24	25	30	34

In 2009 following dissertations were defended:

- *Anton Andrejko*: Novel Approaches to Acquisition and Maintenance of User Model (Software Systems as an orientation in Software Engineering, supervisor: Mária Bieliková, Professor)

- *Erik Csókás*: New Methods of Computer System Design (Computer Hardware and Systems, supervisor: Pavel Čičák, Associate Professor)

- *Jaroslav Jakubík*: Identification of Design Patterns by Static Analysis Based on their Significant Features (Software Systems as an orientation in Software Engineering, supervisor: Pavol Návrat, Professor)

- *Peter Lacko:* Emergence of Game Strategy in Multiagent Systems (Artificial Intelligence, supervisor: Vladimír Kvasnička, Professor)

- *Marián Lekavý*: Planning and Rescheduling (Applied Informatics, supervisor: Pavol Návrat, Professor)

- *Matej Makula*: Benefits and Constrains of Recurrent Neural Networks for Processing Symbolic Sequences (Applied Informatics, supervisor: Ľubica Beňušková, Associate Professor)

- *Radovan Semančík:* Revised World Wide Web Architecture (Computer Hardware and Systems, supervisor: Margaréta Kotočová, Associate Professor)

- *Peter Trebatický:* Prediction of Dynamical Systems by Recurrent Neural Networks (Artificial Intelligence, supervisor: Jirí Pospíchal, Professor)

2009 was already the fifth year that the Faculty admitted students for study in newly accredited study programmes in doctoral study. Three accredited study programmes were offered:

- *Applied Informatics*,
- *Computer Systems and Networks* (as an orientation in Computer Engineering),
- *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.

3.4 Student Conferences and Competitions

The Faculty organised and supported in 2009 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.

Slovakia Student Personality of the year

– Michal Tvarožek: Winner of the Slovakia Student Personality Competition of the academic year 2008/09 in the category Informatics and mathematic-physical science

Brain of the year

– Special prize in prestigious competition for Slovak researchers aimed at popularization of science and engineering: Marián Hönsch, Michal Kompan, Jakub Šimko, Dušan Zeleník with the project Energy Consumption Manager, supervisor: M. Bieliková

IIT.SRC 2009 – Informatics and Information Technologies Student Research Conference
   (to be mentioned in the following section in more detail)

Imagine Cup

– 1st place, Slovak finals of the Imagine Cup 2009 competition:
Martin Labaj, Peter Líška, Michal Lohnický, Daniel Švoňava: Aid AutoMagically, supervisor: M. Bieliková

NAG (Networking Academy Games) – category of individuals

– 1st place, Slovak finals of NAG 2009: Vladimír Michalec
– 2nd place, Slovak finals of NAG 2009: Štefan Gula
– 1st place, Central Europe Finals of NAG 2009: Vladimír Michalec
– 3rd place, Central Europe Finals of NAG 2009: Štefan Gula

ACM International Collegiate Programming Contest

– Winners of the Slovak University of Technology ACM Programming Contest, participation in Central European Regional Contest 2009, Wrocław, Poland: Michal Lohnický, Márius Šajgalík, Daniel Švoňava

CZ ACM & SK ACM Student Research Competition

– 3rd place, Czech and Slovak ACM SRC 2009 finals: Martin Jačala: Identifying Entity Relationships in News Reports, supervisor: J. Tvarožek
– Special Award, Czech-Slovak finals: Katarína Kostková: Identifying an Individual in Large Information Spaces by Leveraging Social Relationships, supervisor: M. Barla

International ACM SRC

– 2nd place, Student Research Competition 2010 organized as a part of Hypertext 2009, Torino, Italy: Michal Tvarožek: Personalized Semantic Web Exploration Based on Adaptive Faceted Browsing, supervisor: M. Bieliková

RoboCup, Soccer Simulation League

– Winners of the Slovak University of Technology RoboCup 2009, 3D:
Tím Agenty 007: Ondrej Ševce, Dušan Rodina, Peter Nosko, Daniel Slamka, Peter Smolinský, Ivan Tomovič, supervisor: M. Lekavý
Tím Sirius 3D: Marián Buchta

– Winners of the Slovak University of Technology RoboCup 2009, 2D:
Ján Hric, Michal Hrubý, Juraj Ligocký, Gabriel Pán, Marek Polák,
supervisor: I. Kapustík

TP Cup

– Best Team of the year 2009 winners: Peter Nosko, Dušan Rodina, Daniel Slamka,
Peter Smolinský, Ondrej Ševce, Ivan Tomovič: RoboCup 3rd dimension,
supervisor M. Lekavý

Web Services Challenge

– 1st place in the International Competition Web Services challenge 2009 in the
category Architecture and 3rd place in the category Performance: Peter Bartalos,
supervisor: M. Bieliková

Graduate Theses Competition in Informatics

– 3rd place: Marko Divéky with diploma thesis: Generating Dynamic Interactive
Stories, supervisor: M. Bieliková

IT Diploma Theses of the year

– participation in the finals: Zdenko Porubčan with diploma thesis Computing
Models for Hierarchical Temporal Memory, supervisor: J. Štefanovič

International 24-hour Programming Contest

– Participation in finals of Challenge 24 – 9th BME 24-hour International
Programming Contest 2009, Budapest, Hungary: Daniel Švoňava, Márius Šajgalík,
Peter Trebatický

3.5 Awarded Theses

Excellent Bachelor Theses

Student name: Peter Abelovský
Degree program: Informatics
Thesis title: *Creation of Intelligent Agent by Symbolic Approach of Artificial
                    Intelligence*
Supervisor: Peter Lacko, PhD.
Defended on: May 2009
Annotation: Simulated environment used for creation and testing of intelligent
                    agents enables us to prove and compare relatively quickly which atti-
                    tudes in the process of making are the most suitable. The first part of
                    the work deals with analysis of multiagent environment called Robo-
                    code. This effort results in setting of rules, limitations and laws that
                    define the options of robot′s behaviour. The next part of the work
                    consists of categorization of used algorithms which control the indi-
                    vidual aspects of contemporary agents' behaviour. The intelligent
                    agent design itself is realized through several different attitudes and
                    its main aspect is the agent segmentation into independent modules.
                    The results of the above-mentioned design suggest usage possibilities

of dynamic clustering technique for data storage and categorization in movement and targeting algorithms as the alternative to the multi dimensional arrays. Another interesting finding is the observed equivalence in performance between the guess factor targeting algorithm and pattern matching algorithm, both used for aiming.

Student name: Martin Labaj
Degree program: Informatics
Thesis title: *Software Design in International Competition*
Supervisor: Mária Bieliková, Professor
Defended on: May 2009
Annotation: This report on bachelor project describes work made on a project, which goal is to develop a system according to the rules of Imagine Cup 2009 competition organized by Microsoft Corporation. This year's theme was "Imagine a world where technology helps solve the toughest problems facing us today". This theme is explained farther by United Nations Millennium Development Goals. The project is being developed by a team of four students, including the author. The document describes the system for simplifying the process of financial contributing to charitable purposes with the help of a concept called "rounder", which allows buyer using credit or debit card in a shop or on the internet to round the amount being paid and let the extra funds be given to a purpose of his choice. The system also enables charitable organizations wanting to receive these funds to present themselves and also spread information about their charity work and about problems of people who need help from others, everything via a new form of information presenting in an entertaining way. This concept is called WOWI (World of Web Information). This form of information presentation could be also used in various other means, from education to commercial purposes and even more.

Student name: Dominik Macko
Degree program: Computer Systems and Networks
Thesis title: *VHDL Model Visualization*
Supervisor: Katarína Jelemenská, PhD.
Defended on: May 2009
Annotation: In this project I deal with the problem of visualization of VHDL model and with the possibilities, existing visualizers can offer. I focus especially on visualizers, solved in diploma projects Visualization of VHDL model and Visualization of VHDL description. >From analysis of present state of these solutions, I propose some upgrades of application VHDL Visualizer, the result of diploma project Visualization of VHDL model. To the proposed solutions belong making the interface user – friendly, improvement of drawing of schematic representation of VHDL model and improvement of the function for detection of incorrect VHDL source code. I propose to extend the application by simulation of VHDL model and visualization of this simulation by the change of the states of signals in the

schematic representation. During implementation of solution I focused mainly on upgrading of visualizing algorithm and eliminating insufficiencies, I came across. In consequence of multiple choices of solution and of information from previous solutions, in this way proposed and implemented system should fulfil the requirements of the project as well as the requirements of users.

Excellent Master Theses

Student name: Marko Divéky
Degree program: Software Engineering
Thesis title: *Generating Dynamic Interactive Stories*
Supervisor: Mária Bieliková, Professor
Defended on: May 2009
Annotation: Interactive storytelling is a field of research in artificial intelligence that focuses on combining conventional stories with interactivity, resulting in immersing the reader inside stories by let-ting him shape the storyline in any desired direction through committing narrative actions. Despite the large amount of work that has already been done in this field, there have been only a few working solutions that found practical use other than being a proof-of-concept demonstrations. Today's popular computer role-playing games are an ideal medium for inter-active storytelling, given their practically unlimited degree of interactivity and visual attractiveness. This work describes a new approach that aims to reduce the border between the field of interactive storytelling and modern computer games by making it possible to programmatically generate interactive stories with visually appealing computer role-playing games as the storytelling medium.

Student name: Matej Jurikovič
Degree program: Computer Systems and Networks
Thesis title: *Communication of the Mobile Phone with Computer via the Bluetooth Interface*
Supervisor: Tibor Krajčovič, Assoc. Professor
Defended on: May 2009
Annotation: The aim was to analyze the communication between the mobile phone and the computer via the Bluetooth interface. It was also necessary to analyze the field of virtual serial ports, AT instructions, to design and to implement software for operation and communication with the mobile phone. Some known solution of the software for operation and communication with the mobile phone were also analyzed. In my thesis all the parts necessary for designing such software are described. The possibility of communication through virtual serial port, OBEX protocol, SMS coding in PDU format, AT format instructions and also a standard Bluetooth communication protocol are also described. The implemented program provides the basic functions for working with a mobile telephone. During the implementation the main focus was given to create a comprehensive and effective method of reading and writing from the serial port. For this reason

threads were implemented, that are providing the realization for requests to communicate with the mobile phone as well as reading from the serial port. Emphasis was also given to the simplicity of the user interface, the speed of the response and the single functions which the program offers.

Student name:	Peter Kajsa
Degree program:	Software Engineering
Thesis title:	*Patterns Application Support in Software Projects*
Supervisor:	Ľubomír Majtás
Defended on:	May 2009
Annotation:	This project deals with design patterns application support in software projects. It provides specification, design and realization of method of design pattern application in software projects. Elaborated method is based on semantics defined via UML profile and transformations of models at more levels of abstraction. Semantics defined via UML profile support specialization of pattern instance and model transformations support and automate concretization of design pattern instance. Presented method provides support of variability of design patterns and it considers ideas of model driven, iterative and incremental development of software systems. Moreover the transformations of models are driven by models of design patterns. So the method does not provide strictly oriented method of design pattern support but represents mechanism or technique of creation and addition of support of other patterns or another custom model structures which are often created in models mechanically.

Student name:	Bianka Kováčová
Degree program:	Software engineering
Thesis title:	*Similarity and Recognition of Plagiarized Program*
Supervisor:	Daniela Chudá, PhD.
Defended on:	May 2009
Annotation:	The aim of this thesis is to inform a reader about basic methods and tools for plagiarism detection, to propose our own method for the detection and to implement an application with the proposed method verification. The thesis focuses on source code plagiarism. Besides a common listing of basic characteristics this thesis offers also their comparative analysis and results of a personal testing. The analysis phase was the basis for our own method proposal which has ambitions to bring something new and to make the plagiarism detection more precise. The application named SIDplag was implemented and deeply tested and it verified the contribution of the proposed method.

Student name:	Lenka Litvová
Degree program:	Software Engineering
Thesis title:	*Multimedia Application for Mobile Device*
Supervisor:	Alena Kovárová
Defended on:	May 2009

Annotation: The purpose of this diploma thesis is to develop a multimedia application for Symbian – the most popular operating system for mobile devices. The advantage of this operating system is the possibility to integrate user specific applications. As mobile devices have limited memory and computing capacity, developing applications for this platform is specific. This diploma thesis is dedicated to an application increasing the security of a mobile device by identifying the user according to their face. After analysis we have chosen the existing elastic bunch graph matching algorithm, which represents the face with a graph and has high success while using frontal face images. The original algorithm includes a time-consuming phase of extracting the face graph, which we completely changed and implemented in a mobile device friendly way. The low quality of taken photographs made the extraction of face graph the most challenging part of implementation. FRamI, an application usable in daily life presenting the possibilities of normal mobile devices in the sphere of face recognition and also the drawbacks by implementing such an application under Symbian OS, is the output of this diploma thesis.

Student name: Juraj Michalák
Degree program: Computer Systems and Networks
Thesis title: *Embedded System for Encryption of Application Layer Protocols*
Supervisor: Ladislav Hudec, Assoc. Professor
Defended on: May 2009
Annotation: Automation of business processes based on business process management frameworks becomes a daily matter of informatics of these days. It is a complex area and requires detailed knowledge of business processes from the view of business and also from the view of IT. Business process automation is a quite new area of IT what results in lack of practical experience with implementation and elimination of potential risks. This thesis analyses a principle of development of information systems based on business process management and service oriented architecture with use of business process management frameworks. The main goal is to create common method for development of information based on before mentioned principles with an emphasis on identification and elimination of most critical risks of information systems development.

Assoc. Prof. Margaréta Kotočová
Vice-Dean for Education (first and second levels)

Prof. Mária Bieliková
Vice-Dean for Research (including the third level education)

4 Research

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:

– collaborative access, analysis and presentation of documents in the world-wide-web by the use of modern software tools,

– information development in distributed environment of intelligent agents,

– methods and tools for software systems development,

– the use of computer graphics in virtual and augmented reality systems,

– "echo state" neural networks and recurrent neural networks,

– application of evolutionary algorithms in theory of multi-agent systems,

– methods and tools for security and administration of network and mobile computer systems,

– parallel systems for real-time computing,

– the design methods and tools for application-specific digital systems,

– formal methods and tools for design and description of digital systems,

– embedded computer systems,

– fault-tolerant high-speed parallel and distributed computer structures.

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 2009, two important events mark development in Slovakia, in both of which FIIT STU through its members has been instrumental. First, thanks to initiative of several members of the ACM

who work or study at FIIT STU, Slovak ACM Chapter has been established in June 2009. The Chapter operates with support of FIIT STU. Second, ACM Slovakia Chapter initiated in collaboration with FIIT STU publishing its Bulletin "Information Sciences and Technologies" as a web based scientific journal.

4.2 Scientific Activities

In the year 2009, FIIT STU has organised or co-organised several scientific events:

- scientific conference *Cognition and Artificial Life IX*,
- international conference *Cybernetics and Informatics 2009*,
- international workshop *CESCG 2009 – Central European Seminar on Computer Graphics for students,*
- international scientific conference *SCCG 2009 – Spring Conference on Computer Graphics*,
- scientific conference *Znalosti 2009*,
- international scientific conference *SOFSEM 2009 – Annual Conference on Current Trends in Theory and Practice of Informatics*,
- scientific workshop *WIKT 2009 – Workshop on Intelligent and Knowledge Oriented Technologies*,
- regular seminar on *Artificial Intelligence* (organized at FIIT STU),
- regular 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,
- AIED, Annual Conference on Artificial Intelligence in Education,
- ASEA, International Conference on Advanced Software Engineering & Its Applications,
- ASIS, Adaptive Networks in Information Systems,
- AWIC, Atlantic Web Intelligence Conference,
- CESCG, Central European Seminar on Computer Graphics,
- CEE-SET, IFIP Central and East European Conference on Software Engineering Techniques,
- CEE SECR, Central and Eastern European Software Engineering Conference in Russia,
- CompSysTech, International Conference on Computer Systems and Technologies,
- Cognition and Artificial Life, Annual Conference on Cognition and Artificial Life,

- CSSim, International Conference on Computer Modelling and Simulation,
- DATAKON, Annual Conference on the Current Trends in Databases and Information Systems,
- DidInfo, International Conference on Teaching of Informatics,
- EC-TEL, European Conference on Technology Enhanced Learning,
- ECDL, European Conference on Research and Advanced Technology for Digital Libraries,
- EJC, European Japanese Conference on Information Modelling and Knowledge Bases,
- ENASE, International Working Conference of Evaluation of Novel Approaches to Software Engineering,
- GCCP, International Workshop on Grid Computing for Complex Problem,
- HT, ACM Conference on Hypertext and Hypermedia,
- IADIS, Virtual Multi Conference on Computer Science and Information Systems – Intelligent Systems and Agents,
- ICCC, International Carpathian Control Conference,
- ICETA, International Conference on Emerging E-Learning Technologies and Applications,
- ICWE, International Conference on Web Engineering,
- INFORMATICS, Conference on Computer Science and Informatics,
- ISMIS, International Symposium on Methodologies for Intelligent Systems,
- ITAT, Workshop on Information Technologies – Applications and Theory,
- KES-AMSTA, KES International Symposium on Agent and Multi-Agent Systems – Technologies and Applications,
- MCCIS-ISA, IADIS International Conference, Intelligent Systems and Agents 2009Conference,
- MENDEL, International Conference on Soft Computing,
- NWESP, International Conference on Next Generation Web Services Practices,
- SADM&ICADIWT, Special Session on Semantics Aware Data Management, International Conference on Application of Digital Information and Web Technologies,
- SAMI, International Symposium on Applied Machine Intelligence and Informatics,
- SCO, Sharable Content Objects Conference,
- SERA, International Conference on Software Engineering Research, Management and Applications,
- SMAP, International Workshop on Semantic Media Adaptation and Personalization,

- SOFSEM, Annual Conference on Current Trends in Theory and Practice of Informatics,

- S3T, International Conference on Software Service Semantic Technologies,

- UMAP, International Conference on User Modelling, Adaptation and Personalization,

- VU, International Conference Virtual University,

- WIKT, Workshop on Intelligent and Knowledge oriented Technologies,

- WIRSS, International Workshop on Web Information Retrieval Support Systems, IEEE/WIC/ACM International Conference on Web Intelligence,

- ZNALOSTI, Annual Conference on Knowledge Acquisition, Representation and Exploitation.

In 2009, FIIT STU organised or co-organised several events aimed at exhibition of students' research work. Above all, it was the *5th Informatics and Information Technologies Students Research Conference – IIT.SRC 2009*, which was held on April 29, 2009.

IIT.SRC 2009 attracted 74 student papers from which 70 were accepted (16 bachelor, 32 master, 21 doctoral, one paper authored by master students together with a doctoral student). It is an increase comparing to 2008 by 9% mostly in master and doctoral student categories. This fact supports our endeavour to attract more students of graduate and undergraduate study. Papers were in two categories: full papers (further organized as researching solutions and developing innovative solutions) and extended abstracts.

IIT.SRC 2009 was organized in five sections:

- Software Engineering,

- Information Processing, Web Technologies,

- Computer Graphics, Multimedia, Artificial Intelligence,

- Computer Science, Artificial Intelligence,

- Computer Systems, Computer Networks, Security and Grids.

The Conference was opened by a keynote of prof. Peter Brusilovsky (University of Pittsburgh) who has been awarded a degree Doctor honoris causa, Dr.h.c., by the Slovak University of Technology in Bratislava. The keynote was on topic of open corpus adaptive hypermedia.

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

- *category of doctoral students – Jakub Mažgut* (Analyzing DNA Sequences Based on Oligomer-Position Information, supervisor P. Tiňo)

- *category of master students – Michal Kasan* (Semantics, AI-planning and User: Mutual Assistance in Web Service Composition, supervisor V. Rozinajová)

- *category of bachelor students – Martin Labaj, Peter Líška, Michal Lohnický, Daniel Švoňava* (inFUNmation – Novel Approach to Information Presentation Employing a Game, supervisor M. Bieliková)

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

- *Martin Jačala* (Identifying Entity Relationship in News Reports, supervisor J. Tvarožek)
- *Peter Kajsa* (Design Patterns Instantiation Based on Semantics and Model Transformations, supervisor L. Majtás)
- *Michal Barla* (On Finding Keyword Relations Using Wisdom of the Crowd, supervisor M. Bieliková)
- *Jaroslav Abaffy* (Performance Comparison of OS Schedulers on Symmetric Multiprocessors, supervisor T. Krajčovič)
- *Gabriel Braniša* (Design of Environment for Simulation Evolutionary 3D Multi-Agent Systems, supervisor M. Šperka)

Besides the 70 papers presented at the conference the *RoboCup* Exhibition was organised as a part of IIT.SRC 2009. RoboCup is an attractive project with free participation, designed to support education and research in artificial intelligence, robotics and information technologies. Through several years, our students achieved interesting results in simulated league both 2D and 3D, which were presented during the conference. Accompanying events included also programming competition and technical presentations related to modern information technologies given by the conference sponsors.

This year we organized for the first time as part of IIT.SRC a showcase of *TP-Cup* competition 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 programmes. 7 teams managed to achieve this stage and presented their projects during the TP-Cup showcase.

