Faculty of Informatics
and Information Technologies

www.fiit.stuba.sk

ANNUAL REPORT
2013
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1 Message from the dean

In the year 2013 the Faculty of Informatics and Information Technologies STU in Bratislava celebrated the 10th anniversary of its establishment. This jubilee has motivated us to look round for our achievements as well as for the definitions of our next objectives.

In ten years of our activity, the FIIT STU in Bratislava has educated 1200 engineers, 1500 bachelors and 50 doctors in two major study programs – Informatics and Computer and Communications Systems and Networks.

For our work, an important criterion of evaluation is a list of the most desirable graduates. This list shows that our graduates are placed in the first positions. Their versatility along with their commencing salary is a sign that education at our faculty is in the right direction.

To maintain this trend, we constantly communicate with companies, our partners and with the main „consumers“ of our students. The market in the field of Informatics has been changing dynamically and therefore without their opinions we would not be able to keep abreast.

What did we succeed? Many students´ teams have been successful in various international competitions and they achieved interesting awards. Students´ team „Speekle“, expect for participation in the international competition „Imagine Cup“, won the Slovak competition „Business plan of the year“ and its product was reversed into the start-up project which has its own company and lives its own life.

Similar accomplishments are for our faculty the best benchmarks of its effort. Along with practical knowledge, our students show their viability and fighting spirit.

Assoc. Prof. Pavel Čičák
Dean of the FIIT STU
2 Faculty Management Bodies

According to the Act No. 131 of February 21, 2002 (the University Code and Amendments 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 2013

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

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

Ladislav Hudec
chairman of the employee section

Jakub Šimko
chairman of the student section
Activities of the Academic Senate of the Faculty in 2013

The Academic Senate of the Faculty of Informatics and Information Technologies in 2013

- discussed the proposal of Rules for forming study plans, conditions for continuation of study and for regular completion of study, and took note of the proposed recommended study plans for each study programme as presented by the Dean,
- approved 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 financial report of the Faculty, presented by the Dean,
- submitted the annual report on its activity to the academic community of the Faculty,
- approved new members of the Disciplinary Commission of the Faculty, as presented by the Dean.

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

Dean and Vice-Deans

Pavel Čičák, Assoc. Professor
Dean
dean@fiit.stuba.sk

Viera Rozinajová, Assoc. Professor
Vice-Dean for Research
vicedean_research@fiit.stuba.sk

Ivan Kotuliak, Assoc. Professor
Vice-Dean for National and International Relations and for Public Relations
vicedean_cooperation@fiit.stuba.sk
2.3 Scientific Board of the Faculty

Members of the Scientific Board in 2013

Chair of the Scientific Board
Pavel Čičák, Assoc. Professor

Deputy chair of the Scientific Board
Viera Rozinajová, Assoc. Professor

Members from the academic community of the Slovak University of Technology
Mária Bieliková, Professor
Pavel Čičák, Assoc. Professor
Elena Gramatová, Assoc. Professor
Ladislav Hudec, Assoc. Professor
Daniela Chudá, Assoc. Professor
Gabriel Juhás, Professor
Margaréta Kotočová, Assoc. Professor
Ivan Kotuliak, Assoc. Professor
Tibor Krajčovič, Assoc. Professor
Oliver Moravčík, Professor
Ján Murgaš, Professor
Pavol Návrat, Professor
Jiří Pospichal, Professor
Gregor Rozinaj, Assoc. Professor
Activities of the Scientific Board of the Faculty in 2013
The Scientific Board of the Faculty of Informatics and Information Technologies in 2013:

− 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 2013/14 offered by the Faculty,
− endorsed other experts with the right to conduct Final examinations in the study programmes offered by the Faculty (in accordance with the University Code),
− endorsed members of the Board of Specialists for doctoral study programmes,
− endorsed supervisors for doctoral study programmes (in accordance with the University Code),
− endorsed the habilitation board.