The finals of the *7th ACM CZ Student Research Competition* were organised in November 2009 in Prague. Nine best bachelor and master student projects from six universities from the Czech Republic and Slovakia were presented. The project

- *Identifying Entity Relationships in News Reports r* authored by our student *Martin Jačala* (supervisor J. Tvarožek) won the 3rd place and the project
- *Identifying an Individual in Large Information Space by Leveraging Social Relationships* authored by *Katarína Kostková* (supervisor M. Barla) won the special prize.

In September 2009 we actively participated in "The Night of Researcher", event supported by European Commission. This event was organized in more than 150 European cities. 31 countries prepared presentations from the field of science and research for the laic public.

Four students' teams presented to public their research projects:

- *World of Web Information* – project, which attended the world final of Imagine Cup 2009 in Egypt, team: Martin Labaj, Michal Lohnický, Peter Líška, Daniel Švoňava supervised by M. Bieliková,
- *Interactive Weather Desktop* – project awarded at the IIT.SRC 2009 by the price of the Czech ACM chapter, team: Martin Čaučík, Tomáš Dankovčík, Peter Jakubec, Martin Jakubeci, Luboš Ukrop, Martin Zachar supervised by A. Kovárová,

- *Experimental music instrument* – project awarded at the IIT.SRC 2008 by the price of Circuits and Systems, Communications Societies and Signal Processing Societies IEEE Chapter Award, Mária Pohronská supervised by T. Krajčovič,

- *How to play football – project RoboCup*, team: Tomáš Backstuber, Peter Nosko, Daniel Slamka, Peter Smolinský supervised by I. Kapustík,

- *Bloodlezzz* – project was awarded by the price of Czechoslovak Section IEEE and Best Poster Award at the IIT.SRC 2008, team: Sašo Kiselkov, Bianka Kováčová, Martin Kozmon, LenkaLitvová, Michal Poláčik, Jakub Teleľ supervised by A. Kovárová,

- *Laser Pointer Map Interaction* – bachelor project, team: Viktor Mészáros, Andrej Zelman supervised by A. Kovárová.

4.3 Publications

Results of our research were published in 207 publications, which presents slight increase in comparison with 2008. 148 scientific contributions were published in conference proceedings, 58 out of which were published in reviewed proceedings of international conferences. 35 scientific contributions were published in scientific journals and we have authors (co-authors or editors) of 27 books or book chapters.

FIIT STU is a co-publisher of the international scientific journal "Computing and Informatics" (until 2001 Computers and Artificial Intelligence). Two faculty staff members, P. Návrat and V. Kvasnička were members of its editorial board in 2009. Moreover, the faculty participates in editorial boards of seven other international journals and two national journals.

Number of publications in 2009	UAPI[4]	UISI	UPSS	**FIIT**
Books and parts of books published by international/national publisher	2/3	1/11	1/-	4/14
Scientific works published in international/national scientific journals	5/8	12/7	1/2	18/17
Scientific works published in international conference proceedings	10[*]	25[*]	24	58
Scientific works published in national or local conference proceedings	16	55	14	85
Conference proceedings editors	0	5	-	5
Books editors	2[*]	1[*]	-	2
Published reviews	-	4	-	4

* common publication

Overview of other most significant activities in 2009	UAPI	UISI	UPSS	**FIIT**

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[4] UAPI – Institute of Applied Informatics, UISI – Institute of Informatics and Software Engineering, UPSS – Institute of Computer Systems and Networks

Membership in editorial boards of scientific journals	7	4	2	13
Membership in programme committees of international scientific conferences	9	36	12	57
Membership in programme committees of national or local scientific conferences	3	12	2	17
Membership in steering committees of scientific conferences	1	6	2	9

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.

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 2009 two VEGA projects were completed, five were progressed and two new projects were prepared for funding in 2010-2011. One APVV project was completed in 2009, and one other progressed. One project of the Cultural and Educational Grant Agency of the Ministry of Education of Slovak Republic (KEGA) was completed in 2009 and one four new projects were prepared for funding in 2010 -2011. Mentioned projects are described in reports of institutes presented in the following parts.

The Faculty under the leadership of P. Návrat and V. Rozinajová participated in two international projects, under the leadership of J. Štefanovič in one international project and under the leadership of P. Čičák in one international project.

Number of projects funded in 2009	UAPI	UISI	UPSS
VEGA	5[*]	1	3[*]
KEGA	-	1	-
APVV	1[*]	1	1[*]
RVT	-	1	-
European Structural Funds	-	1	1
International projects	1	2	1
FIIT STU	**7**	**8**	**6**

[*] common projects

Overview of funds (in Eur)	UAPI	UISI	UPSS	**SUM**

VEGA[5]	47 435	32 057	35 874	115 366
KEGA	-	25 845	-	25 845
APVV	3 334	26 953	3 333	33 620
RVT	-	33 194	-	33 194
International projects	-	3 517	-	3 517
FIIT STU	**50 769**	**121 566**	**39 207**	**221 542**

In 2009 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 started new project SMART – 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. 1 395 tis. Eur. The same team participated in the preparation of continuing project SMART II that was approved with overall budget approx. 2 214 tis. Eur. Institute of Informatics and Software Engineering participated in preparation of research project for Call of the ERDF Agency directed towards applied research in collaboration with industry. This project led by Gratex Ltd. was approved for financing for period of 2010-2013.

The projects are realized in our research laboratories (description can be found in the parts devoted to individual institutes). In 2009 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,
- Laboratory of Intelligent Embedded Systems, manager: Š. Kozák,
- Laboratory of Modelling and Simulation, manager: Š. Kozák,
- VLSI Design Laboratory, manager: J. Hudec,
- Digital Systems Description and Design Laboratory, manager: K. Jelemenská,
- Grid Computing Laboratory, manager: L. Hudec.

Prof. Mária Bieliková
Vice-Dean for Research

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[5] 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,
RVT – Ministry of Educations Grants for Science and Technology Development

5 National and International Relations

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, guaranties 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. In 2009 our faculty participated on the second annual set of CiscoOlymp2009 contest. One of the very successful activities is yearly organised Open Day.

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 Ltd., GTEC Ltd., and Microsoft Slovakia Ltd. 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 established a new form of cooperation with partner companies. We organized one week serial of special lessons provided by our industry partners for our students. The first annual set of this activity was successful especially thanks to the following companies and lessons themes:

- HP Slovakia, Ltd.: IT management and administration
- PosAm, Ltd.: Software Development Trends
- Soitron, Ltd.: IT Trends of the year 2009
- Softec, Ltd., Centaur, Ltd.: Information Technologies in Praxis
- Cisco, Ltd., GTEC, Ltd., ELFA, Ltd.: Modern Network Technologies and Technology Platforms

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 Ltd., Soitron Ltd., Siemens Enterprise Communications Ltd., DITEC Ltd., DATALAN Ltd., ASSECO Slovakia Ltd., HP Slovakia Ltd, Goldstein Fuchs, Tempest Ltd.

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 2009, this programme was contracted with these European universities:

- KaHo Sint-Lieven University, Gent, Belgium
- Angel Kunchev University of Rousse, Bulgaria
- Faculty of Information Technologies, Technical University in Brno, Czech Republic
- University of Southern Denmark, Odense, Denmark
- University of Aarhus, Denmark
- Tallinn University of Technology, Estonia
- Lahti University of Applied Sciences, Finland
- EPITA, Graduate School of Computer Science and Advanced Technologies, Paris, France

- ISEP, Graduate school of Engineers in Computer Engineering, Electronics, Telecommunications and Network, Paris, France
- The Nordakademie, Elmshorn, Germany
- Ruhr-University, Bochum, Germany
- Leipzig University, Germany
- Wienna University of Technology, Austria
- Faculty of Electrical Engineering and Computer Science, University of Maribor, Slovenia
- Faculty of Engineering, Mondragón University, Spain
- Technical university of Madrid, Spain
- Catalunya Technical University, Barcelona, Spain
- University of Alcalá, Spain
- Växjo University, Sweden
- University of Calabria, Italy

In 2009, seven incoming Erasmus students have visited FIIT STU. In 2009, 14 students of our faculty were approved for Erasmus-mobility abroad for various destinations, 6 students were hosted by our faculty and 6 teachers have visited France, Great Britain and Belgium.

Besides the LLP/Erasmus agreements, a special agreement of cooperation is established with the Institut Superieur d'Electronique de Paris (ISEP). Based on this agreement, students from ISEP were visiting FIIT STU for the training period of 1 month (July) to do their mandatory students' internship. In summer 2009, we hosted 5 students from ISEP.

Assoc. Prof. Pavel Čičák
Vice-Dean for Public Relations

Juraj Štefanovič, PhD.
Socrates Erasmus Coordinator

6   Faculty Services

6.1 Information and Library Services

Centre for Information and Library Services at the Faculty of Informatics and Information Technologies (CIKS) provides information services for study and research purposes at FIIT STU.

The book catalogue contains more than 6 100 items, which are freely available in the Library. The catalogue can be found on `http://olib.cvt.stuba.sk`. The Centre for Information and Library Services purchased and acquired thanks to donation 40 titles of professional journals (mainly ACM, IEEE membership) in various languages (5 out of them are in Slovak). Journals and selected books are located in the Study Room.

The information services make available, within the FIIT STU environment, 12 external electronic databases (Science Direct, ACM Digital Library, IEEE Computer Society Digital Library, EI Engineering Village 2, EIFL Direct – EBSCO host, IoP Electronic Journals, Journal Citation Report, Oxford Reference Online, The Scientific World, Web of Science, SCOPUS, Web of Knowledge, Willey Encyclopaedia of Electrical and Electronics Engineering), include several fulltext accesses.

The Centre for Information and Library Services also covers loan of the books and magazines and lending basic assistance besides information search.

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 computer network,

–   new computers, printers, scanners etc. installation,

–   operation 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 180 personal computers and notebooks of the faculty staff and PhD students, 215 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

Ľubica Palatinusová
Faculty Secretary

7 Institute of Applied Informatics

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Web:	uapi.fiit.stuba.sk
Tel:	+421 2 654 22 707
Fax:	+421 2 654 20 587

The institute specializes in the area of applied informatics. The scientific and professional activities of the institute concentrate mainly on the area of database systems, data mining, information processing in distributed environment of intelligent agents and computer and information security; further topics of interest lay in the area of computational intelligence (neural networks, evolutionary algorithms, artificial life, simulation of social systems), and in application of computer graphics in virtual reality systems and in systems of enhanced reality, in visualization and human – computer interaction.

The institute is responsible for the following degree programme:

– Applied informatics (doctoral degree).

7.1 Staff

Director
Vladimír Vojtek, Professor (till February 2009)
Ladislav Hudec, Assoc. Professor (since February 2009)

Deputy Director
Vladimír Kvasnička, Professor

Administrative Department
Katarína Pribišová

Teaching Staff
Michal Čerňanský, PhD.
Miroslav Galbavý
Štefan Kozák, Professor, till August 2009
Vladimír Kvasnička, Professor
Peter Lacko, PhD.
Matej Makula, PhD.

Jana Parízková
Jiří Pospíchal, Professor
Branislav Steinmüller (part time)
Ondrej Strnád, PhD. (part time)
Martin Šperka, Assoc. Professor (part time)
Juraj Štefanovič, PhD.
Vladimír Vojtek, Professor, till February 2009
Ladislav Hudec, Assoc. Professor, since February 2009

External lecturers
Wanda Benešová, PhD.

Researchers
Ján Cigánek
Peter Trebatický, PhD.
Viliam Solčány, PhD. (part time)

Full time PhD Students
Peter Drahoš
Martin Hinka
Ondrej Hirjak
Peter Kapec
Alena Kovárová
Juraj Laca
Miroslav Makýš
Tomáš Selnekovič
Juraj Števek
Matúš Uherčík
Ľubomír 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	Autumn	6	M. Šperka
Database Systems	Spring	6	V. Vojtek
IT Security Management	Spring	5	O. Strnád
Mathematical Logic I	Spring	6	V. Kvasnička
Operating Systems	Autumn	6	J. Štefanovič
Modelling and Simulation	Autumn	6	Š. Kozák

Master Study (Ing.)

Course	Semester	Credits	Lecturer
Multimedia Computer Systems	Spring	6	M. Šperka
Evolutionary Algorithms	Spring	6	J. Pospíchal
Neural Networks	Autumn	6	M. Čerňanský
Operating Systems Design	Spring	6	J. Štefanovič
Security in Internet	Spring	6	L. Hudec
Security and Management of Information Systems	Autumn	5	O. Strnád

7.3 Theses

Bachelor (Bc.) Theses – graduates 2009

Study Programme Informatics

- Abelovský, Peter: *Creation of Intelligent Agent by Symbolic Approach of Artificial Intelligence*. May 2009. Supervisor: P. Lacko

- Babinec, Andrej: *Editor of Traffic Events within the Web Map Environment.* May 2009. Supervisor: M. Galbavý

- Barna, Jozef: *Add-on Module for Total Commander*. May 2009. Supervisor: P. Trebatický

- Beňo, Marián: *Multimedia Information in the Regional Information System.* May 2009. Supervisor: M. Galbavý

- Blaško, Miloš: *Speech Recognition.* May 2009. Supervisor: M. Makula

- Blažko, Martin: *Computer Support of Synthesis of Embedded Systems.* May 2009. Supervisor: Š. Kozák

- Božík, Peter: *Image Processing.* May 2009. Supervisor: M. Makula

- Buch, Ondrej: *Design of Mrs. Perkins's Quilt by Combinatorial Optimisation.* May 2009. Supervisor: J. Pospíchal

- Clementis, Ladislav: *Travelling Salesman Problem Solution by Using Simulated Annealing.* May 2009. Supervisor: V. Kvasnička

- Cupák, Marek: *Creating Intelligent Agent Using Symbolic Approach of Artificial Intelligence.* May 2008. Supervisor: P. Lacko

- Časnochová, Hana: *Agents in Circle.* May 2009. Supervisor: J. Pospíchal

- Číková, Zuzana: *Interactive Visualization of Large Graphs in Virtual Reality.* May 2009. Supervisor: M. Šperka

- Ferencz, Frederik: *Machine Language in Application Context.* May 2009. Supervisor: J. Parízková

- Fogelton, Andrej: *Image Processing.* May 2009. Supervisor: M. Makula

−   Fojtík, Michal: *Dynamic Binding of Libraries into Lua Language.* May 2009. Supervisor: P. Drahoš

−   Freml, Milan: *Managing of Virtual Domains for XEN.* May 2009. Supervisor: B. Steinmüller

−   Gabura, Štefan: *Solving Travelling Salesman Problem with Genetic Algorithm.* May 2009. Supervisor: V. Kvasnička

−   Harsányi, Zoltán: *Barrier Synchronization for Parallel Simulator.* May 2009. Supervisor: V. Solčány

−   Hetteš, Miroslav: *E-commerce Portal with Modern Web Technology.* May 2009. Supervisor: P. Trebatický

−   Hopko, Andrej: *Automated Database Normalization.* May 2009. Supervisor: J. Parízková

−   Chnúrik, Jaroslav: *Volumetric Data Browser.* May 2009. Supervisor: V. Solčány

−   Ivančík, Ondrej: *X3D and its Capabilities of Creation Three-Dimensional Interactive Scenes.* May 2009. Supervisor: A. Kovárová

−   Jaborník, Martin: *Entity Relationship Types in Data Model.* May 2009. Supervisor: J. Parízková

−   Janík, Ján: *Management of Virtual Domains for Xen.* May 2009. Supervisor: B. Steinmüller

−   Juhas, Matúš: *Modelling of Nonlinear Processes Usage Fuzzy Logic and Neural Networks.* May 2009. Supervisor: J. Cigánek

−   Kacera, Miroslav: *Study of Human-Machine Interface.* May 2009. Supervisor: J. Štefanovič

−   Kaniansky, Miroslav: *Image Processing.* May 2009. Supervisor: M. Makula

−   Kindernayová, Monika: *A Virtual Presentation of a Work of Art.* May 2009. Supervisor: J. Štefanovič

−   Koprda, Matúš: *Visual Interface for Programming in the Cg Language.* May 2009. Supervisor: P. Drahoš

−   Kovačev, Radovan: *Creating an Intelligent Agent with Use of Symbolic Approach of Artificial Intelligence.* May 2009. Supervisor: P. Lacko

−   Kozák, Andrej: *X3D and its Capabilities in Modelling Three-Dimensional Interactive Scenes.* May 2009. Supervisor: A. Kovárová

−   Kožuch, Michal: *Use of Particle Swarm Optimization to Minimize Logic Circuits.* May 2009. Supervisor: J. Pospíchal

−   Krchniak, Matej: *Effective Building and Filling of Data Warehouses from Transaction Databases through the Use of Metadata.* May 2009. Supervisor: M. Hinka

−   Kuric, Eduard: *Interactive Browsing of Multimedia Content in 3D Space.* May 2009. Supervisor: P. Kapec

- Lulčo, Michal: *Usage of the JAPE Software to Proof Formulas in Sententional and Predicate Logic.* May 2008. Supervisor: V. Kvasnička

- Macko, Michal: *Optimization of Decision Tree Topology.* May 2009. Supervisor: P. Angelovič

- Majzúnová, Petra: *System for the Support of Building and Administering Exam Schedule.* May 2009. Supervisor: M. Galbavý

- Mego, Marek: *Remote Supervision above the Remote Desktop.* May 2009. Supervisor: B. Steinmüller

- Mikuška, Peter: *Supporting System for Term Timetables.* May 2009. Supervisor: M. Galbavý

- Mindek, Peter: *Interactive Browsing of Multimedia Content in 3D Space.* May 2009. Supervisor: P. Kapec

- Murányi, Ján: *Forensic Tools for Collecting Digital Evidence in Windows Environment.* May 2009. Supervisor: L. Hudec

- Ondrášek, Maroš: *The Tool for Visual Debugging Programs Written in Lua Programming Language.* May 2009. Supervisor: P. Drahoš

- Palo, Dušan: *Interactive Presentation of Complex Graphs in Virtual Reality.* May 2009. Supervisor: M. Šperka

- Paulovič, Aurel: *Interactive Forums with Utilization of Modern Web Technology (e.g. Ajax, Flex, etc.).* May 2009. Supervisor: P. Drahoš

- Pavlík, Adam: *Visualization of Human eye with Light Refraction in the Lens.* May 2009. Supervisor: P. Drahoš

- Perdík, Pavol: *Interactive Forums with Utilization of Modern Web Technology (e.g. Ajax, Flex, etc.).* May 2009. Supervisor: P. Drahoš

- Prílepok, Dušan: *Application for Mobile Devices.* May 2008. Supervisor: M. Čerňanský

- Spusta, Juraj: *Variable Length Markov Models.* May 2009. Supervisor: M. Čerňanský

- Szadvári, Jozef: *Security in Databases.* May 2009. Supervisor: J. Parízková

- Šopinec, Róbert: *Virtual Presentation of Art.* May 2009. Supervisor: J. Štefanovič

- Tomašovič, Tomáš: *Databases for Embedded Systems.* May 2009. Supervisor: J. Parízková

- Torda, Dušan: *Nine Queens and Pawn: Optimalization of Relative Position.* May 2009. Supervisor: J. Pospíchal

- Turza, Stanislav: *Source Code Metrics Measurement.* May 2008. Supervisor: P. Kapec

- Ukrop, Jakub: *Constraints in Force-Directed Graph Visualization.* May 2009. Supervisor: P. Kapec

- Zámečník, Daniel: *Coat of Arms Editor.* May 2009. Supervisor: M. Makula

- Zembuchová, Ľudmila: *Using System Engineering Tools the Development of Schedules.* May 2009. Supervisor: M. Galbavý
- Zjara, Matúš: *X3D and its Capabilities in Creating Three-Dimensional Interactive Avatars.* May 2009. Supervisor: A. Kovárová
- Zvalo, Jozef: *Entities Relationships Types in Data Model.* May 2009. Supervisor: J. Parízková

Study Programme Computer Systems and Networks

- Koža, Marek: *Operating System Kernel Components.* May 2009. Supervisor: J. Štefanovič
- Kudlačák, Michal: *Software Security and Protection.* May 2009. Supervisor: L. Hudec
- Ševeček, Gabriel: *Forensic Tools for Collecting Digital Evidence in Unix Environment.* May 2009. Supervisor: L. Hudec
- Šugarek, Ján: *Forensic Tools for Collection of Digital Evidence for Windows.* May 2009. Supervisor: L. Hudec

Master Theses – graduates 2009

Study Programme Information Systems

- Balocký, Stanislav: *Wireless Patient Monitoring System.* May 2009. Supervisor: M. Galbavý
- Braniša, Gabriel: *Design of Evolution Simulating Environment for 3D Multiagent Systems.* May 2009. Supervisor: M. Šperka
- Ivanič, Michal: *AJAX Internet Database Application.* May 2009. Supervisor: P. Drahoš
- Kimák, Peter: *Multimedia Learning Program for Compression Image.* May 2009. Supervisor: M. Šperka
- Košťál, Michal: *Support of Effective Work with Multimedia Information.* December 2008. Supervisor: M. Galbavý
- Kvasničák, Peter: *Information Retrieval in the Process of E-learning.* May 2009. Supervisor: J. Štefanovič
- Makýšová, Jana: *System for Design and Administration Coats of Arms.* May 2009. Supervisor: M. Makula
- Mlynarovič, Vladimír: *Collaboration Environment Modelling.* May 2009. Supervisor: J. Štefanovič
- Nagy, Attila: *E-learning and Operation Systems.* May 2009. Supervisor: J. Štefanovič
- Nemčík, Lukáš: *Web Application for Database Learning Support.* May 2009. Supervisor: J. Parízková
- Ondáč, Stanislav: *Data Integration in Enterprise Environment.* December 2008. Supervisor: M. Galbavý

- Paulech, Martin: *Representative Facilities of Networks with Echo State Property.* May 2009. Supervisor: M. Čerňanský

- Piňák, Andrej: *The Support of Timetable Creation in Multiagent Environment.* May 2009. Supervisor: M. Galbavý

- Rendek, Ladislav: *Data Visualization in Nonlinear Space.* December 2008. Supervisor: P. Kapec

- Sekereš, Tibor: *Combinatorial Optimization with Hopfield Network.* May 2009. Supervisor: V. Kvasnička

- Stanček, Martin: *System for Design and Administration of Arms.* December 2008. Supervisor: V. Vojtek

- Valachovič, Peter: *Stochastic Optimization of Decision Trees.* December 2008. Supervisor: P. Angelovič

- Vilhan, Peter: *Support Tools for Remote Device Management via Web Application.* May 2009. Supervisor: B. Steinmüller

Study Programme Software Engineering

- Čimo, Peter: *Multiparadigm Programming in Language Lua.* May 2009. Supervisor: P. Kapec

- Gregor, Ján: *Solid Geometry and Virtual Reality.* May 2009. Supervisor: A. Kovárová

- Janiš, Pavol: *Adaptation of Training Algorithms of Recurrent Neural Networks on Cell Broadband Engine Architecture.* May 2009. Supervisor: M. Čerňanský

- Kiselkov, Sašo: *Visual Enhancement and Highlighting of Source Code.* May 2009. Supervisor: P. Drahoš

- Komorovský, Filip: *Visual Data Mining in Software.* May 2009. Supervisor: P. Kapec

- Kováč, Dávid: *Automated Testing of Visualization Tools.* May 2009. Supervisor: V. Solčány

- Kozmon, Martin: *Application for Creating 3D Models Using Sketch-Based 2D Modeling.* May 2009. Supervisor: A. Kovárová

- Koščák, Michal: *Natural Speech and Communication with Computer.* May 2009. Supervisor: P. Drahoš

- Kútny, Martin: *Modeling user Behaviour Characteristics for Identification.* December 2008. Supervisor: V. Vojtek

- Lamoš, Dušan: *Usage of Multimedia Content in Traffic Information Systems.* December 2008. Supervisor: M. Galbavý

- Litvová, Lenka: *Multimedia Application for Mobile Device.* May 2009. Supervisor: A. Kovárová

- Pažitný, Michal: *Interactive Visualization of Large Tree Groups.* May 2009. Supervisor: M. Šperka

- Poláčik, Michal: *Adaptation of Recurrent Neural Network Training Algorithms for Multiprocessor Computer Environment.* May 2009. Supervisor: M. Čerňanský

- Porubčan, Zdenko: *Computing Models for Hierarchical Temporal Memory.* May 2009. Supervisor: J. Štefanovič

- Princzkel, Daniel: *Adaptation of Neural Networks Using Newton Raphson Method.* May 2009. Supervisor: V. Kvasnička

- Sim, Lukáš: *Optimalization of Random Forest Algorithm for Prediction Tasks.* May 2009. Supervisor: P. Angelovič

- Svrček, Matúš: *Evolution of Optimal Networks.* May 2009. Supervisor: J. Pospíchal

- Šillík, Milan: *Multimedial E-learning System about Video Compression.* May 2009. Supervisor: M. Šperka

- Šimko, Alexander: *Symbolic Sequence Processing with Recurrent Neural Networks.* May 2009. Supervisor: M. Čerňanský

- Valaška, Ján: *Manipulation with Parts of Different Program's.* May 2009. Supervisor: J. Parízková

- Varga, Ľubomír: *Classification of Visual Data by Neural Networks.* May 2009. Supervisor: P. Lacko

- Zeman, Jozef: *GIS for the Support of Tourism in Towns and Regions.* May 2009. Supervisor: M. Galbavý

Doctoral (PhD.) Theses

Student name:　　　Peter Lacko
Degree program:　　Artificial Intelligence
Thesis title:　　　　*Emergence of Game Strategy in Multiagent Systems*
Supervisor:　　　　Vladimír Kvasnička, Professor
Defended on:　　　　June 25, 2009
Annotation:　　　　In this thesis we focused on subsymbolic approach to machine game play problem. We worked on two different methods of learning. Our first goal was to test the ability of common feed-forward neural networks and the mixture of expert topology. We have derived reinforcement learning algorithm for mixture of expert network topology. This topology is capable to split the problem into smaller parts, which are easier to be solved by an expert neural network. We have compared the quality of strategy emergence between mixture of expert networks and feed-forward networks. Our experiments demonstrate that mixture of experts is able to play a game at the same level as feed-forward networks with equal number of weights. The second approach derived in this work is reinforcement learning with usage of extended Kalman filer. Extended Kalman filter can be used for neural network training. Its advantage is very high learning rate in terms of training cycles. We have proposed usage of extended Kalman filter for reinforcement learning with TD(0) and Monte Carlo method. We have compared the quality of strategy emergence between extended

Kalman filter and TD(l) approach. Our results show that extended Kalman filter is able to create a game strategy after playing a considerably fewer number of games.

Student name:	Matej Makula
Degree program:	Applied Informatics
Thesis title:	*Benefits and Constrains of Recurrent Neural Networks for Processing Symbolic Sequences*
Supervisor:	Ľubica Beňušková, Associate Professor
Defended on:	July 8, 2009
Annotation:	This thesis studies properties of recurrent neural networks while processing symbolic inputs. We focused mainly on their relation and description of their behaviour in the terms of dynamical systems. We describe the dynamics of randomly initialized neural network and its relation to Markov prediction models of variable length. In the main part of our work we present usability of methods for visualization, clusterization and the state space analysis as an effective tool for thorough study of recurrent networks capabilities on prediction tasks. In experimental part we focus on studying changes occurring during training. We are mostly interested in the change of naïve Markovian dynamics of randomly initialized network during training in relation to various factors such as: input sequence, training algorithm, network architecture, number of hidden units, etc. We focused not only on simple recurrent network before and after training, but also on the computational capabilities of the new approach called echo state networks. It uses large randomly initialized neural reservoir, which dynamics is the subject of our interest. We demonstrate benefits and constraints of this approach based on the results of our experiments and differences identified after recurrent networks training.

Student name:	Peter Trebatický
Degree program:	Artificial Intelligence
Thesis title:	*Prediction of Dynamical Systems by Recurrent Neural Networks*
Supervisor:	Jirí Pospíchal, Professor
Defended on:	June 25, 2009
Annotation:	Recurrent neural networks in general achieve better results in prediction of time series then feedforward networks. Echo state neural networks seem to be one alternative to them. I have shown on the task of text correction, that they achieve slightly better results compared to already known method based on Markovov model. The major part of this work is focused on alternatives to recurrent neural networks training that are based on Kalman filtration modifications. I describe in detail the training by filters: Extended Kalman Filter, Unscented Kalman Filter (UKF), nprKF Filter and their joint versions UKFj and nprKFj. Filter UKFj in context of recurrent neural networks was probably firstly described in my work. Contribution of this work is presentation of simpler equations for individual filters, because they are modified specifically for recurrent neural network training. I

compare individual filters with each other and also with gradient descent method Truncated Backpropagation Through Time (BPTT(h)). I show the results are consistently better when comparing recurrent neural networks trained by these advanced methods with BPTT(h). In the like manner, Extended Kalman Filter achieves worse results compared to the other filters, which on the other hand achieve comparable results with each other. I describe how to speed up their computation by utilizing the graphics card. My work is one of the first (if not the first) that focuses on recurrent neural network training utilizing the processor on graphics card.

7.4 Research Laboratories

Laboratory of Database Technologies

Manager: M.Galbavý
Contact: `miroslav.galbavy@stuba.sk`
Description: The laboratory is oriented towards support of research tasks, which use in some stages of solution a database environment, or which deal with security issues of database and information systems. Further application is in database application including multimedia applications, Global Information Systems, on-line transaction processing, on-line analytical processing, data-mining, data warehouses, internet access to databases, applications of CASE systems. The laboratory is equipped with SUN Enterprise 250 server and tens of SunRay workstations and some PC's. Software equipment includes database environment Oracle 8.1.6, MySQL, PostgreSQL, MS SQL Server, and Progress v8.

Laboratory of Intelligent Embedded Systems

Manager: Š. Kozák
Contact: `stefan.kozak@stuba.sk`
Description: The aim of the laboratory is the development of advanced soft techniques and principles and their broad and far-reaching applications to practical embedded systems in industries. In the Laboratory of Intelligent Embedded Systems researchers are developing smart systems and transmitters, electronic devices, and control-and-decision-making software and algorithms to empower embedded systems performance using artificial intelligence methods. The big challenge of the research work in the laboratory is to develop efficient methods and software and hardware tools which can be used in industries to enhance the product design process, make time-to-market shorter and improve overall quality of the final products.

Laboratory of Modelling and Simulation

Manager: Š. Kozák
Contact: `stefan.kozak@stuba.sk`

Description: The laboratory is oriented towards support of teaching modelling, simulation and control, using mainly Matlab and Simuling with various toolboxes for intelligent control, life fuzzy, neural and evolutionary toolboxes. It provides advanced research and education program in development of novel approaches and their applications in modelling, simulation and control of continuous-time, discrete-time, discrete events and hybrid systems. The education is adapted to the current demand of the industries in Slovakia (power industry, gas and car industries, health care, banking) and aims to training specialists to be able to cope with today's problems and to design appropriate solutions. Various basic and applied research projects dealing with challenging interdisciplinary problems are solved in this laboratory.

Grid Computing Laboratory

Manager: L. Hudec
Contact: `ladislav.hudec@stuba.sk`
Description: The research and teaching laboratory is devoted to teaching distributed processing and parallel programming graduate modules and experimental 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 and Globus Toolkit software. The second part is production grid equipped 40 CPUs, 1Gb network connection, front-end server with UPS and Globus Toolkit software. Grid is connected to Internet and is going to be as a part of SlovakGrid national grid structure.

7.5 Research Projects

Study of Co-evolution between Genes and Memes using Artificial Life Methods and Replicator Theory (VEGA, 1/0804/08)

Project leader: V. Kvasnička
Members: J. Pospíchal, Š. Babinec, J. Laca, P. Lacko, P. Trebatický
Supported by: Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration: January 2008 – December 2010
Description: Evolutionary methods of artificial life and replicator theory will be used to study co-evolution between genes and memes. A population will be composed of complexes built from one gene and one meme: the complex will be called an m-gene. The propagation of m-genes in the population will be based on following three elementary operations: replication (m-gene is replicated onto another m-gene – a descendent, which may contains a mutated version of the parental m-gene; interaction (a memetic transfer from a donor to an acceptor) and extinction (m-gene is eliminated out of the population. By computational simulations "in silico" we shall study a co-evolution between memes and genes and identify various mechanisms of evolution of memes in population. The results of this study will enable to identify

various mechanisms of social learning in multiagent systems, during which a transfer of knowledge is carried out from one agent to another.

Intelligent Embedded Systems (IVS) (VEGA, 1/0822/08)

Project leader:	Š. Kozák
Members:	V. Vojtek, T. Krajčovič, J. Štefanovič, M. Čerňanský, J. Flochová, P. Čičák, M. Galbavý, J. Parízková, P. Drahoš, J. Laca, R. Valo
Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2008 – December 2010
Description:	The project consists of three interconnected parts: (i) development of methods and tools for intelligent synthesis of complex systems including continuous-time and discrete-event dynamics; (ii) development of information and communication software tools and systems providing intelligent and real-time communication and control operation; (iii) development of application hardware and software modules of intelligent embedded software systems applicable in various processes (transportation, industry, health care, banking and service business).

Connectionist Computational Models for Computer Grid Environment (VEGA, 1/0848/08)

Project leader:	M. Čerňanský
Members:	J. Pospíchal, Š. Babinec, D. Bernát, M. Makula
Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2008 – December 2010
Description:	Common feedforward neural networks are a successful approach of artificial intelligence. Specialized recurrent neural networks were proposed to process structured data such as sequences, trees or graphs. Despite the high application potential of the latter type of neural networks, they have not yet become a widely used and accepted approach. The high computational requirements of these advanced training approaches have prevented recurrent networks to become widespread and generally accepted computing devices.

Application of Neural Networks with Echo States to Time Series Prediction (VEGA, 1/4053/07)

Project leader:	J. Pospíchal
Members:	V. Kvasnička, P. Lacko, P. Trebatický, Š. Babinec, M. Čerňanský, J. Laca, T. Selnekovič
Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2007 – December 2009
Description:	The goal of the project is a study of a modern approach to recurrent neural networks, which is exceptionally suitable for a prediction of

time series. Neural network in this case contains a block of neurons with a recurrent architecture, which is randomly generated and its weight coefficients are fixed during the learning of the network. Our preliminary numerical results show, that by an application of an incremental learning we can achieve an adapted neural network with Echo states, which has then substantially better generalization ability. The proposed project will be aimed at a study of assorted methods of incremental learning of these networks and their application to prediction of time series produced in finance, energy industry, etc.

Security and Reliability in Distributed Computer Systems and Mobile Computer Networks (VEGA, 1/0649/09)

Project leader:	L. Hudec
Members:	M. Kolesár, I. Grellneth, , M. Kotočová, T. Krajčovič, K. Jelemenská, J. Hudec, E. Tomalová, P. Čičák, B. Dado, D. Bernát, A. Bagala, J. Flochová
Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2009 – December 2010
Description:	Project deals with new methods and tools for development for security and reliability implementation in distributed computers systems and mobile computer networks. Distributed system is presented by grid systems (clusters). The project solves the creation of real time grid system with reliability enhancement by means of standard operating system. Further, it solves the implementation of secure access control to grid resources by means of certificates. The last solved field in distributed environment is modular method for permanent or intermittent fault diagnostics. The diagnostic method is based on the knowledge of algebraic Petri net model of system, whereas the model is extended to probabilistic and time parameters. The mobile computer network is presented by wireless mobile ad hoc network. The project solves the problem of node failure, packets losses and end-to-end communication interruption from the point of communication reliability.

Joint Degree in Media Development Engineering (Erasmus, 29079-IC-1-2005-1-DK-ERASMUS-PROGUC-3)

Project leader:	J. Štefanovič for STU
Contractor:	Eva Sorum Poulsen, Herning Institute of Business Administration and Technology, Denmark
Countries:	BE, DE, FI, IS, PL,
Supported by:	Socrates programme of the European Commission,
Duration:	October 2006 – September 2009
Description:	By STU participating, this project will promote curriculum development and student/staff mobility. It will also allow STU to extend the use of ECTS, and will fulfil the institution's aim to teach in English. It will provide STU students with a solid foundation to be able to

compete on an international basis, and will ensure that the level and contents of the study are equivalent to those of the partners.

Universal Modular Industrial Computer (APVV, VMSP-P-0059-09)

Project leader:	Š. Kozák, T.Krajčovič
Members:	R. Deák, P. Gábor, P. Šamaj, M. Janovčík, R. Chovan, J. Štefanovič
Supported by:	Slovak Research and Development Agency
Duration:	August 2009 – December 2010
Description:	The main goal – a support of research and development in the company VOIPAC Technologies Ltd. Partial goals – a development of a computer, which will be a suitable platform for increase in effectiveness of a development of a broad range of terminal equipment; support in a development of terminal equipment for companies, which do not have enough know-how; research and development of modern embedded computational systems by involving and with a support of an organization for academy, which shall cause an increase of the added value of the project; a production of a prototype, management support in production, sales and increase of its volume; job-creation.

7.6 Publications

Journals

BABINEC, Š., POSPÍCHAL, J.: Combination of Dynamic Reservoir and Feedforward Neural Network for Time Series Forecasting. In: *Lecture Notes in Computer Science*. Vol. 5507, Advances in Neuro-Information Processing, Vol. 2 (2009). ISSN 0302-9743. Springer-Verlag Berlin Heidelberg 2009. pp. 284-291.

BABINEC, Š., POSPÍCHAL, J.: Gating Echo State Neural Networks for Time Series Forecasting. In: *Lecture Notes in Computer Science*. Vol. 5506, Advances in Neuro-Information Processing, Vol. 1, ISSN 0302-9743. Springer-Verlag Berlin Heidelberg 2009. pp. 200-207.

ČERŇANSKÝ, M., MAKULA, M., BEŇUŠKOVÁ, Ľ.: Improving the State Space Organization of Untrained Recurrent Networks. In: *Lecture Notes in Computer Science*. Vol. 5506, Advances in Neuro-Information Processing, Vol. 1, ISSN 0302-9743. Springer-Verlag Berlin Heidelberg 2009. pp. 670-677.

ČERŇANSKÝ, M., BEŇUŠKOVÁ, Ľ.: Training Recurrent Connectionist Models on Symbolic Time Series. In: *Lecture Notes in Computer Science*. Vol. 5506, Advances in Neuro-Information Processing, Vol. 1, ISSN 0302-9743. Springer-Verlag Berlin Heidelberg 2009. pp. 284-292.

ČERŇANSKÝ, M.: Training Recurrent Neural Network Using Multistream Extended Kalman Filter on Multicore Processor and Cuda Enabled Graphic Processor Unit. In: *Lecture Notes in Computer Science*. Vol. 5768, Artificial Neural Networks. ISSN 0302-9743. Springer-Verlag Berlin Heidelberg 2009. pp. 381-390.

KVASNIČKA, V.: Artificial Chemistry and Darwinian Evolution. In: *ChemZi*, (Slovak journal about chemistry for chemical education, research and industry), No. 5/9 (2009), ISSN 1336-7242. p. 62. (in Slovak)

KVASNIČKA, V., POSPÍCHAL, J.: Darwinian Evolution as an Algorithm. In: *Československý časopis pro fyziku*. Vol. 59, No. 6 (2009), ISSN 0009-0700. pp. 360-367. (in Slovak)

LACKO, P.: Emergence of Game Strategy in Multiagent Systems. In: *Information Sciences and Technologies Bulletin of the ACM Slovakia*. Vol. 1, No. 1 (2009), ISSN 1338-1237. pp. 57-64.

MAKULA, M.: Power and Limits of Recurrent Neural Networks for Symbolic Sequences Processing. In: *Information Sciences and Technologies Bulletin of the ACM Slovakia*. Vol. 1, No. 1 (2009), ISSN 1338-1237. pp. 39-45.

MAKULA, M., BEŇUŠKOVÁ, Ľ.: Interactive Visualisation of Oligomer Frequency in DNA. In: *Computing and Informatics*. Vol. 28, No. 5 (2009), ISSN 1335-9150. p. 695-710.

PARÍZKOVÁ, J., KOZÁK, S., TOMAŠOVIČ,T.: Databases for embedded System. In: *AT&P Journal*, Vol. XVI, No.12, 2009, on-line vesion, ISSN 1336-233X. pp. 63-66. (in Slovak)

PARÍZKOVÁ, J., FERENCZ, F.: Web page for teaching of machine oriented languages. In: *Technology of education*. Vol. XVII, No.10, Vol. 17, 2009, ISSN 1335-003X. pp. 7-9 (in Slovak)

TREBATICKÝ, P.: Prediction of Dynamical Systems by Recurrent Neural Networks. In: *Information Sciences and Technologies Bulletin of the ACM Slovakia*. Vol. 1, No. 1 (2009), ISSN 1338-1237. pp. 46-56.

International Conferences

BABINEC, Š., POSPÍCHAL, J.: Echo State and Fir Neural Metworks: Comparison of Predictive Abilities. In: *Mendel 2009*. 15th International Conference on Soft Computing. Brno, Czech Republic, Brno University of Technology, 2009. pp. 160-165.

CIGÁNEK, J., KOZÁK, Š.: An Effective Robust Controller Algorithm Design. In: *Process Control 2009*, 17th International Conference, Štrbské Pleso, Slovak Republic, 2009. pp. 375-380.

CIGÁNEK, J., KOZÁK, Š.: Robust Controller Design Based on Reflection Vectors. In: *3rd IEEE Multi-conference on Systems and Control MSC 2009*, Saint Petersburg, Russia, IEEE, 2009. pp. 938-943.

CIGÁNEK, J., KOZÁK, Š.: Robust Digital Controller Design. In: *Modelling and Simulation of System. MOSIS´09*, 43rd Spring International Conference, Rožnov pod Radhoštěm, Czech Republic. Ostrava MARQ, 2009. pp. 154-161.

CHUDÁ, D., NEHÉZ, M., ČERŇANSKÝ, M.: On Using of Random Access Machine Simulators in Teaching of Theoretical Computer Science. In: *Proceedings of the International Conference on Computer Systems and Technologies and Workshop for PhD Students in Computing - CompSysTech´09*, Ruse, Bulgaria. Bulgarian Chapter of ACM 2009, IV.14.1-14.6.

KAPEC, P., DRAHOŠ, P.: Hypergraph Based Software Representation, Mining and Visualization. In: *Informatics 2009*, 10th International Conference on Informatics, Herľany, Slovak Republic, 2009. pp. 253-258.

MAKÝŠ, M., KOZÁK, Š.: Modelling, Simulation and Control of Hybrid Embedded Systems. In: *Modelling and Simulation of System. MOSIS 2009*, 43rd Spring International Conference, Rožnov pod Radhoštěm, Czech Republic. Ostrava MARQ, 2009. pp. 31-38.

MICHALÁK, J., HUDEC, L.: Transparent proxy for Secure e-mail. In: *Proceeding of the tenth International Conference on Informatics, Informatics 2009*, Herľany, Slovak Republic, Technical University of Košice, 2009, pp. 82-87.

POSPÍCHAL, J.: The Simplest Mechanisms of Decentralized Coordination. In: *Mendel 2009*. 15th International Conference on Soft Computing. Brno, Czech Republic, Brno University of Technology, 2009. pp. 214-219.

ŠTEVEK, J., KOZÁK, Š.: Computer Aided Programme Control Systeme (CAPCS). In: *Modelling and Simulation of System. MOSIS 2009*, 43rd Spring Int. Conference, Rožnov pod Radhoštěm, Czech Republic. Ostrava MARQ, 2009. pp. 24-30.

Local and National Conferences

BANDA, P.: Upper Bound Performance of Cellular Automata for Leader Election Problem. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: J. Pospíchal, 2009. pp. 155-162.

DRAHOŠ, P.: LuaDist: Extendable Embedded Runtime and Development Environment. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Šperka, 2009. pp. 335-341.

GALBAVÝ, M.: Set of ISO/IEC 27000 Standards - Base for Enterprise ISMS. In: *Informačná bezpečnosť'09*, Bratislava, 2009. pp. 5-11.

KAPEC, P.: Hypergraph-Based Repository for Software Visualization Systems. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Šperka, 2009. pp. 251-258.

KAPEC, P.: Hypergraph-Based Software Visualization. In: *GraVisMa 2009*, Abstract Proceedings University of West Bohemia, Pilsen, Czech Republic, 2009. p. 40.

KOVÁROVÁ, A., GREGOR, J.: Solid Geometry and Virtual Reality. In: *SCO 2009*, Proceedings of 6th conference on electronic support of education. Brno, Czech Republic, 2009. pp. 93-98. (in Slovak)

KVASNIČKA, V.: Artificial Chemistry and Darwinian Evolution. In: *ChemZi*, 5/9 (2009), 61. Symposon of chemists , Tatranské Matliare, Slovak Republic, 2009. p. 62. (in Slovak)

KUČEČKA, T.: Feedforward Neural Network Training Using Extended Kalmam Filter. In: *Student Research Conference 2009*. 5th Student Research Conference in Informat-

ics and Information Technologies Bratislava, Supervisor: M. Čerňanský, 2009. pp. 385-392.

LACA, J.: Organizations in Random Catalytic Reaction Networks. In: *Cognition and Artificial Life IX*. Silesian University in Opava, Czech Republic, 2009. pp. 155-159. (in Slovak)

LACKO, P.: Training of Neural Networks with Reinforcement Learning Monte Carlo Method Using Enhanced Kalman Filter. In: *Cognition and Artificial Life IX*. Silesian University in Opava, Czech Republic, 2009. pp. 161-168. (in Slovak)

PAULECH, M.: Epileptic Seizure Detection Using Echo State Network. In: *Student Research Conference 2009.* 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Čerňanský, 2009. pp. 202-209.

POLÁČIK, M.: Adaptation of Recurrent Neural Network Training Algorithms for Multiprocessor Environment. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Čerňanský, 2009. pp. 210-217.

POSPÍCHAL, J.: Simplest Mechanisms of Decentralised Coordination. In: *Cognition and Artificial Life IX*. Silesian University in Opava, Czech Republic, 2009. pp. 267-272. (in Slovak)

ŠPERKA, M., DRAHOŠ, P., KOVÁROVÁ, A.: Computer Graphics and Related Subjects at the FIIT STU and FI BVŠP. In: *Future of Computer Graphics Education - FCGE´09*, Spring Conference on Computer Graphics. Budmerice, Czech Republic, 2009. pp. 5-7.

ŠTEFANOVIČ, J.: Student Projects in Computer Graphics. In: *Future of Computer Graphics Education - FCGE´09*, Spring Conference on Computer Graphics. Budmerice, Czech Republic, 2009, pp. 47-48.

TREBATICKÝ, P.: Signal Propagation in Neural Network Using Graphics Processor. In: *Cognition and Artificial Life IX*. Silesian University in Opava, Czech Republic, 2009. pp. 349-355. (in Slovak)

Books

KELEMEN, J. KVASNIČKA, V. RYBÁR, J. (Eds.): *Cognition and Artificial Life IX*. Silesian University in Opava, 2009. 363 p.

KVASNIČKA, V. POSPÍCHAL, J. KOZÁK, Š. NÁVRAT, P. PAROULEK, P. (Eds.): *Artificial intelligence and cognitive science I*. Slovak University of Technology in Bratislava, 2009. 451 p.

Part of Books

ČERŇANSKÝ, M.: Recurrent neural networks.. In: *Artificial Intelligence and Cognitive Science*. Slovak University of Technology in Bratislava, 2009. ISBN 978-80-227-3080-8. pp. 37-86. (in Slovak)

KOZÁK, Š.: Intelligent Embedded Systems. In: *Artificial Intelligence and Cognitive Science*. Slovak University of Technology in Bratislava, 2009. ISBN 978-80-227-3080-8. pp. 139-193. (in Slovak)

KVASNIČKA, V.: Mental Models of Logic in Cognitive Science. In: *Struny mysli*. Ostrava, Czech Republic, Montranex, 2009. ISBN 978-80-7225-302-9. pp. 100-116. (in Slovak)

KVASNIČKA, V., POSPÍCHAL, J.: Darwinian Evolution as an Algorithm Darwinian Evolution as an Algorithm. In: *Artificial Intelligence and Cognitive Science*. Slovak University of Technology in Bratislava, 2009. ISBN 978-80-227-3080-8. pp. 231-279. (in Slovak)

KVASNIČKA, V., POSPÍCHAL, J.: Cognitive Science, Artificial Intelligence and Bounded Rationality Theory. In: *Cognitive Science Today and Tomorrow*, Liberec, Czech Republic, Bor, 2009. ISBN 978-80-86807-55-3. pp. 173-186. (in Czech)

7.7 Cooperation

Cooperation in Slovakia

– Faculty of Mathematics, Physics and Informatics, Comenius University in 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

International Cooperation

– University of Zagreb, Croatia

– Institute of Software Technology and Interactive Systems, Wienna University of Technology, Austria

– Institute Superieur d'Electronique 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 Deutchland, Germany

– Brno University of Technology, Czech Republic

– Technical University of Liberec, Czech Republic

– Technical University of Ostrava, Czech Republic

Visits of Staff Members

– *J. Štefanovič*: Visual Computing Trends workshop, Vienna, Austria, January 28, 2009

– *V. Solčány*: Visual Computing Trends workshop, Vienna, Austria, January 28, 2009

– *M. Šperka*: Visual Computing Trends workshop, Vienna, Austria, January 28, 2009

– *V. Kvasnička*: FIT VUT Brno, Czech Republic, March 27, 2009

– *J. Cigánek, J. Števek, M. Makýš*: MOSIS´09, Rožnov pod Radhoštěm, April 6-9, 2009

– *P. Trebatický, D. Švoňava, M. Šajgalík*: Challenge24 Student Competition, Budapest, Hungary, May 1-3, 2009

– *A. Kovárová*: SCO 2009 – Sharable Content Objects, Brno, Czech Republic, June 15-17, 2009

– *A. Kovárová*: Vienna University of Technology, visit at the Interactive Media Systems Group (together with 2 graduate students) April 3, 2009

– *J. Pospíchal*: Mendel 2009, Brno, Czech Republic, June 25-29, 2009

– *V. Kvasnička*: University of Economics, Prague, Czech Republic, July 1-3, 2009

– *Š. Kozák*: MSC 2009, IEEE Multi-conference on Systems and Control, S. Petersburg. Russia, July 7-11, 2009

– *M. Galbavý:* InterSystems, Prague, Czech Republic, July 23-24, 2009

– *P. Drahoš, P. Kapec*: GraVisMa´09, Graphics, Vision and Mathematics workshop, Pilsen, Czech Republic, September 1-4, 2009

– *J. Štefanovič*: Profinit, Prague, Czech Republic, September 3-4, 2009

– *M. Čerňanský*: ICANN 2009, International Conference on Artificial Neural Networks, Limasol, Cyprus, September 12-19, 2009

Visits to the institute

– *Sonja Zentner Pilinsky*, Polytechnic of Zagreb, Poland, establishing of the Erasmus cooperation

7.8 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)

Štefan Kozák

– Slovak Society for Cybernetics and Informatics at Slovak Academy of Sciences (member since 1970, chairman, since 1998)

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)

Martin Šperka

– Slovak Society for Informatics (member, since 2006)

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)

Štefan Kozák

– IFAC, member of the Technical Committee on Linear Control Systems

– ECCAI European Coordination Committee for Artificial Inteligence (member, since 1996, member of National Board)

– IFAC, International Federation of Automatic Control Technical Committee (member of Technical Committee TC 2.2. Linear Control Systems, TC 3.1. Computers for Control, TC 3.2. Cognition and Control)

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

Vladimír Kvasnička

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

Peter Lacko

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

Jiří Pospíchal
– EUROFUSE, EURO Working group on fuzzy sets (member, since 1999)
– IEEE, Institute of Electrical and Electronic Engineers (member, since 2008)

Viliam Solčány
– ACM, Association for Computing Machinery (member, since 2004)

Martin Šperka:
– EADIM, Europen Academy of Digital Media (fellow, since 2001), Instructors Network (since 2003)

Peter Trebatický
– IEEE, Institute of Electrical and Electronic Engineers (member, since 2005)

7.9 Other Activities

– National COST Coordinator, L. Hudec (since 1993)
– Member of the COST Senior Officials Committee, L. Hudec (since 1993)
– Artificial Intelligence Seminar organization
  `www.fiit.stuba.sk/~kvasnicka/Seminar_of_AI`
– Journal of Computing and Information Technology – V. Vojtek (since 1993), V. Kvasnička (since 2005): members of advisory board
– MATCH Communications in Mathematical Chemistry – V. Kvasnička (since 1998): member of advisory board
– Neural Network World – V. Kvasnička (since 2001): member of advisory board
– Journal Cybernetics and Informatics – Š. Kozák: editor in chief
– Croatica Chimica Acta – V. Kvasnička (since 2002): member of advisory board
– Publishing House Pergamon Press – Š. Kozák: member of editorial board
– Computing and Informatics (CAI) – V. Kvasnička: member of editorial board
– APVV, Slovak Research and Development Agency – Š. Kozák, member of committee for technical sciences
– CESCG 2009 – Central European Seminar on Computer Graphics, Budmerice castle, Slovakia – M. Šperka: member of programme committee
– Cognition and Artificial Life IX, Prague – V. Kvasnička: member of programme committee
– GCCP 2009 – 5th International Workshop on Grid Computing for Complex Problems, October 26-28, 2009, Bratislava, Slovakia – L. Hudec: member of programme committee
– Information Security 2009 Conference, February 10, 2009, Bratislava – L. Hudec: member of programme committee

- Informatics 2009 – 10th International Scientific Conference on Informatics, November 23-25, 2009, Herľany, Slovakia – L. Hudec, V. Kvasnička: member of programme committee

- ITI 2009 – 31st International Conference on Information Technology Interfaces, Dubrovnik – V. Vojtek: member of programme committee

- MENDEL 2009 – 15th International Conference on Soft Computing, Prague, Czech Republic – V. Kvasnička, J. Pospíchal: members of programme committee

- SCCG 2009 – Spring Conference on Computer Graphics, Budmerice castle, Slovakia – M. Šperka: member of programme committee

- SAMI 2009, 7th International Symposium on Applied Machine Intelligence and Informatics, Herľany, – Š. Kozák, V. Kvasnička: members of programme committee

8 Institute of Computer Systems and Networks

E-mail:	upss@fiit.stuba.sk
Web:	upss.fiit.stuba.sk
Tel:	+ 421 2 654 22 707
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 each of the three levels of university education:

- Computer Systems and Networks (bachelor degree) substituted in academic year 2009/10 by Computer and Communication Systems and Networks (bachelor degree),
- Computer Systems and Networks (master degree) substituted in academic year 2009/10 by Computer and Communication Systems and Networks (master degree),
- Computer Systems and Networks (doctoral 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
>Ladislav Hudec, Assoc. Professor (till February 2009)
>Pavel Čičák, Assoc. Professor (since March 2009)

Deputy Director
>Katarína Jelemenská, PhD.
>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.
>Pavol Horváth, Professor (part time)
>Ján Hudec
>Ladislav Hudec, Assoc. Professor (till February 2009)
>Katarína Jelemenská, PhD.
>Milan Kolesár, Professor
>Margaréta Kotočová, Assoc. Professor
>Ivan Kotuliak, PhD.
>Tibor Krajčovič, Assoc. Professor
>Elena Tomalová (part time)
>Peter Trúchly, PhD.

Researchers
>Dušan Bernát

Full time PhD Students
>Jaroslav Abaffy
>Adrian Bagala
>Adam Hlavatovič
>Matej Jurikovič
>Tomáš Kováčik
>Peter Magula
>Juraj Michalák
>Peter Pištek
>Mária Pohronská
>Michal Vrábel

8.2 Teaching

Undergraduate Study (Bc.)

Course	Semester	Credits	Lecturer
Logic Circuits	Spring	6	M. Kolesár
Computer Engineering Principles and Practice	Autumn	6	M. Kolesár
Computer Engineering Principles	Autumn	4	M. Kolesár
Computer Application Design	Spring	6	P. Čičák
Computer and Communication Networks I	Autumn	6	P. Trúchly
Computer Networks I	Spring	6	M. Kotočová
Computer Networks II	Autumn	6	I. Grellneth
Convergence of Mobile and Wired Networks	Autumn Spring	6	I. Kotuliak
Engineering Methods	Autumn	4	P. Čičák
Final Bachelor Project I-II	Autumn Spring	3-9	P. Čičák, L. Hudec
Machine and System Level Programming	Autumn	5	P. Čičák
Microcomputers	Autumn	6	T. Krajčovič
Peripheral Devices	Spring	4	P. Horváth
Programmable Logic	Autumn	6	M. Kolesár
Digital Systems Description	Autumn	6	K. Jelemenská
WAN Technologies	Spring	6	I. Grellneth

Master Study (Ing.)

Course	Semester	Credits	Lecturer
Communication Services and Networks	Autumn	5	M. Kotočová
Computer Systems Architecture	Autumn	5	L. Hudec
Computing Systems Research	Autumn	2	M. Kolesár
Computing Systems Security	Autumn	5	L. Hudec
Diagnostics and Reliability	Spring	5	E. Gramatová
Digital Systems Design	Spring	5	K. Jelemenská
Digital Systems Testing	Autumn	5	E. Gramatová
Diploma Project I –III (Computer Systems and Networks)	Autumn Spring	8-12-20	L. Hudec
Diploma Project I-III (Computer and Communication Systems and Networks)	Autumn Spring	8-12-20	P. Čičák
Distributed Computer Systems	Autumn	5	D. Bernát
Embedded Systems	Autumn	5	T. Krajčovič
Internet Security	Spring	5	L. Hudec

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

8.3 Theses

Bachelor (Bc.) Theses – graduates 2009

Study Programme Computer Systems and Networks

- Bereš, Ondrej: *TCP Protocol in Wireless Systems.* May 2009. Supervisor: P. Trúchly

- Binder, Martin: *The Program Environment for Design of Control Units on the Basis of Microprocessor Modules.* May 2009. Supervisor: P. Čičák

- Binder, Andrej: *Implementation of IP Multimedia Subsystem Network.* May 2009. Supervisor: I. Kotuliak

- Burda, Filip: *Convergence in Computer Networks.* May 2009. Supervisor: M. Kotočová

- Dian, Marek: *ASP Course Support Aid.* May 2009. Supervisor: P. Čičák

- Dúcky, Viktor: *Design of Security Gate.* May 2008. Supervisor: J. Hasan

- Ďarmek, Vratislav: *Finite State Automat and its Use for Description of Behaviour Synchronious Sequential Circuit – Application for OS Windows.* May 2008. Supervisor: E. Tomalová

- Ďurista, Tomáš: *Automatically Documentation of OS Type UNIX.* May 2009. Supervisor: D. Bernát

- Fülöp, Martin: *Virtual Verification Panel with NAND Gates.* May 2009. Supervisor: M. Kolesár

- Gabčo, Ondrej: *Stochastic Petri Nets II.* May 2009. Supervisor: J. Flochová

- Geržo, Daniel: *Automatic Documentation of Unix-like OS.* May 2009. Supervisor: D. Bernát

- Havrila, Peter: *Management of TCP/IP Networks.* May 2009. Supervisor: M. Kotočová

- Hollý, Jakub: *Stochastic Petri Nets II.* May 2009. Supervisor: J. Flochová

- Hrdina, Michal: *Instruments for Support of Administration of Road Metrological Stations.* May 2009. Supervisor: P. Čičák

- Hriagyel, Erik: *Visualization of BFMA Tree on Computer.* May 2009. Supervisor: I. Grellneth

- Jombík, Peter: *Contact Circuits Editor.* May 2009. Supervisor: M. Kolesár

− Kimlička, Samuel: *Educational System about Design Methods of Digital Circuit Simple Testing.* May 2009. Supervisor: E. Gramatová

− Kišák, Stanislav: *Tools for Support of Tuition of the Assembler and System Programming.* May 2009. Supervisor: P. Čičák

− Knězek, Marián: *Optimalization of Routing Approaches in TCP/IP Networks.* May 2009. Supervisor: M. Kotočová

− Koczman, Jozef: *Virtual Verification Panel with AND, OR and NOT Gates.* May 2009. Supervisor: M. Kolesár

− Konôpková, Klaudia: *STP – Spanning Tree Protocol 802.1w (Rapid STP) - visualization.* May 2009. Supervisor: I. Grellneth

− Kovács, Peter: *Charakteristics of the Bluetooth Technology.* May 2009. Supervisor: I. Kotuliak

− Lesňák, Rudolf: *Program System for Support the Education of Petri Nets – Application for OS Windows.* May 2009. Supervisor: E. Tomalová

− Lysý, Tomáš: *Program System for Failure Diagnostic in Petri Nets.* May 2009. Supervisor: J. Flochová

− Macko, Dominik: *VHDL Model Visualization.* May 2009. Supervisor: K. Jelemenská

− Maholányi, Tomáš: *Statistical Properties of the Traffic in EtherNet Networks.* May 2009. Supervisor: I. Kotuliak

− Majzlík, Michal: *Multimedial Learning Module for Handel-C.* May 2009. Supervisor: K. Jelemenská

− Malečka, Peter: *Wireless Communication Analysis.* May 2009. Supervisor: B. Dado

− Martinický, Stanislav: *Protocol TCP in Wireless Systems.* May 2009. Supervisor: P. Trúchly

− Mikóczy, Tibor: *Software Switch with Support of STP.* May 2009. Supervisor: I. Grellneth

− Mrekaj, Peter: *Web Portal for CAS in Globus Toolkit.* May 2009. Supervisor: A. Bagala

− Nemeček, Juraj: *Quality of Services and Real-Time Transport.* May 2009. Supervisor: M. Kotočová

− Olejník, Štefan: *Experimental Microcomputer Based on AT89S52.* May 2008. Supervisor: T. Krajčovič

− Ondriga, Lukáš: *Image Processing on PC under Linux OS.* May 2009. Supervisor: B. Dado

− Orságh, Juraj: *The Design and Implementation of a System for Graphic Visualization of Input-Output Computer Subsystem Activity.* May 2009. Supervisor: J. Hudec

− Palaj, Tomáš: *Virtual Verification Panel with AND-NOR and NAND Logical Gates.* May 2009. Supervisor: M. Kolesár

- Patoprstý, Mário: *Automatic Documentation of the OS Unix Type.* May 2009. Supervisor: D. Bernát

- Pilarčík, Viliam: *Virtual Verification Panel with NOR Logic Gates.* May 2009. Supervisor: M. Kolesár

- Píš, Peter: *Testing of the Extended MAC Layer of the Network Adapter and Design in PLD.* May 2009. Supervisor: J. Hudec

- Pivarček, Ján: *Virtual Verification Panel with Logic Gates XOR and OR.* May 2009. Supervisor: M. Kolesár

- Plevko, Ján: *Stochastic and Probabilistic Petri Nets.* May 2009. Supervisor: J. Flochová

- Polerecká, Marcela: *The Design and Implementation of a System for Graphic Visualization.* May 2009. Supervisor: J. Hudec

- Popelka, Martin: *Gates and Gate Structures, E-learning System - HTML Application.* May 2009. Supervisor: E. Tomalová

- Pozdech, Boris: *Educational Material for the Satellite Constellations.* May 2009. Supervisor: P. Trúchly

- Pristaš, Peter: *Learning Material about Satellite Systems.* May 2009. Supervisor: P. Trúchly

- Sebín, Juraj: *Reliability Analysis of Restored Systems.* May 2009. Supervisor: J. Hudec

- Siebert, Miroslav: *Virtual Verification Panel with XOR and AND Gates.* May 2009. Supervisor: M. Kolesár

- Sivák, Marek: *Logic Gates and Gate Structures, Education Support – OS Windows Application.* May 2009. Supervisor: E. Tomalová

- Szabó, Rastislav: *Visualization of IP Addresses Localization.* May 2009. Supervisor: D. Bernát

- Štrba, Juraj: *Timed Automata II.* May 2009. Supervisor: J. Flochová

- Šťastný, Tomáš: *Statistical Properties of Ethernet Traffic.* May 2009. Supervisor: I. Kotuliak

- Táborský, Roman: *Multimedia Enhanced Learning Module for Handel C Programming Language.* May 2009. Supervisor: K. Jelemenská

- Tanko, Michal: *Visualization of ip Addresses Localization.* May 2009. Supervisor: D. Bernát

- Tuka, Martin: *Simulation of Digital Systems in NuSMV.* May 2009. Supervisor: K. Jelemenská

- Valko, Martin: *Performance Evaluation of Optical Network.* May 2009. Supervisor: I. Kotuliak

- Voroňák, Peter: *Finite State Machine – HTML Application.* May 2008. Supervisor: E. Tomalová

– Zapatický, Michal: *Design of Bridge Contact-Diode Dipole.* May 2009. Supervisor: M. Kolesár

Master Theses – graduates 2009

Study Programme Computer Systems and Networks

– Alasadi, Ehab: *Description and Simulation Digital Circuits with Language VHDL-HTML* Applications. May 2009. Supervisor: E. Tomalová

– Bartoš, Miroslav: *Regional Cisco Academy Information System.* May 2009. Supervisor: B. Dado

– Bebej, Stanislav: *Design of Special Functions of Network Adapter in PLD Environment*. December 2008. Supervisor: J. Hudec

– Beleš, Štefan: *Functional Generator of VoIP Attacks.* May 2009. Supervisor: Ľ. Koprda

– Beňovský, Marián: *Data Synchronization between Groupware Server and Client Application.* May 2009. Supervisor: B. Dado

– Bilík, Michal: *Functional Test Generator for VLSI Circuits.* May 2009. Supervisor: J. Hudec

– Červenák, Marián: *Authentication in Grid.* December 2008. Supervisor: A. Bagala

– Fajnor, Matej: *Image Classification.* May 2009. Supervisor: B. Dado

– Gregor, Vladimír: *GPS Application Programming Support for OS Windows Mobile.* May 2009. Supervisor: T. Krajčovič

– Hameed, Rabab: *Penetration Testing for Web Server*. May 2009. Supervisor: L. Hudec

– Hamšík, Adam: *Secure Logging with Improved BSD Syslog Protocol.* May 2009. Supervisor: Ľ. Batěk

– Hrubša, Juraj: *Interactive Presentation System.* May 2009. Supervisor: K. Jelemenská

– Jurikovič, Matej: *Communication of the Mobile Phone with Computer via the Bluetooth Interface.* May 2009. Supervisor: T. Krajčovič

– Kalanin, Peter: *The Description and Simulation of Digital Circuit in VHDL Language - Windows Application.* May 2009. Supervisor: E. Tomalová

– Katreniak, Radoslav: *Choosen Functions of Parallel Distributing Systems.* May 2009. Supervisor: J. Hudec

– Knotka, Peter: *Flow Control in TCP/IP Network.* May 2009. Supervisor: M. Kotočová

– Krajčo, Tomáš: *Client System for Job Submission to Grid.* May 2009. Supervisor: A. Bagala

– Letkovský, Andrej: *Distance Education Support in the Subject Digital Systems Description.* May 2009. Supervisor: K. Jelemenská

– Magula, Peter: *Congestion Control in TCP/IP Networks.* May 2009. Supervisor: M. Kotočová

- Mayer, Matej: *Distance Education Support in Subject Digital Systems Description.* May 2009. Supervisor: K. Jelemenská

- Michalák, Juraj: *Embedded System for Encryption of Application Layer Protocols.* May 2009. Supervisor: L. Hudec

- Mózes, Tomáš: *QoS Parameters Measurement and Evaluation in TCP/IP Networks.* May 2009. Supervisor: M. Kotočová

- Péti, Peter: *Support for Simulator/Emulator of Computer Network.* May 2009. Supervisor: I. Grellneth

- Pištek, Peter: *Automatic Design of Combinational Logical Circuits with Multiplexers and Integrated Circuits SSI.* May 2009. Supervisor: M. Kolesár

- Polák, Tomáš: *Special functions Design of Networking Adapter in PLD Environment.* May 2009. Supervisor: J. Hudec

- Pulai, Tomáš: S*pam Detection Techniques.* May 2009. Supervisor: M. Grund

- Rabčan, Ľuboš: *Model of Activation Processing in Brain's Cortex.* May 2009. Supervisor: P. Hubka

- Schmotzer, Marián: *Nonstandard Interprocess Communication in UNIX Systems.* May 2009. Supervisor: D. Bernát

- Sečanský, Igor: *Generator of WEB GUI for the Archive Server According to XML Configuration.* May 2009. Supervisor: L. Domin

- Sobolič, Marek: *Computer Support for Organization Sport Events.* May 2009. Supervisor: T. Krajčovič

- Thoeny, Ameer: *Statistical Properties of Host in Computer Network.* May 2009. Supervisor: D. Bernát

- Žucha, Marián: *Support for Programming GPS Application under OS Windows XP and Higher.* May 2009. Supervisor: T. Krajčovič

Study Programme Software Engineering

- Hopko, Jozef: *Wireless Sensor Network Visualization.* May 2009. Supervisor: T. Krajčovič

Doctoral (PhD.) Theses

Student name: Erik Csókás
Degree program: Computer Hardware and Systems
Thesis title: *New Methods of Computer System Design*
Supervisor: Pavel Čičák, Associate Professor
Defended on: May 20, 2009
Annotation: Today's control engineers face ever-increasing challenges in the design of embedded control systems. It is well documented that delivering a product to market ahead of all competitors typically results in a decided advantage. The main goal of this thesis was to research and analyze system methods, propose contributions to the field of methods of computer system de-sign. One of the contributions was a modelling language, which should provide a better coverage of the design

flow in the field of co-design. The proposed language supports graphical and textual visualization, heterogeneous behavioural modelling, and object oriented design. Several contributions have been proposed in the processing step of the system design flow. Testing has shown us an increase of the speed of the modified Kernighan-Lin algorithm of approx. 27% and minor increase of the fitness. In the case of genetic algorithm the impact of changing the parameters of the partitioning algorithm has been analyzed.

Student name:	Radovan Semančík
Degree program:	Computer Hardware and Systems
Thesis title:	*Revised World Wide Web Architecture*
Supervisor:	Margaréta Kotočová, Associate Professor
Defended on:	May 20, 2009
Annotation:	Internet and World Wide Web were developed in evolutionary fashion following changing requirements of the users and usage patterns. The recent requirements on the dynamics of World Wide Web, increased interactivity and effectiveness of cooperation introduce yet an-other paradigm shift that goes deep into the architecture of World Wide Web. A model that can be used to describe the interactions of physical and virtual worlds is provided for better under-standing of the forces behind these changes. The target environment for the Internet and World Wide Web is discussed; motivated by a desire to better understand requirements of the users. The described model and the discussion of desired environment is used to evaluate the architecture of the Internet and World Wide Web. Inconsistencies of World Wide Web architecture are identified and described in detail. Architectural improvements are proposed to solve the problems, described in a form of a new architectural styles and constraints, especially the RRSS architectural style. The proposed architecture is divided into several layers of abstraction for easier understanding and maintainability. Proposed architecture is validated by showing that it can support scenarios that are difficult to implement in current World Wide Web environment.

8.4 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 net-

work 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:	The research and teaching laboratory predefined 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 are to 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:	`tibor.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, implementation 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 (logic analyzer, in-circuit emulators, Bluetooth development kits, Pentium II based embedded system development kit) necessary for practical teaching.

VLSI Design Laboratory

Manager:	J. Hudec
Contact:	`jan.hudec@stuba.sk`
Description:	The research and teaching 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 modern computers with internet connection and other hardware and software components and tools (XIL-

INX ISE WebPack, MODELSIM) for programmable circuits PLD 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 system. Laboratory is equipped with modern computers connected to the Internet, RC10 FPGA boards and necessary software tools to gain practical skills in the area of digital systems design – FPGA Advantage and DK Design Suite.

8.5 Research projects

Security and Reliability in Distributed Computer Systems and Mobile Computer Networks (VEGA, 1/0649/09)

Project leader: L. Hudec

Members: M. Kolesár, I. Grellneth, M. Kotočová, T. Krajčovič, K. Jelemenská, J. Hudec, E. Tomalová, P. Čičák, B. Dado, D. Bernát, A. Bagala, J. Flochová

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

Duration: January 2009 – December 2010

Description: Project deals with new methods and tools development for security and reliability implementation in distributed computers systems and mobile computer networks. Distributed system is presented by grid systems (clusters). The project solves the creation of real time grid with reliability enhancement by means of standard operating system. Further, the project solves the implementation of secure access control to grid resources by means of certificates. The last solved field in distributed environment is modular method for permanent or intermittent fault diagnostics. The diagnostic method is based on the knowledge of algebraic Petri net model of system, whereas the model is extended to probabilistic and time parameters. The mobile computer network is presented by wireless mobile ad hoc network. The project solves the problem of node failure, packets losses and end-to-end communication interruption from the point of communication reliability.

Intelligent Embedded Systems (IVS) (VEGA, 1/0822/08)

Project leader: Š. Kozák

Members:	V. Vojtek, T. Krajčovič, J. Štefanovič, M. Čerňanský, J. Flochová, P. Čičák, M. Galbavý, J. Parízková, P. Drahoš, J. Laca, R. Valo
Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2008 – December 2010
Description:	The project consists of three interconnected parts: (i) development of methods and tools for intelligent synthesis of complex systems including continuous-time and discrete-event dynamics; (ii) development of information and communication software tools and systems providing intelligent and real-time communication and control operation; (iii) development of application hardware and software modules of intelligent embedded software systems applicable in various processes (transportation, industry, health care, banking and service business).

Innovative Communication Technologies in metropolitan Environment based on Optical and Wireless Technology with Focus on Converged Architectures (VEGA, 1/4084/07)

Project leader:	I. Kotuliak
Members:	P. Trúchly, P. Podhradský, V. Olejček, T. Kováčik, F. Husák, M. Ďungel, R. Kadlic, S. Schumann, R. Vargic
Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2007 – December 2009
Description:	The goal of the project is the research in the area of high-speed metropolitan architectures based on optical technology with optical switching as well as in the area of convergence of metropolitan optical network with ad-hoc networks. In this context, the research team focuses besides architectures also on medium access protocols and on class of services with corresponding quality parameters. Among the most important research subjects of the project falls influence of deployed security methods on the throughput, and mainly routing which should ensure convergence with other types of network. The project research should be based on rich experience of the research team in the area of simulation and modelling. In this context, we define also parameters of prospective traffic in metropolitan and ad-hoc networks.

The Universal Modular Industry Computer (APVV, VMSP-P-0059-09)

Project leader:	Š. Kozák, T.Krajčovič
Members:	R. Deák, P. Gábor, P. Šamaj, M. Janovčík, R. Chovan, J. Štefanovič
Supported by:	Slovak Research and Development Agency
Duration:	August 2009 – December 2010
Description:	The goal of the project is the support of research and development in VOIPAC Technologies Ltd. The main objectives include the development of computer that will represent the suitable platform for more effective evolution of wide range of end-user equipments; to help en-

terprises that do not dispose of sufficient know how in end-user equipments development; the research and development of modern embedded computer systems engaging the cooperation and support of academic organization, attaining thus the increase in added value of project; the production of prototype, manufacturing and sales; creation of job position.

Support of Building a Center of Exellence for Smart Technologies, Systems, and Services (ITMS 26240120005)

Project leader: T. Krajčovič for UPSS
Members: International Laser Centre Bratislava, ÚI SAV Bratislava
Supported by: European Structural Fund
Duration: May 2009 – April 2011
Description: The project aims at following: concentration of the top research-educational teams of smart technologies, systems, and services in Bratislava region; improving the quality of technological infrastructure and smart technology development of systems and services including the information and communication infrastructure modernization; improving effectiveness of the know-how transfer between academy and industry sphere in the area of smart technologies, systems, and services; improving integration into international cooperation in research and development in the field of smart technologies.

Mobile Education Center (HP Technology for Teaching Higher Education Grant Initiative 2007)

Project leader: P. Čičák
Members: D. Bernát, B. Dado, K. Jelemenská, M. Kotočová
Supported by: Hewlett Packard
Duration: September 2007 – August 2009
Description: The main goal of the project is the education innovation by means of convenient utilization of capabilities, provided by the newest IT technologies, including mobile technology, into the learning environment. Thus one of the most important goals of a modern school is to be reached, that each graduate in its future job should be able to apply information and communication technologies. A mobile laboratory represents more effective way of exploitation existing technological equipment. The activities that does not require technological equipment, can take place in mobile laboratory.

8.6 Publications

Journals

KOTMANOVÁ, D., KOLESÁR, M.: Application of Model Checking to the Verification of Digital Systems. In: *Acta Electrotechnica et Informatica*. Vol. 9, No. 2 (2009), Faculty of Electrical Engineering and Informatics Košice, ISSN 1335-8243, pp. 30-37.

MARÍN-LÓPEZ, A., DÍAZ-SÁNCHEZ, D., ALMENÁREZ-MENDOZA, F., RODRÍGUEZ-GARCIA, F., LÓPEZ-RIZALDOS, J., CUBERO-VEGA, A., ORMAETXEA, I., LOPEZ, J. L., FERNÁNDEZ, S., ORTIGOSA, F., KOTULIAK, I., MIKOCZY, E., LAHNALAMPI, T., KOSKI, T., AVESSTA, S.: Interoperability of IP Multimedia Subsystems: The Net.Lab Approach. In: *IFIP Advances in Information and Communication Technology*. Vol. 308, Wireless and Mobile Networking, ISSN 1868-4238. Springer-Verlag Berlin Heidelberg 2009, pp. 20-31.

SEMANČÍK, R.: Revised World Wide Web Architecture. In: Information Sciences and Technologies Bulletin of the ACM Slovakia. Vol. 1, No. 1 (2009), ISSN 1338-1237. pp. 11-24.

International Conferences

ABAFFY, J., KRAJČOVIČ, T.: Latencies in Linux and FreeBSD Kernels with Different Schedulers - O(1), CFS, 4BSD, ULE. In: *The 2nd International Multi-Conference on Engineering and Technological Innovation*, Orlando, Florida, USA, Orlando - International Institute of Informatics and Systemics, 2009. pp. 110-115.

ABAFFY, J., KRAJČOVIČ, T.: PI-ping -Benchmark Tool for Testing Latencies and Throughput in Operating Systems. In: *International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 09)*, Bridgeport, Connecticut, USA, Vol. 2 Innovations in Computing Sciences and Software Engineering, Proceedings in press.

BENKOVIČ, J., KOTULIAK, I., TRÚCHLY, P.: Comparison of DSR and DYMO Routing Protocols in Building Environments. In: *Proceedings ELMAR-2009*, 51st International Symposium ELMAR-2009, Zadar, Croatia, Zadar Croatian Society Electronics in Marine, 2009. pp. 109-112.

BURDA, F: Increasing Availability of End Devices by Using FHRP Protocols and Object Tracking. In: *Informatics 2009,* Tenth International Conference on Informatics Herľany, Slovakia, 2009. pp. 39-44.

FLOCHOVÁ, J., BOEL, R.: On Fault Diagnosis of Random Free-Choice Petri Nets. In: *Safeprocess´09*, 7th IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Systems, Barcelona, Spain, 2009. pp. 1390-1395.

FLOCHOVÁ, J., LOJAN, T.: Tool Designed for Supervisory Control of DES and Model-Based Diagnosis. In: *ITI 2009*, Proceedings of the 31st International Conference on Information Technology Interfaces, Cavtat/Dubrovnik, Croatia, SRCE University Computing Centre, University of Zagreb, 2009. pp. 33-34.

GRELLNETH, I., SCHUSTEROVÁ, Z.: An Approach to Implementation of Virtual Network Laboratory. In: *Virtual University VU´09*, Bratislava, Book of Abstracts, Bratislava, FEI STU, 2009, CD-ROM, p. 6.

HAVRILA, P: Visualization in TCP/IP Networks Based on SNMP Accessible Information. In: *Informatics 2009*, Tenth International Conference on Informatics Herľany, Slovakia, 2009. pp. 88-93.

JAKAB, F., BUČKO, M., SIVÝ, I., MADARÁSZ, L., ČIČÁK, P.: The System of Career Promotion of Networking Professional Based on Industrial Certificates. In: *INES 2009*,

IEEE 13th International Conference on Intelligent Engineering Systems 2009, Barbados, IEEE Joint Chapter of IES and RAS, 2009. pp. 221-226.

JELEMENSKÁ, K., ČIČÁK, P.: Education Improvement In Mobile Education Centre, In: *ICETA 2009*, 7th International Conference on Emerging e-Learning Technologies and Applications, Stará Lesná, Slovak Republik, Košice Elfa, 2009. pp. 187-192.

JELEMENSKÁ, K., ČIČÁK, P., JURIKOVIČ, M., PIŠTEK, P.: Digital System Description Knowledge Assessment. In: *CISSE´09*, International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering, Vol.1, Technological Developments in Networking, Education and Automation, Proceedings. Bridgeport, Connecticut, USA, 2009. 6 p.

JELEMENSKÁ, K., JURIKOVIČ, M., PIŠTEK, P., ČIČÁK, P.: Automated Skills Assessment in Mobile Environment. In: *Research, Reflections and Innovations in Integrating ICT in Education*, Vol.1, V. International Conference on Multimedia and Information & Communication Technologies in Education (m-ICTE 2009), Lisbon, Portugal, Badajoz Formatex, 2009. pp. 487-491.

JELEMENSKÁ, K., TOMALOVÁ, E., ČIČÁK, P.: Knowledge Assessment Improvement in Moodle Environment. In: *Research, Reflections and Innovations in Integrating ICT in Education*, Vol.1, V. International Conference on Multimedia and Information & Communication Technologies in Education (m-ICTE 2009), Lisbon, Portugal, Badajoz Formatex, 2009. pp. 979-983.

KNĚZEK, M.: Blended Metrics Comparative Algorithm: Initialization Phase. In: *Cracow´09 Grid Workshop*, Krakow, Poland, Krakow Cyfronet, 2009.

KNĚZEK, M.: Blending Routing Metrics for Optimization the Best Path Selection in Multiple Protocol Environment. In: *Cracow´09 Grid Workshop*, Krakow, Poland, Krakow Cyfronet, 2009.

KNĚZEK, M: Network Simulator for Advanced Testing of Blending Metrics. In: *Informatics 2009*, Tenth International Conference on Informatics, Herľany, Slovakia, 2009. pp. 51-56.

KOTMANOVÁ, D., KOLESÁR, M.: Temporal Operators Until and Unless in Digital System Verification. In: *Informatics 2009*, Tenth International Conference on Informatics, Herľany, Slovakia, 2009. pp. 198-206.

KOVÁČIK, T., KOTULIAK, I.: Traffic Characterization in IP Multimedia Subsystem. In: *IWSSIP 2009*, 16th International Conference on Systems, Signals & Image Processing, Chalkida, Greece, IEEE eXpress, 2009. CD-Rom.

NEMSILA, M., GRELLNETH, I.: Host-Based Network Intrusion Prevention System Using Snort-inline. In: *Informatics 2009*, Proceedings of the Tenth International Conference on Informatics, Herľany, Slovak Republic, 2009. pp. 33-38.

POHRONSKÁ, M., KRAJČOVIČ, T.: Implementation of Expert Systems in Embedded and Real-Time Systems. In: *Informatics 2009*, Proceedings of the Tenth International Conference on Informatics, Herľany, Slovak Republic, 2009. pp. 259-264.

POHRONSKÁ, M., KRAJČOVIČ, T.: ARM7 Based Embedded System for Education. In: *Applied Electronics 2009*, International Conference, Pilsen, Czech Republic, pp. 207-210.

TRÚCHLY, P., SLÁVIK, M.: Performance of TCP Protocol in Geostationary Satellite Systems. In: *RTT 2009 Research in Telecommunication Technology*, 11th International Conference, Srby, Czech Republic, CD-Rom.

TUROŇ, J., HUPKA, Š., CHOLEVA, M., JELEMENSKÁ, K., KOINE, P., MOŤOVSKÝ, E.: Petri Net Education Tool. In: *ICETA 2009*, 7th International Conference on Emerging eLearning Technologies and Applications, Stará Lesná, Slovak Republik, Košice Elfa, 2009. pp. 145-150.

VRÁBEL, M., GRELLNETH, I.: The "Amber" Approach to Active Queue Management. In: *ICETA 2009*, 7th International Conference on Emerging eLearning Technologies and Applications, Stará Lesná, Slovak Republic, Košice Elfa, 2009. CD-ROM.

Local and National Conferences

ABAFFY, J.: On-line Control of Program Flow in Embedded systems. In: *Computer Architecture and Diagnostic 2009*, Czech-Slovak Workshop for PhD Students. Soláň, Czech Republic, 2009. pp. 7-12.

ABAFFY, J.: Performance Comparison of OS Schedulers on Symmetric Multiprocessors. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: T. Krajčovič, 2009. pp. 277-283.

ADÁMEK, A., HABAJ, D., OCHODNICKÝ, D., KOVÁČ, T., SZABÓ, G.: Data Sharing in a Workgroup. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: B. Dado, 2009. pp. 235-242.

BURDA, F.: Convergence in Computer Networks. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Kotočová, 2009. pp. 327-334.

DOBAI, R.: Test Generation for Asynchronous Circuits. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: E. Gramatová, 2009. pp. 284-291.

GRELLNETH, I., SCHUSTEROVÁ, Z.: An Approach to Implementation of Virtual Network Laboratory. In: *Virtual University VU´09*, Bratislava, 2009. CD-ROM, pp. 6.

HAVRILA, P.: Visualization of Management Related Information in TCP/IP Networks. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Kotočová, 2009. pp. 349-356.

KNĚZEK, M.: Building Robust Enterprise Network Avoided Server Failures in Linux Environment. In: *Student Research Conference 2009*. 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: M. Kotočová, 2009. pp. 357-363.

KONÔPKOVÁ, K., GRELLNETH, I.: Rapid Spanning Tree Protocol - properties visualization. In: *Proceedings of the 6th Conference SCO 2009* – Sharable Content Objects. Brno, Czech Republic, 2009. pp. 163-168. (in Slovak)

KOVÁČ, T., SZABÓ, G.: Experimental Information-Collection Method Using Bluetooth and Mobile Technology. In: *Student Research Conference 2009.* 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: T. Krajčovič, 2009. pp. 364-369.

KOVÁČIK, T.: Traffic Analysis in IP Multimedia Subsystem. In: *Student Research Conference 2009.* 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: I. Kotuliak, 2009. pp. 292-299.

MICHALÁK, J.: Transparent Cryptographic Embedded Computer System. In: *Student Research Conference 2009.* 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: L. Hudec, 2009. pp. 401-408.

POHRONSKÁ, M.: Utilization of FPGAs in Real-Time and Embedded Systems. In: *Student Research Conference 2009.* 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: T. Krajčovič, 2009. pp. 300-307.

TUROŇ, J., CHOLEVA, M., MOŤOVSKÝ, E., HUPKA, Š., KOINE, P.: Petri Net Designer. In: *Student Research Conference 2009.* 5th Student Research Conference in Informatics and Information Technologies Bratislava, Supervisor: K. Jelemenská, 2009. pp. 433-437.

Part of Books

TOMÁŠIK, J., KOTULIAK, I.: Markovian Analysis of a Synchronous Optical Packet Switch. In: *Current Research Progress of Optical Networks*. London. ISBN 978-1-4020-9888-8. Springer Science+Business Media B.V. 2009. pp. 45-64.

8.7 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 Žilina

– Faculty of Electrical Engineering, University of Žilina

– Regional Cisco Networking Academy, Faculty of Management Science and Informatics, University of Žilina

– Faculty of Informatics, Bratislava School of Law

- Abonus Ltd.
- Asseco Slovakia Ltd.
- CISCO Systems Slovakia Ltd.
- Datalan Ltd.
- GTEC Ltd.
- Hewlett-Packard Slovakia Ltd.
- IBM Slovakia Ltd.
- Infostat Bratislava
- Molpir Ltd.
- Oracle Slovakia Ltd.
- Siemens Enterprise Communications Ltd.
- Soitron Ltd.
- Spinet Ltd.
- Tempest Ltd.
- Tronet Ltd.

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
- INRIA, Grenoble, 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

Visits of Staff Members
- *I. Kotuliak*: Celtic Event 2009, Paris, France, March 8-13, 2009
- *P. Čičák*: INES 2009 - IEEE International Conference on Intelligent Engineering Systems, Barbados, April 16-18, 2009
- *K. Jelemenská, P. Pištek*: m-ICTE 2009 Conference 2009, Lisbon, Portugal, April 21-25, 2009
- *P. Čičák, I. Grellneth*: CEE CCNP Regional Academy Instructor Annual Meeting, Zagreb, Croatia, June 3-6, 2009

- *P. Trúchly*: TIMS workshop, VUT Brno, Czech Republic, June 4, 2009
- *K. Konôpková:* SCO 2009 - Sharable Content Objects, Brno, Czech Republic, June 17, 2009
- *T. Kováčik*: IWSSIP 2009, International Conference on Systems, Signals & Image Processing, Chalkida, Greece, June 18-20, 2009
- *K. Jelemenská, M. Vrábel, V. Michalec, Š. Gula*: NetAcad Annual Conference, Brno, Czech Republic, June 18-20, 2009
- *J. Flochová*: ITI 2009, Information Technology Interfaces, Cavtat, Croatia, June 21-26, 2009
- *J. Flochová*: Safe Process 2009, Barcelona, Spain, June 30 - July 5, 2009
- *J. Abaffy*: IMETI 2009, International Multi-confeerence on Engineering and Technological Innovation, Orlando, Florida, USA, July 7-15, 2009
- *P. Čičák, K. Jelemenská*: Erasmus mobility, Paris, France, September 6-12, 2009
- *I. Kotuliak*: WMNC 2009, Joint IFIP Wireless and Mobile Networking Conference, Gdansk, Poland, September 7-11, 2009
- *T. Krajčovič, M. Pohronská*: Applied Electronics 2009, Pilsen, Czech Republic, September 8-11, 2009
- *E. Gramatová, J. Abaffy*: PAD 2009, Veľké Karlovice, Czech Republic, September 9-11, 2009
- *P. Trúchly*: ELMAR 2009, Zadar, Croatia, September 26 - October 1, 2009
- *M. Knězek*: Cracow´09 Grid workshop, Krakow, Poland, October 11-15, 2009
- *E. Gramatová*: FIT VUT Brno, Czech Republic, November 4, 2009
- *E. Gramatová*: FIT VUT Brno, Czech Republic, November 18, 2009

Visits to the Institute
- *Matthias Moschik,* Faculty of Telecommunication, University of Applied Sciences, Leipzig, Germany, September 1 - December 22, 2009
- *Mariusz Zyngier and group of students,* Combined school in Polianec, Poland, April 20, 2009
- *Dmitrij Andrjushko,* National University of Radioelektronics, Charkov, Ukraine, June 25-26, 2009
- *Mariusz Zyngier and group of students*, Combined school in Polianec, Poland, October 5, 2009

8.8 Membership in Professional Organisations and Societies

Slovak Professional Organisations and Societies

Pavel Čičák
- Slovak Centre of the IET (member, since 1999)

Elena Gramatová
- Slovak Society for Computer Science (member, since 1995)

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

Milan Kolesár
- Slovak Centre of the IET (member, since 2001)
- Slovak Society for Computer Science (member, since 1995)

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
- IEEE, Institute of Electrical and Electronic Engineers (member, since 1995)
- 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)

Ladislav Hudec
- Information Systems Audit and Control Association (member, since 1998)

Tibor Krajčovič
- Slovak Commission for UNESCO. Informatics, Information and Communication Technologies (member, since 2005)

Mária Pohronská
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2009)

8.9 Other Activities
- National COST Coordinator, L. Hudec (since 1993)
- Member of the COST Senior Officials Committee, L. Hudec (since 1993)

– Newsletter of Cisco Networking academy in Slovakia – P. Čičák, I. Grellneth: members of editorial board

– Slovak Expert Council for informatics in education – P. Čičák, E. Gramatová: members

– Working Group of the Accreditation Commission of Slovakia for Information Sciences and Technologies – E. Gramatová, member

– IJMIT, International Journal of Managing Information Technology – K. Jelemenská, J. Abaffy: editorial board members

– CSSIM 2009, EUROSIM/CSSS International conference on computer modelling and simulation, September 2009, Brno, Czech Republic – M. Kolesár: member of programme committee

– DDECS 2009 – 12th IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, April 2009, Liberec, Czech Republic – E. Gramatová: member of programme and steering committee

– ETS 2009 – 14th IEEE European Test Symposium, May 2009, Sevilla, Spain – E. Gramatová: member of programme committee, programme vice-chair

– FPL 2009 – 19th International Conference on Field Programmable Logic and Applications, August 2009, Prague, Czech Republic – E. Gramatová: member of programme committee

– ICETA 2009 – 7th International Conference on Emerging E-Learning Technologies and Applications, November 19-20, 2009, Stará Lesná, High Tatras, Slovakia – P. Čičák: member of programme committee

– ICCIT 2009 – International Conference on Convergence and Hybrid Information Technology, December 21-23, 2009, Dhaka, Bangladesh – I. Kotuliak: member of programme committee

– Informatics 2009 – 10th International Scientific Conference on Informatics, November 2009, Herľany, Slovakia – M. Kolesár, E. Gramatová: members of programme committee

– Information Security 2009 Conference, February 10, 2009, Bratislava – L. Hudec: member of programme committee

– MEMICS 2009 – Annual Doctoral Workshop on Mathematical and Engineering Methods in Computer Science, November 2009, Znojmo, Czech Republic – E. Gramatová: member of programme committee

– NCM 2009 – 5th International Conference on Networked Computing and Advanced Information Management, Seoul, Korea, August 25-27, 2009 – I. Kotuliak: member of programme committee

– NAG 2009 – 4th International Competition for Cisco Networking Academy program students - Networking Academy Games 2009 – Institute of Computer Systems and Networks FIIT STU Bratislava, June 2009 – P. Čičák, I. Grellneth: members of steering committee, I. Grellneth, K. Jelemenská: members of Competition Jury

- NAG 2009 – 1st and 2nd place in regional contest, May 6-7, 2009, RCNA Žilina, Slovakia, (P.Čičák - supervisor)
- NAG 2009 – 1st and 3nd place in – 4th International Competition, June 25-26, 2009, RCNA Bratislava, Slovakia, (P.Čičák - supervisor)
- ngnlab.eu 2009 workshop organization – I. Kotuliak: workshop chair, T. Kováčik: organizing chair
- PAD 2009 – Počítačové architektúry a diagnostika, czech-slovak seminar, September 2009, Pilsen, Czech Republic – E. Gramatová: member of programme and steering committee

9 Institute of Informatics and Software Engineering

E-mail:	uisi@fiit.stuba.sk
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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 and software engineering. Among the related areas, it is oriented especially to artificial intelligence in research of knowledge approaches in solving problems of informatics 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 Slovak and European 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 by 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 7th 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, PhD.

Administrative Department
>   Zuzana Macková

Teaching Staff
>   Nadežda Andrejčíková (part time)
>   Pavel Bartoš
>   Mária Bieliková, Professor
>   Anna Bou Ezzeddine
>   Peter Brusilovsky, visiting Professor (part time)
>   Iveta Dekýšová
>   Pavol Frič, PhD. (part time)
>   Marta Gnipová (part time)
>   Nikoleta Habudová
>   Daniela Chudá, PhD.
>   Ivan Kapustík
>   Gabriela Kosková, PhD.

Rastislav Královič, Assoc. Professor (part time)
Ján Lang, PhD.
Jana Minárová, Assoc. Professor (part time)
Marián Mlynarovič, PhD. (part time)
Vladimír Mlynarovič, Assoc. Professor (part time)
Ľudovít Molnár, Professor
Pavol Návrat, Professor
Ivan Polášek, PhD. (part time)
Ivan Polický (part time)
Anna Považanová
Viera Rozinajová, PhD.
Tomáš Seidmann, PhD., visiting Assoc. Professor (part time)
Jiří Šafařík, Professor (part time)
Ľubor Šešera, PhD., visiting Assoc. Professor (part time)
Valéria Šimáková (part time)
Peter Tiňo, PhD., visiting Assoc. Professor (part time)
Valentino Vranić, PhD.
Michal Winczer, PhD. (part time)

Researchers

Mark Frederick Rudolph, PhD.
Tomáš Chvostek
Marián Lekavý PhD.

External Lecturers

Michal Laclavík, PhD.
Martin Marko
Jozef Papula, Professor
Petr Šaloun, Assoc. Professor
Danica Šoltésová, PhD.
Marián Šuráb, Assoc. Professor

Full time PhD Students

Michal Barla
Peter Bartalos
Peter Kajsa
Michal Kasan
Ivan Kišac
Branislav Kokavec
Tomáš Kuzár
Matej Košík
Ľubomír Majtás
Ján Máté
Jakub Mažgut
Pavol Mederly
Ján Suchal
Martin Šechný

Marián Šimko
Jozef Tvarožek
Michal Tvarožek
Peter Vojtek
Marek Závodský

9.2 Teaching

Undergraduate Study (Bc.)

Course	Semester	Credits	Lecturer
Artificial Intelligence	Spring	6	P. Návrat
Communication in Culture History	Spring	3	D. Šoltésová
Construction of Effective Algorithms	Spring	6	R. Královič
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	D. Gregušová
Managerial Economics	Autumn	5	V. Mlynarovič
Object-Oriented Programming	Spring	6	V. Vranić
Program Development for Java Platform	Spring	6	M. Marko
Programming Languages and Compilation	Autumn	6	Ľ. Molnár
Principles of Information Systems	Autumn	5	V. Rozinajová
Principles of Software Engineering	Spring	7	M. Bieliková
Procedural Programming	Autumn	6	A. Bou Ezzeddine
Research Seminar I-III	Autumn Spring	0-3-3	M. Bieliková
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
Architecture of Information Systems	Autumn	4	M. Mlynarovič

Course	Semester	Credits	Lecturer
Architecture of Software Systems	Autumn	4	P. Návrat
Application Architectures of Software Systems	Spring	6	Ľ. Šešera
Aspect-Oriented Software Development	Autumn	6	V.Vranić
Design of Compilers	Autumn	6	Ľ. 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 Operating Systems	Autumn	6	T. Seidmann
History of Design	Autumn	5	D. Šoltésová
Industry Project	Spring	5	M. Bieliková
Information Search	Autumn	5	M. Laclavík
Knowledge Discovery	Autumn	6	G. Kosková
Knowledge-Based Systems	Autumn	5	I. Kapustík
Law – Selected Problems	Spring	5	D. Gregušová
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
Team Information System Development I-II	Autumn Spring	7-5	M. Bieliková
Team Software System Development I-II	Autumn Spring	7-5	M. Bieliková

9.3 Theses

Bachelor (Bc.) Theses – graduates 2009

Study Programme Informatics

– Bako, Peter: *Recommendation in Large Graphs*. May 2009. Supervisor: J. Suchal

– Barilla, Marek: *Using MathML, SVG, XML in Creating of Web Pages*. May 2009. Supervisor: M. Šechný

– Bartal, Kamil: *Analysis and Usage of the Representational State Transfer Technology*. May 2009. Supervisor: I. Polášek

– Bartek, Michal: *Robotic Hockey Player Improvement.* May 2009. Supervisor: M. Závodský

- Bartošík, Maroš: *Generator of Object Ontology Mapping.* May 2009. Supervisor: P. Bartalos

- Basár, Peter: *Focused Web Crawler.* May 2009. Supervisor: M. Barla

- Bielik, Peter: *Simulator of Formal Abstract Machines - Turing Machine, RAM.* May 2009. Supervisor: D. Chudá

- Boroš, Martin: *Support of E-learnings System.* May 2009. Supervisor: V. Šimáková

- Bradáč, Peter: *DeveFlopment of Information Systems Based on Service Oriented Architecture.* May 2009. Supervisor: V. Rozinajová

- Brandobúr, Marek: *The InterNet - Basic Medium of Communication.* May 2009. Supervisor: P. Návrat

- Capík, Zdenko: *Analysis and Use of Representational State Transfer.* May 2009. Supervisor: I. Polášek

- Dittinger, Tomáš: *Defenders Decision Making.* May 2009. Supervisor: I. Kapustík

- Drahoš, Juraj: *Digital Photo Gallery.* May 2009. Supervisor: A. Považanová

- Eľko, Ľubomír: *QEMU as Plugin for Web Browser.* May 2009. Supervisor: M. Košík

- Ertl, Peter: *Monitoring and Presentation of Changes in Project Development.* May 2009. Supervisor: I. Polášek

- Godány, Robert: *Downloading and Visualization of Weather Informations on a Platform UIQ 3.* May 2009. Supervisor: J. Máté

- Hošak, Michal: *The Information Search Model Based on Behaviour of the Social Insect.* May 2009. Supervisor: P. Návrat

- Hruška, Marek: *Recognition Design Patterns.* May 2009. Supervisor: I. Polášek

- Hujsi, Ivan: *Players without Ball Decision Process.* May 2009. Supervisor: I. Kapustík

- Chabadová, Martina: *Analysis of Communication Algorithms over Regular and Unreliable Networks*. May 2008. Supervisor: M. Nehéz

- Chalupa, David: *Virtual Educational Laboratory Design.* May 2009. Supervisor: V. Šimáková

- Chovančák, Marián: *Data Classification Using SVM Methody.* May 2009. Supervisor: M. Ružovič

- Institoris, Juraj: *Certification Authority.* May 2009. Supervisor: J. Dobias

- Ivanov, Peter: *Data Mining through Association Rules.* May 2008. Supervisor: A. Bou Ezzeddine

- Jačala, Martin: *Identifying Entity Relationships in News Reports.* May 2009. Supervisor: J. Tvarožek

- Janošík, Jozef: *Integration Semiformal and Formal Specification Methods.* May 2009. Supervisor: D. Komorová

- Juhász, Vojtech: *Information Retrieval from Files.* May 2009. Supervisor: J. Máté

- Kallo, Ondrej: *Simple Device Drivers Implemented in Pict Programming Language.* May 2009. Supervisor: M. Košík

- Karas, Peter: *Web Service Composition.* May 2009. Supervisor: V. Rozinajová

- Kojda, Juraj: *The Creation of Intelligent Module for Knowledge Management.* Supervisor: I. Polášek

- Korduliak, Robert: *Proposal of Solution for is for Support of Creation Offers for Companies.* May 2009. Supervisor: A. Molnárová

- Kmeťko, Ján: *Analysis of Students' Feedback to Education Quality.* May 2009. Supervisor: M. Gnipová

- Labaj, Martin: *Software Design in International Competition.* May 2009. Supervisor: M. Bieliková

- Lackovič, Ľubomír: *Phasing Optimization of Crossroad Controlled by Traffic Lights.* May 2009. Supervisor: A. Bou Ezzeddine

- Lauro, Tomáš: *The Management System for Registration and Distribution of Working Resources.* May 2009. Supervisor: N. Habudová

- Lazarčík, Lukáš: *Web Log Server Analysis.* May 2009. Supervisor: T. Kuzár

- Líška, Peter: *Software Design in International Contest.* May 2009. Supervisor: M. Bieliková

- Lohnický, Michal: *Software Design in International Competition.* May 2009. Supervisor: M. Bieliková

- Lukáč, Branislav: *The Extension of WS-BPEL 2.0 with User Interaction Possibilities.* May 2009. Supervisor: P. Mederly

- Majchrák, Matúš: *Portal to Support Development of Software Applications.* May 2009. Supervisor: I. Polášek

- Majer, Tomáš: *Control of Usability of Web Pages for Search Engines and Supervision of Personal Information Published on the Web.* May 2008. Supervisor: M. Šechný

- Marcinčín, Roman: *QEMU as a Plugin for Web Browser.* May 2009. Supervisor: M. Košík

- Marko, Peter: *Legal Conditions for the Development and Supplies of Information Systems.* May 2009. Supervisor: I. Dekyšová

- Martinka, Vladimír: *Optimization of Traffic Signal Phasing.* May 2009. Supervisor: A. Bou Ezzeddine

- Masliš, Michal: *Focused Web Crawler.* May 2009. Supervisor: M. Barla

- Meľo, Patrik: *Interactive Web-Based Photogallery.* May 2009. Supervisor: M. Tvarožek

- Mičko, Tomáš: *Utilization of Models in Software Projects.* May 2009. Supervisor: Ľ. Majtás

- Mihál, Vladimír: *Annotation Programs and Texts about Programming.* May 2009. Supervisor: M. Bieliková

- Mihalovič, Martin: *Searching Information by Evaluating Graphs.* May 2009. Supervisor: J. Suchal

- Mikluš, Miroslav: *Porting Graphical User Interface of Application Putty to Platform SYMBIAN UIQ3.* May 2009. Supervisor: J. Máté

- Nágl, Pavol: *Portal for Simple Project Management.* May 2009. Supervisor: I. Kapustík

- Námešný, Michal: *Possibility of Automatic Refactoring.* May 2009. Supervisor: I. Polášek

- Noskovič, Michal: *Proposal of Virtual Teaching Laboratory.* May 2009. Supervisor: V. Šimáková

- Nováková, Katarína: *Visualization of Results of Biclustering Methods.* May 2009. Supervisor: J. Mažgut

- Ondruška, Peter: *Server Web Log Analysation.* May 2009. Supervisor: T. Kuzár

- Ott, Marián: *Generator of Technical Documentation from CASE Tool.* May 2009. Supervisor: I. Polášek

- Pagáč, Matej: *Time Stamp Authority.* May 2009. Supervisor: J. Dobias

- Pajbach, Michal: *InterNet and Misuse of its Means.* May 2009. Supervisor: I. Dekyšová

- Palo, Martin: *Extending of BPEL 2.0 Language with Enabling User Interaction.* May 2009. Supervisor: P. Mederly

- Paprčka, Michal: *Address Book for Mobile Phones.* May 2009. Supervisor: P. Bartalos

- Pavlík, Michal: *Time-Stamp Authority.* May 2009. Supervisor: J. Dobias

- Pažitnaj, Adam: *Online Word Game.* May 2009. Supervisor: T. Kuzár

- Pekala, Dominik: *Time Stamp Authority.* May 2009. Supervisor: J. Dobias

- Petrík, Matej: *Rescheduling Based on Minimal Graph Cut - Combination with Existing Approaches.* May 2009. Supervisor: M. Lekavý

- Pružinský, Matej: *E-Business Like a New Form of the Communication.* May 2009. Supervisor: P. Návrat

- Rakovský, Adrián: *Web Browsing Based on Graph Visualization.* May 2009. Supervisor: M. Tvarožek

- Rástočný, Karol: *Specification in Object-Z.* May 2009. Supervisor: D. Komorová

- Sabo, Matej: *Online Word Game.* May 2009. Supervisor: T. Kuzár

- Sabo, Štefan: *Recommendation of Information in Web Environment.* May 2009. Supervisor: A. Bou Ezzeddine

- Sadauskas, Martin: *Suitability for Search Engines Control of Web Pages and on Web Published Personal Information Supervision.* May 2009. Supervisor: M. Šechný

- Soha, Miroslav: *Simulation of Work Distribution Using Agent Systems.* May 2009. Supervisor: I. Kapustík

- Sokol, Matej: *Aspects of Security in Heterogeneous Environment.* May 2009. Supervisor: I. Polášek

- Sokolský, Michal: *Syntactic Analyzer of Context-Free Languages Generated by LL and LR grammars.* May 2009. Supervisor: I. Polický

- Somora, Michal: *Lecture Sheet.* May 2009. Supervisor: A. Považanová

- Ščepán, Juraj: *Improvement of Robotic Hockey Player.* May 2009. Supervisor: M. Závodský

- Števaňák, Samuel: *Phonebook for Mobile Devices.* May 2009. Supervisor: P. Bartalos

- Študent, Peter: *Computer Program – Author's Work.* May 2009. Supervisor: P. Návrat

- Švajdlenka, Robert: *Outsourcing and the Privacy Act.* May 2009. Supervisor: I. Dekyšová

- Švoňava, Daniel: *Software Design in International Competition.* May 2009. Supervisor: M. Bieliková

- Tóth, Ján: *Application Creating XAdES Electronic Signature.* May 2009. Supervisor: J. Dobias

- Uhlík, Martin: *Texts Extraction from the Web.* May 2009. Supervisor: T. Kuzár

- Urbanec, Maroš: *Action Selection of Players Leading Ball.* May 2009. Supervisor: I. Kapustík

- Valčuha, Matej: *Generation of a Centrally Controlled Team of Players of Simulated Robotics Soccer.* May 2009. Supervisor: M. Závodský

- Valent, Martin: *Generator of Technical Documentation from the CASE Tool.* May 2009. Supervisor: I. Polášek

- Zdechovan, Ján: *Catalogue of Changes Realized by Aspect-Oriented Programming.* May 2009. Supervisor: V. Vranić

Master Theses – graduates 2009

Study Programme Information Systems

- Barlík, Rastislav: *Plan Searching by Means of Evolution Algorithms.* May 2009. Supervisor: M. Lekavý

- Buchta, Marian: *RoboCup 3D.* May 2009. Supervisor: I. Kapustík

- Červenák, Roman: *Bringing a Functionality of Complex Desktop Applications to Mobile Devices.* May 2009. Supervisor: V. Vranić

- Dančík, Ondrej: *Finding Similar and Identical Data in Datasets.* May 2009. Supervisor: G. Frivolt

- Dlugolinský, Štefan: *Distance Search on the Web.* May 2009. Supervisor: M. Laclavík

- Fris, Martin: *Searching in Multigraphs.* May 2009. Supervisor: J. Suchal

- Janov, Vladimír: *Automation of Business Processes*. May 2009. Supervisor: V. Rozinajová

- Kajaba, Michal: *Context Search*. May 2009. Supervisor: P. Návrat

- Kasan, Michal: *Web Service Composition*. May 2009. Supervisor: V. Rozinajová

- Katona, Aleš: *Impact of Dataset Structure on Relational Classification*. May 2009. Supervisor: P. Vojtek

- Kendera, Matej: *System for Creating and Processing Educational Units*. May 2009. Supervisor: A. Považanová

- Kontúr, Branislav: *Ontologies and Culture Heritage*. May 2009. Supervisor: N. Andrejčíková

- Kosorín, Michal: *E-learning Environment Risk Analysis and Assessment*. May 2009. Supervisor: D. Chudá

- Legéň, Miroslav: *Framework for Learning Patterns from Documents*. December 2008. Supervisor: G. Frivolt

- Ország, Miloš: *Row Version Management in Relational Databases*. May 2009. Supervisor: J. Máté

- Perďoch, Ján: *Presentation of History of Informatics on STU*. December 2008. Supervisor: V. Šimáková

- Romanová, Miroslava: *Security in Information Systems of E-learning*. May 2009. Supervisor: D. Chudá

- Schvartz, Tibor: *Experts Finding System*. May 2009. Supervisor: A. Považanová

- Slížik, Lukáš: *Opinion Mining*. May 2009. Supervisor: A. Bou Ezzeddine

- Vanek, Lukáš: *Information System for Administration of Employees Vacation*. May 2009. Supervisor: N. Habudová

Study Programme Software Engineering

- Brtáň, Peter: *The Support of the Reverse Process in the Model Driven Architecture*. May 2009. Supervisor: Ľ. Majtás

- Divéky, Marko: *Generating Dynamic Interactive Stories*. May 2009. Supervisor: M. Bieliková

- Formanko, Martin: *Overriding the Barrier between Web and Desktop Applications*. May 2009. Supervisor: V. Vranić

- Garaj, Ján: *Positive Feedback in Computer Supported Group Learning*. May 2009. Supervisor: J. Tvarožek

- Jastrzembská, Lucia: *Information Search with the Bee Hive*. May 2009. Supervisor: P. Návrat

- Jelínek, Tomáš: *Searching for New Ways of Application of the Bee Hive Model*. May 2009. Supervisor: P. Návrat

- Kajsa, Peter: *Patterns Application Support in Software Projects*. May 2009. Supervisor: Ľ. Majtás

- Kohut, Ján: *Guidelines for Employing of Aspect-Oriented Approach in Software Product Lines.* May 2009. Supervisor: V. Vranić

- Kolesár, Ján: *Simulated Robotic Soccer - Automated Learning.* May 2009. Supervisor: M. Lekavý

- Kostková, Katarína: *Identification of a Particular User According to Relations in Social Networks.* May 2009. Supervisor: M. Barla

- Kováčová, Bianka: *Similarity and Recognition of Plagiarized Program.* May 2009. Supervisor: D. Chudá

- Kvetan, Michal: *Player Decision Making in RoboCup 3D.* May 2009. Supervisor: I. Kapustík

- Labaš, Matej: *Discovering User's Characteristics Using Relational Classification.* May 2009. Supervisor: P. Vojtek

- Laššú, Miroslav: *Graphics Curves Recognition.* May 2009. Supervisor: A. Považanová

- Leitmanová, Stanislava: *Gene Expression Profiles Analysis.* May 2009. Supervisor: J. Mažgut

- Majan, Marian: *The Linux Kernel Partial Automation and Graphic Configuration.* May 2009. Supervisor: J. Máté

- Majerčík, Maroš: *Modeling User Behaviour Characteristics for Identification.* May 2009. Supervisor: D. Chudá

- Menkyna, Radoslav: *Capturing Interaction of Changes Implemented by Aspects Using Feature Modelling.* May 2009. Supervisor: V. Vranić

- Michalco, Pavol: *Use Cases and Themes in Theme/Doc Approach.* May 2009. Supervisor: V. Vranić

- Michálek, Martin: *Development of Information Systems Based on Business Process Management Frameworks.* May 2009. Supervisor: M. Fabrici

- Nepšinský, Martin: *Creating on-the-fly Documents for Adaptive Applications.* May 2009. Supervisor: A. Andrejko

- Omelina, Ľuboš: *Extracting Information from Web Pages Based on Graph Models.* May 2009. Supervisor: M. Barla

- Paroulek, Pavel: *Routing in Computer Networks.* May 2009. Supervisor: M. Nehéz

- Petráš, Martin: *Methods of Design Pattern Recovery in Reverse Engineering.* May 2009. Supervisor: J. Jakubik

- Rado, Ladislav: *Sharing Information in a Portal Based on the Semantic Web.* December 2008. Supervisor: M. Bieliková

- Šimon, Juraj: *Distributed Functional and Data Integration of Chosen Educational Systems.* May 2009. Supervisor: V. Šimáková

- Štekláč, Michal: *Web Data Gathering and Web Data Processing by Objects Defined in Authority Records and Thesauruses of a Library.* May 2009. Supervisor: N. Andrejčíková

–   Štolc, Miroslav: *Object Structures Transformations.* May 2009.
    Supervisor: I. Polášek

–   Tešlár, Jaroslav: *The Interconnection between Geographic Information Systems and Informations Systems of Libraries, Museums, Galleries.* May 2009.
    Supervisor: N. Andrejčíková

–   Zelinka, Ľuboš: *Use Case Modelling Metamodel and Its Profiling.* May 2009.
    Supervisor: V. Vranić

Doctoral (PhD.) Theses

Student name: Anton Andrejko
Degree program: Programme Systems
Thesis title: *Novel approaches to acquisition and maintenance of user model*
Supervisor: Mária Bieliková, Professor
Defended on: February 19, 2009
Annotation: There are many problems related to the Web, e.g. one is overloaded by huge amount of information or a searcher can get lost in information space. These problems can be partially overcome by employing personalization. We focus on the user modelling area and we exploit existing knowledge, mostly from the Adaptive and Semantic Web. We focus on creation and maintenance of the user model. We propose three novel methods for acquisition and maintenance of user characteristics in the user model. The first method is based on generating questions to be used for user model. Particular questions are generated according to the attributes of information concepts that are the subject of the specific application domain. The entire process of asking questions is driven by user defined rules. The second method is based on the content analysis and assumes that comparing attributes of documents, which were found interesting for a user, can be a source for discovering information about user's interests. The third method is based on spreading activation. If there are connections between information concepts of the domain model user's characteristics can be utilized even for concepts that have not been visited yet. The proposed methods were evaluated by means of software tools that were incorporated in research projects.

Student name: Jaroslav Jakubík
Degree program   Programme Systems
Thesis title: *Identification of Design Patterns by Static Analysis Based on their Significant Features*
Supervisor: Pavol Návrat, Professor
Defended on: May 7, 2009
Annotation: The target of this work was to design and prototype specific extensions of a selected method with better and more precise results. This work documents separate phases of a project – analysis of different design pattern representations, analysis of different algorithms for identification of design patterns in software systems, selection of a concrete method for extensions, design, implementation and tests of

an extended method. In this work, multi level weighting and weighting in general, feature filtering based on selected structural feature presence or absence and additional analysis based on a lexicographical distance between design pattern terminology and identified instance terminology were designed and prototyped. Extended method was experimentally tested on more than 3000 classes of open source systems from different software engineering areas. Based on the test results, the general conclusion for designed extensions was formulated.

Student name:	Marián Lekavý
Degree program:	Applied Informatics
Thesis title:	*Planning and Rescheduling*
Supervisor:	Pavol Návrat, Professor
Defended on:	March 25, 2009
Annotation:	This thesis presents results in two areas. The first area is automated planning. Approaches to domain-independent automated planning can be divided into two groups: STRIPS-like planning (based on operators) and HTN-like planning (based on hierarchical decomposition). It is widely believed, that the expressivity of STRIPS-like planning is lower than the expressivity of HTN-like planning. This would mean that HTN-like planning can solve more problems than STRIPS-like planning. We show, that the expressivity of both approaches is identical and that both approaches can solve all problems solvable by a finite tape Turing machine (i.e. solvable by a common computer). The second part of this thesis addresses rescheduling. If we have a schedule with unmovable deadline, we need to react on late activities by shortening of the remaining schedule part. In this thesis, we show that every rescheduling corresponds to a graph cut or the superposition of several graph cuts. Based on this fact, we designed a new algorithm for the cheapest rescheduling. The algorithm is based on the conversion of the rescheduling problem to the problem of minimal graph cut.

9.4 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.

9.5 Research Projects

Semantic Composition of Web and Grid Services (APVV-0391-06)

Project leader: V. Rozinajová
Contractor: Institute of Informatics, Slovak Academy of Sciences
Partners: ÚI SAV Bratislava, Microstep Ltd., FEI TU Košice
Members: P. Bartalos, M. Bieliková, I. Kapustík, P. Mederly, P. Návrat
Supported by: Slovak Research and Development Agency
Duration: February 2007 – December 2009
Description: In recent years many distributed applications have moved towards loosely coupled sets of web and grid services. These services are part of a complex environment, which enables creation of many new applications. However, it also requires an extensive amount of knowledge and information in order to be effectively controlled. This project proposes the creation of an intelligent middleware layer, comprising of tools enabling such control. These tools will monitor the environment, will analyze captured information, and extract new knowledge from it. The new knowledge will be used in later application composition. Applications are modelled as service workflows. The whole system is integrated and accessible by a web portal.

Adaptive Social Web and its Services for Information Accessing and Search (VEGA, 1/0508/09)

Project leader: P. Návrat
Members: M. Bieliková, A. Bou Ezzeddine, D. Chudá, I. Kapustík, J. Lang, I. Polášek, V. Rozinajová, V. Vranić, M. Barla, P. Bartalos, P. Kajsa, M. Kasan, T. Kuzár, Ľ. Majtás, P. Mederly, J. Suchal, M. Šimko, P. Vojtek, J. Tvarožek, M. Tvarožek

Supported by:	Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration:	January 2009 – December 2010
Description:	Web is evolving, changing, which itself requires a need of its further exploration. It becomes a place to mutual communication of people, what can be used to design of new methods of searching, classification or presentation information from web. Besides new methods will take more and more into account the context, in which the retrieval is realized. Project is focused on research of methods of information retrieval and way if its usage/utilization. In this framework, the concept of semantic web service will be elaborated. Important part of research of automated data collecting about user activities and user groups collaboration on web with the aim to offer better information services. We shall seek new approaches to develop software tools for support of adaptive social web paradigm and its services including post-object paradigms, model-driven development (MDD), web design patterns, which can allow more effective implementation of software information systems acting in web environment.

Adaptive Web-based Portal for Learning Programming (KEGA, 3/5187/07)

Project leader:	M. Bieliková
Members:	A. Andrejko, M. Barla, A. Bou Ezzeddine, D. Chudá, I. Kapustník, J. Minárová, P. Návrat, I. Polášek, A. Považanová, J. Suchal, J. Tvarožek, M. Tvarožek, V. Vranić
Supported by:	Cultural and Educational Grand Agency of the Ministry of Education of Slovak Republic
Duration:	January 2005 – December 2009
Description:	The essence of the project is the development of the methods and techniques to support adaptation in e-learning systems using the latest semantic web technologies. Adapting to user (personalization) requires mechanisms capable of working with semantics and discovering connections based on user behaviour during learning. The goal is to design and verify methods and techniques of knowledge presentation in an e-learning system based on ontology content representation.

Teacher Induction: Supporting the Supporters of Novice Teachers in Europe (Comenius, 128825-CP-1-2006-UK-Comenius-C21-TISSNTE)

Project leader:	V. Rozinajová for STU
Contractor:	Joan Stephenson, Liverpool John Moores University, United Kingdom
Supported by:	Socrates programme of the European Commission,
Countries:	United Kingdom, Belgium, Greece, Ireland, Austria, Portugal, Bulgaria, Latvia, Lithuania, Hungary, Malta
Duration:	October 2006 – September 2009
Description:	The European Commission has developed a common European Framework for teacher competences and qualifications. However, there is no common focus on the specific needs of new entrants to the

profession or the concomitant needs of those who will induct and support them in schools. The project topics are: role of supporters; analysis of what currently takes place; devising instruments to identify the needs of mentors/supporters; facilitate cross European debate about "good practice"; formulate a portfolio of support strategies for those involved in supporting novice teachers; stimulate exchange between teachers and teacher educators; add to the European policy debate on the induction and support of novice teachers; provide training and support for those involved with novice teachers in schools.

European Thematic Network for Teaching, Research and Innovations in Computing Education (ETN-142399-LLP-1-2008-1-BG-ERASMUS-ENW)

Project leader:	P. Návrat for STU
Contractor:	Angel Sotirov Smrikarov, Angel Kanchev University of Ruse, Bulgaria
Supported by:	Lifelong Learning Program
Countries:	Bulgaria
Duration:	October 2008 – September 2011
Description:	The project has several innovative aspects. One of them is the fact that it suggests reorganising the teaching process, through the use of modern technologies such as e-Learning, m-Learning, and development of new updated educational programs which will lead to higher quality education. Another innovative aspect is the fact that the education in Computing opens to science and business on one hand and on the other hand they open to it. Teaching, research and innovations are treated as inseparable components in Computing education and training. The project will contribute to the integration of the European Higher Education Area and that of the European Research and Innovation Area in the field of Computing education.

Support of Building a Center of Exellence for Smart Technologies, Systems, and Services (ITMS 26240120005)

Project leader:	M. Bieliková for FIIT
Members:	International Laser Centre Bratislava, ÚI SAV Bratislava
Supported by:	European Structural Fund
Duration:	May 2009 – April 2011
Description:	The project aims at following: concentration of the top research-educational teams of smart technologies, systems, and services in Bratislava region; improving the quality of technological infrastructure and smart technology development of systems and services including the information and communication infrastructure modernization; improving effectiveness of the know-how transfer between academy and industry sphere in the area of smart technologies, systems, and services; improving integration into international cooperation in research and development in the field of smart technologies.

Interdisciplinary Transfer of Knowledge to Improve Preservation of Material Cultural Heritage and HEI Education (Ministry of Education Grant for Science and Technology Development, project submission No. 006STU-8/2008)

Project leader: E. Králová; Information Technologies Section: V. Rozinajová
Members: N. Andrejčíková, M Bieliková, P. Návrat
Supported by: Ministry of Education of Slovak Republic
Duration: April 2009 – November 2009
Description: Main objective of the project is to create technological conditions for concentration and integration of research within existing research and development institutes in the fields of architecture, civil engineering, chemical technology, informatics, machine engineering. They all are actively involved in processes of identification, conservation, and efficient utilisation of cultural heritage of Slovakia. The project creates a basis for interdisciplinary data repository that will serve for concentration and transfer of results of research and development that facilitate processes of material cultural heritage preservation.

9.6 Publications

Journals

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Generation web Services Practices, NWeSP 2009, Prague, Czech Republic. Los Alamitos, California IEEE Computer Society, 2009. pp. 17-22.

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Books

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BIELIKOVÁ, M., NÁVRAT, P. (Eds.): Selected studies on software and information systems 4. Slovak University of Technology in Bratislava, The Edition of Research Texts in Informatics and Information Technologies. Slovak University of Technology in Bratislava, 2009, 329 p.

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BIELIKOVÁ, M., A KOL.: About Software from A to Z. Slovak University of Technology in Bratislava, 2009. ISBN 978-80-227-3133-1. 299 p. (in Slovak)

BIELIKOVÁ, M., NÁVRAT, P.: Funkcional and logic programming. - 2. ed. Slovak University of Technology in Bratislava, 2009. ISBN 978-80-227-3225-3. 281 p. (in Slovak)

Reviews in Journals

BIELIKOVÁ, M. (rev.): Foundation Flash CS3 for Designers. In: *Computing Reviews*. Vol. 50, No. 10 (2009). New York ACM Books and Journals, p. 601.

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NÁVRAT, P. (rev.): Wright, D., Gutwirth, S., Friedewald, M., Vildjiounaite, E., Punie, Y.: Safeguards in a world of ambient intelligence. In: *Computing Reviews*. Vol. 50, No. 12 (2009), New York ACM Books and Journals, pp. 744-745.

9.7 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 Žilina

- Ditec Ltd.
- Datalan Ltd.
- Gratex International Ltd.
- GBSW Ltd.
- Hewlett-Packard Slovakia Ltd.
- IBM Slovakia Ltd.
- Microsoft Slovakia Ltd.
- Oracle Slovakia Ltd.
- PosAm Ltd.
- Siemens Ltd.
- Softec Ltd.
- Soitron Ltd.
- Slovak Telecom
- Tempest Ltd.
- Unicorn Ltd.

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 Návrat 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
- 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

Visits of Staff Members

- *M. Bieliková:* SOFSEM 2009, Špindlerův Mlýn, Czech Republic, January 26-30, 2009

- *M. Bieliková, D. Chudá, P. Návrat, M. Barla, M. Šimko, M. Divéky, T. Kramár:* Znalosti 2009, Brno, February 4-6, 2009

- *V. Rozinajová:* TISSNTE meeting, Braga, Portugal, March 24-28, 2009

- *P. Návrat:* INQAAHE Conference, Abu Dhabi, UAE, March 29 - April 3, 2009

- *M. Bieliková, P. Návrat, M. Šimko:* World Wide Web Conference – WWW 2009, Madrid, Spain, April 20-24, 2009

- *P. Návrat:*Technical University, Ostrava, Czech Republic, May 25, 2009

- *Ľ. Molnár:* UNESCO, Paris, France, April 25 - May 1, 2009

- *M. Bieliková:* FIT Brno, Czech Republic, May 27, 2009

- *P. Návrat:* CEEN workshop, Vilnius, Lithuania, May 29-31, 2009

- *M. Bieliková, P. Návrat:* FIT VUT Brno, Czech Republic, June 1, 2009

- *D. Chudá, P. Návrat:* CompSysTech´09, Ruse, Bulgaria, June 17-20, 2009

- *M. Bieliková, P. Návrat:* FIT VUT Brno, June 22, 2009

- *M. Bieliková, M. Šimko, M. Tvarožek:* Hypertext 2009, Torino, Italy, June 25 – July 2, 2009

- *M. Šimko:* EDM 2009, International Conference on Educational Data Mining, Cordoba, Spain, June 28 - July 7, 2009

- *M. Bieliková, M. Labaj, P. Líška, M. Lohnický, D. Švoňava:* Imagine Cup Finals, Cairo, Egypt, July 2-8, 2009

- *Ľ. Molnár:* UNESCO, London, United Kingdom, July 4-6, 2009

- *P. Bartalos: ICWS/Services, IEEE International Conference on Web Services, Los Angeles, USA,* July 5-14, 2009
- *J. Tvarožek:* AIED 2009, International Conference on Artificial Intelligence in Education, Brighton, United Kingdom, July 5-11, 2009
- *P. Bartalos:* IEEE CEC 2009, International Conference on Commerce and Enterprise Computing, Vienna, Austria, July 20-23, 2009
- *M. Bieliková:* Czech Technical University, Prague, Czech Republic, August 25-28, 2009
- *D. Chudá:* E-learning conference + ETN-TRICE meeting, Berlin, Germany, August 30 – September 2, 2009
- *V. Vranić:* IEEE ECBS-EERC 2009, Eastern European Region Conference on the Engineering pf Computer Based Systems, Novi Sad, Serbia, September 6-9, 2009
- *P. Bartalos, M. Kasan, T. Kuzár, P. Mederly*: NWeSP 2009, International Conference on Next Generation Web Services Practices, Prague, Czech Republic, September 8-11, 2009
- *M. Barla, P. Vojtek:* AWIC 2009, Atlantic Web Intelligence Conference, Prague, Czech Republic, September 8-11, 2009
- *D. Chudá:* ISMIS 2009, International Symposium on Methodologies for Intelligent Systems, Prague, Czech Republic, September 14-17, 2009
- *P. Návrat, M. Tvarožek*: Web Intelligence 2009, Milano, Italy, September 14-19, 2009
- *I. Polášek:* Ambient Intelligence Forum 2009, Hradec Králové, Czech Republic, September 15-17, 2009
- *Ľ. Molnár:* UNESCO Paris, France, September 16-23, 2009
- *V. Rozinajová:* TISSNTE meeting, Vienna, Austria, September 26-29, 2009
- *M. Bieliková, M. Šimko, M. Divéky*: EC-TEL 2009, European Conference on Technology Enhanced Learning, Nice, France, September 28 - October 4, 2009
- *M. Barla:* ICCCI 2009, International Conference on Computational Collective Intelligence – Semantic Web, Wroclaw, Poland, October 4-8, 2009
- *I.* Polášek: KEOD 2009, International Conference on Knowledge Engineering and Ontology Development, Madeira, Portugal, October 6-8, 2009
- *M. Barla, P. Vojtek, J. Suchal:* Datakon 2009, Prague, Czech Republic, October 10-13, 2009
- *Ľ. Molnár:* UNESCO Paris, France, October 10-16, 2009
- *P. Mederly, V. Vranić:* CEE-SET 2009, IFIP TC2 Central and East European Conference on Software Engineering Techniques, Krakow, Poland, October 12-14, 2009
- *M. Bieliková, P. Návrat*: FIT VUT Brno, Czech Republic, November 4, 2009

- *J. Tvarožek, J. Jánošík, K. Rástočný, M. Labaj, M. Šajgalík, M. Lohnický, D. Švoňava:* CEPC´09, Central European Programming Contest, Wroclaw, Poland, November 6-11, 2009

- *M. Bieliková, M. Kasan, M. Jačala:* ACM Student Research Competition, Prague, Czech Republic, November 20-21, 2009

- *V. Vranić:* Erasmus mobility, Lancaster University, United Kingdom, November 21-28, 2009

- *Ľ.Molnár,* UNESCO, Paris, France, November 23-24, 2009

- *Ľ. Molnár:* UNESCO IFAP meeting, Moscow, Russia, December 6-9, 2009

- *M. Bieliková, ,* SMAP 2009, International Workshop on Semantic Media Adaptation and Personalization, San Sebastian, Spain, December 12-16, 2009

Visits to the institute

- *Thomas Meier,* Hochschule fuer Telekommunikation, Leipzig, Germany, December 1-3, 2009

- *Peter Brusilovsky*, University of Pittsburgh, April 26-30, 2009

9.8 Membership in Professional Organisations and Societies

Slovak Professional Organisations and Societies

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

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

Pavel Bartoš
- Slovak Society for Computer Science (member, since 1992)

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)

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

Marián Lekavý
– Slovak Society for Computer Science (member, since 2007)

Ľudovít 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)
– Informatics Working Group of the Accreditation Commission of Slovakia (member, since 1999, chair of the executive council since 2009)
– 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)

Ivan Polášek
– Gratex IT Institute (supervisory board member, since 2008)

Viera Rozinajová
– Slovakia Chapter of the Association for Computing Machinery (member, since 2009)

Ján Suchal
– Slovak Society for Computer Science (member, since 2007)

Marián Šimko
– Slovakia Chapter of the Association for Computing Machinery (member, since 2009)

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

Peter Vojtek
– Slovak Society for Computer Science (member, since 2007)

Valentino Vranić
- – Slovak Society for Computer Science (member, since 2001)
- – AOSD-Europe, European Network of Excellence on Aspect-Oriented Software Development (contact person at STU, since 2009)

International Professional Organisations and Societies

Pavel Bartoš
- – IEEE Computer Society (member, 2003–2005)

Mária Bieliková
- – 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)
- – 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)

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

Pavol Návrat
- – CEE Network, Central and Eastern European Network for Quality Assurance in Higher Education (chair, since 2006)
- – 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)

Ľudovít 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 since1993. 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

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)

9.9 Other Activities

– ACM International Collegiate Programming Contest 2009 – Slovak University of Technology Contest – M. Lekavý: event organiser
  `http://www.fiit.stuba.sk/acm/`

– CZ & SK ACM Student Research Competition 2009, Prague, Czech Republic – participation of 3 student projects (M. Barla, V. Rozinajová, J. Tvarožek: supervisors) – 3rd place (J. Tvarožek: supervisor)

– ACM Student Research Competition 2009, Turin, Italy – participation of 2 student projects (M. Bieliková: supervisor) – 2nd place with advance to grand finals, advance to semifinals

– Web Services Challenge 2009, Vienna, Austria Italy – participation of a student project (M. Bieliková: supervisor) – 1st place in architecture, 3rd place in performance

- Google Online Marketing Challenge 2009 – participation of 3 student projects (D. Chudá: supervisor)

- RoboCup at FIIT 2009, Soccer Simulation League, Regional Tournament in Bratislava – I. Kapustík and M. Lekavý: event organisers
  `http://www.fiit.stuba.sk/robocup/`

- Imagine Cup – 1st place in the Slovak student team contest, Bratislava, Slovakia (M. Bieliková, supervisor)

- Imagine Cup 2009 – participation in the world cup, Cairo, Egypt (M. Bieliková, supervisor)

- IIT.SRC 2009 – Informatics and Information Technologies Student Research Conference, M. Bieliková: programme committee chair, D. Chudá, Ľ. Molnár, P. Návrat, I. Polášek, V. Rozinajová, V. Vranić: members of programme committee
  `http://www.fiit.stuba.sk/iit-src/`

- TP Cup 2009 student competition – M. Bieliková: event organiser
  `http://www.fiit.stuba.sk/tp-cup/`

- TP Cup 2009 student competition – 1st place (M. Lekavý: supervisor)

- ProFIIT – secondary school programming competition – I. Dekýšová: event organiser, `http://www.fiit.stuba.sk/profiit`

- FIITApixel – photography competition – J. Lang: competition director, `http://foto.fiit.stuba.sk`

- GraFIIT Foundation – book edition support – I. Polášek, P. Návrat: organisers

- Computing and Informatics (CAI) – P. Návrat: associate editor and member of the editorial board

- International Journal of Intelligent Information and Database Systems – 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

- Journal of Computer Assisted Learning (JCAL), Special Issue on Adaptive Technologies and Methods in e/m-Learning and Internet-Based Education – M. Bieliková: guest editor

- International Journal on Semantic Web and Information Systems, Special issue on Semantic Media Adaptation & Personalization – M. Bieliková: guest editor

- ACM CZ Student Research Competition 2009, Prague, Czech Republic – M. Bieliková: member of steering committee

- VEGA, Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences – M. Bieliková: member of technical committee

- Personalized Web (PeWe) Group seminar organization – M. Bieliková: group coordinator; `http://www.fiit.stuba.sk/research/pewe/`

- (Co)-organizing workshop WIKT 2009, Znalosti 2009

– Datakon 2009 – Annual Conference on the Current Trends in Databases and Information Systems, October 10-13, 2009, Šumava, Czech Republic – M. Bieliková: member of steering committee, member of programme committee

– DIDINFO 2009 – International Conference on Teaching of Informatics, Poľana, Slovakia, March 25-27, 2009 – M. Bieliková: member of programme committee

– ITAT 2009 – Conference on Information Intelligent Technologies – Applications and Theory. September 25-29, 2009. Kráľova studňa, Slovakia – M. Bieliková, D. Chudá: member of programme committee

– SCO 2009 – 6th International Conference on Sharable Content Objects, June 16-17, 2009, Brno, Czech Republic – M. Bieliková: member of programme committee

– WIKT 2009 – 4th Workshop on Intelligent and Knowledge oriented Technologies, November 12-13, Herľany, Slovakia – M. Bieliková, P. Návrat, V. Rozinajová: members of programme committee

– Znalosti 2009, February 4-6, 2009, Brno, Czech Republic – P. Návrat: chair of programme committee, M. Bieliková, D. Chudá, V. Rozinajová: members of programme committee, P. Návrat: member of steering committee

– ACIIDS 2009 – 1st Asian Conference on Intelligent Information and Database Systems, Dong Hoi City, Quang Binh Province, Vietnam, April 1-3, 2009 – M. Bieliková: member of programme committee

– ADBIS 2009 – 13th East-European Conference on Advances in Databases and Information Systems, September 7-10, 2009, Riga, Latvia, M. Bieliková, P. Návrat: members of programme committee, P. Návrat: member of steering committee

– AIED 2009 – 14th Annual Conference on Artificial Intelligence in Education, Brighton, UK, July 8-10, 2009 – M. Bieliková: member of programme committee

– ASEA 2009 – International Conference on Advanced Software Engineering & Its Applications, Jeju Island, Korea, December 10-12, 2009 – M. Bieliková: member of programme committee

– AWIC 2009 – 6th Atlantic Web Intelligence Conference, Prague, The Czech Republic, September 9-11, 2009 – M. Bieliková, P. Návrat: member of programme committee

– CEE-SET 2009 – 3rd IFIP Central and East European Conference on Software Engineering Techniques, October 12-14, 2009, Krakow, Poland – M. Bieliková, member of steering and programme committee

– CEE-SECR 2009 – The 5th Central and Eastern European Software Engineering Conference in Russia, Moscow, Russia, October 28-29, 2009 – M. Bieliková: member of programme committee

– CompSysTech 2009 – International Conference on Computer Systems and Technologies 2009, June 18-19, 2009, Ruse, Bulgaria – P. Návrat: member of programme committee

– CSSim 2009 – International Conference on Computer Modelling and Simulation, Brno, Czech Republic, September 7-9, 2009 – M. Bieliková, P. Návrat: members of programme committee

–   ECDL 2009 – 13th European Conference on Research and Advanced Technology for Digital Libraries, September 17 - October, 2, 2009, Corfu, Greece – M. Bieliková: member of programme committee

–   EC-TEL 2009 – 4th European Conference on Technology Enhanced Learning, Nice, France, September 29 - October 2, 2009 – M. Bieliková: member of programme committee

–   EJC 2009 – 19th European Japanese Conference on Information Modelling and Knowledge Bases, June 1-5, 2009, Maribor, Slovenia – M. Bieliková: member of programme committee

–   ENASE 2009 – 4th International Working Conference of Evaluation on Novel Approaches to Software Engineering, May 6-10, 2009, Milan, Italy, M. Bieliková: member of programme committee

–   GCCP 2009 – 5th International Workshop on Grid Computing for Complex Problems, October 26-28, 2009, Bratislava, Slovakia – Ľ. Molnár: member of programme committee

–   HT 2009 – 20th ACM Conference on Hypertext and Hypermedia, Torino, Italy, June 29 - July 1, 2009 – M. Bieliková: member of programme committee

–   ICETA 2009 – 7th International Conference on Emerging E-Learning Technologies and Applications, November 19-20, 2009, Stará Lesná, High Tatras, Slovaka – P. Návrat, Ľ. Molnár: members of honorary committee, M. Bieliková: member of programme committee

–   ICWE 2009 – International Conference on Web Engineering, July 24-26, 2009, San Sebastian, Spain – M. Bieliková: member of programme committee

–   Informatics 2009 – 10th International Scientific Conference on Informatics, November 23-25, 2009, Herľany, Slovakia – Ľ. Molnár, P. Návrat: member of programme committee

–   ISMIS 2009 – 18th International Symposium on Methodologies for Intelligent Systems, Prague, Czech Republic, September 14-17, 2009 – M. Bieliková, P. Návrat: members of programme committee

–   KES AMSTA 2009 – 3rd International KES Symposium on Agent and Multi-Agent Systems – Technologies and Applications, June 3-5, 2009, Uppsala, Sweden – M. Bieliková: member of programme committee

–   MCCIS-ISA 2009 – IADIS International Conference, Intelligent Systems and Agents 2009 Conference, June 21-23, 2009, Algarve, Portugal, M. Bieliková: member of programme committee

–   NWESP 2009 – 5th International Conference on Next Generation Web Services Practices, Prague, The Czech Republic, September 9-11, 2009 – M. Bieliková, V. Rozinajová: member of programme committee

–   S3T 2009 – International Conference on Software Service Semantic Technologies, Sofia, Bulgaria, October 28-29, 2009 – M. Bieliková: member of programme committee

–   SADM@ICADIWT 2009 – Special Session on Semantics Aware Data Management, 2nd International Conference on Application of Digital Information

and Web Technologies, London, UK, August 4-6, 2009 – M. Bieliková: member of programme committee

– SERA 2009 – International Conference on Software Engineering Research, Management and Applications, December 2-4, 2009, Hainan Island, China, M. Bieliková: member of programme committee

– SMAP 2009 – 4th International Workshop on Semantic Media Adaptation and Personalization, December 14-15, 2009, San Sebastian, Spain – M. Bieliková: member of programme committee

– SOFSEM 2009 – International Conference on Current Trends in Theory and Practice of Informatics, January 24-30, 2009, Špindlerův Mlýn, Czech Republic – M. Bieliková: chair of Student Research Forum

– UMAP 2009 – 1st and 17th International Conference on User Modelling, Adaptation and Personalization, Trento, Italy, June 22-26, 2009, (Springer LNCS Series) – M. Bieliková: member of programme committee

– WIRSS 2009 – International Workshop on Web Information Retrieval Support Systems, IEEE/WIC/ACM International Conference on Web Intelligence, Milan, Italy, September 15-18, 2009 – P. Návrat: member of programme committee

10   Regional Networking Academy

E-mail:	info@cisco.fiit.stuba.sk
Web:	www.cisco.fiit.stuba.sk
Tel:	+ 421 2 602 91 689
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Regional Networking Academy (RCNA FIIT STU) consists of three multipurpose research and pedagogical laboratory facilities designated for education in the field of computer networks at all three 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 Regional 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 a part of the Academy offer 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.

RCNA 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 subjects related to computer networking throughout all three degrees of study program Computer systems. Within the education process of RCNA prepares instructor training of 24 Local Cisco Networking Academies in the Slovakia 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

       Boris Dado
       Igor Grellneth, PhD., CCNA, CCAI
       Štefan Gula, CCNA, CCNP
       Katarína Jelemenská, PhD.
       Margaréta Kotočová, Associate Professor, CCNA, CCAI
       Dušan Malina
       Peter Mesjar, CCNA, CCNP, CCAI, CCIE
       Vladimír Michalec, CCNA, CCNP
       Michal Vrábel
       Filip Burda, CCNA, CCNP
       Peter Havrila, CCNA, CCNP
       Adrián Chovan, CCNA

Engineering Staff

       Dušan Bernát
       Roman Stovíček, PhD.

10.2 Projects

Mobile Education Center (HP Technology for Teaching Higher Education Grant Initiative 2007)

Project leader:	P. Čičák
Members:	D. Bernát, B. Dado, K. Jelemenská, M. Kotočová
Supported by:	Hewlett Packard
Duration:	September 2007 – August 2009
Description:	The main goal of the project is the education innovation by means of convenient utilization of capabilities, provided by the newest IT technologies, including mobile technology, into the learning environment. Thus one of the most important goals of a modern school is to be reached, that each graduate in its future job should be able to apply information and communication technologies. A mobile laboratory represents more effective way of exploitation existing technological equipment. The activities that does not require technological equipment, can take place in mobile laboratory.

10.3 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

10.4 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 Žilina
- 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

11   New Building Photo Gallery

12 FIIT Personnel

ABAFFY, Jaroslav, Ing. — Institute of Computer Systems and Networks
ANDREJČÍKOVÁ, Nadežda, Ing. — Institute of Informatics and Software Engineering
BAGALA, Adrián, Ing — Institute of Computer Systems and Networks
BARLA, Michal, Ing. — Institute of Informatics and Software Engineering
BARTALOS, Peter, Ing. — Institute of Informatics and Software Engineering
BARTOŠ, Pavol, Ing. — Institute of Informatics and Software Engineering
BÁTORYOVÁ, Magda — Registry
BELAJOVÁ, Lenka — Deanship – Study Affairs
BENEŠOVÁ, Wanda, dipl. Ing. — Institute of Applied Informatics
BERNÁT, Dušan, Ing. — Institute of Computer Systems and Networks
BIELEKOVÁ, Alexandra, Ing. — Head of Administrative Department
BIELIKOVÁ, Mária, prof. Ing. PhD. — Institute of Informatics and Software Engineering
BOU EZZEDDINE, Anna, RNDr. — Institute of Informatics and Software Engineering
BRATH, Peter — Centre of Computing and Communication Services
BREZNENOVÁ, Soňa — Deanship – Personal Resources
BRUSILOVSKY, Peter, visiting prof. — Institute of Informatics and Software Engineering
CIGÁNEK, Ján, Ing. — Institute of Applied Informatics
CSONKOVÁ, Monika, Mgr. — Deanship – Research
ČERŇANSKÝ, Michal, Ing. PhD. — Institute of Applied Informatics
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DADO, Boris, Ing. — Institute of Computer Systems and Networks
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