Assoc. Professor Pavel Čičák
Chair of the 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 2013
Chair of the Disciplinary Commission of the Faculty for Students
Ladislav Hudec, Assoc. Professor

Members of the Disciplinary Commission of the Faculty for Students
Boris Dado (since September 2013)
Ivan Kapustík
Juraj Štefanovič
Ľubomír Varga – student of the doctoral degree programme (till September 2013)
Peter Jurík – student of the doctoral degree programme (since September 2013)
Valeria Harvanová – student of the master degree programme (till September 2013)
Martin Janík – student of the master degree programme (since September 2013)
Matúš Michalko – student of the master degree programme
Jana Podlucká – student of the bachelor degree programme (since September 2013)

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

3.1 Undergraduate Study (Bc)

In the academic year 2013/14 two accredited study programmes with regular length three or four years were offered:

- Informatics
- Computer and Communication Systems and Networks

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

Numbers of the full-time bachelor programme students

<table>
<thead>
<tr>
<th>Academic year</th>
<th>1st year</th>
<th>2nd year</th>
<th>3rd year</th>
<th>4th year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003/2004</td>
<td>150</td>
<td>103</td>
<td>123</td>
<td>134</td>
</tr>
<tr>
<td>2004/2005</td>
<td>333 (216/117)</td>
<td>112 (60/52)</td>
<td>95¹</td>
<td>156</td>
</tr>
<tr>
<td>2005/2006</td>
<td>344 (230/114)</td>
<td>262 (176/86)</td>
<td>91 (54/37)</td>
<td>92</td>
</tr>
<tr>
<td>2006/2007</td>
<td>332 (221/111)</td>
<td>269 (192/77)</td>
<td>246 (163/83)</td>
<td>19</td>
</tr>
<tr>
<td>2007/2008</td>
<td>290 (195/95)</td>
<td>272 (188/84)</td>
<td>266 (186/80)</td>
<td>1</td>
</tr>
<tr>
<td>2008/2009</td>
<td>265 (181/84)</td>
<td>229 (159/70)</td>
<td>308 (215/93)</td>
<td>-</td>
</tr>
<tr>
<td>2009/2010</td>
<td>291 (189/102)</td>
<td>169 (124/45)</td>
<td>244 (170/74)</td>
<td>-</td>
</tr>
<tr>
<td>2010/2011</td>
<td>253 (172/81)</td>
<td>196 (143/53)</td>
<td>190 (141/49)</td>
<td>-</td>
</tr>
<tr>
<td>2011/2012</td>
<td>444 (291/153)</td>
<td>173 (123/50)</td>
<td>198 (142/56)</td>
<td>-</td>
</tr>
<tr>
<td>2012/2013</td>
<td>492 (305+52/10+25)</td>
<td>214 (161/53)</td>
<td>156 (109/47)</td>
<td>-</td>
</tr>
<tr>
<td>2013/2014</td>
<td>501 (258+67/127+49)</td>
<td>262 (177+55/18+12)</td>
<td>199(142+57)</td>
<td>-</td>
</tr>
</tbody>
</table>

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 3 overseas students.

In June 2013 the students defended their bachelor theses and passed the final examination. The number of all graduates was 120. Thereof, there were 69 in study programme Informatics and 31 in study programme Computer Systems and Networks.

¹ Only the students in study programme Informatics.
The following students were conferred awards for their excellent study results:

- **“Magna cum laude”:** Kamil Burda, Peter Demčák, Dávid Durčák, Tomáš Jánošík, Patrik Polatsek, Miroslav Šimek

- **“Cum laude”:** Ondrej Galbavý, Marek Jakab, Samuel Molnár, Martin Petluš, Veronika Štrbáková

- **Dean’s Award for Excellent Bachelor Thesis:** Kamil Burda, Miroslav Šimek, Patrik Polatsek

- **Dean’s Commendatory Letter for Bachelor Thesis:** Kamil Burda, Peter Demčák, Marek Hasin, Marek Jakab, Tomáš Jánošík, Šimon Kompas, Matej Marcoňák, Patrik Polatsek, Daniel Soós, Miroslav Šimek, Erik Šuta, Timotej Tkáč

1094 applicants took part in the entrance examination to bachelor study programmes (635+218 applicants for study programme Informatics, 157+84 applicants for study programme Computer and Communication Systems and Networks). 787 applicants were offered admission, 503 out of them actually made use of it and were enrolled (258+128 Informatics, 68+49 Computer Systems and Networks).

### 3.2 Master Study (Ing)

In 2013, FIIT STU offered three accredited study programmes with regular length two or three years:

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

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

<table>
<thead>
<tr>
<th>Academic year</th>
<th>all</th>
<th>SI or CSN</th>
<th>CCSN</th>
<th>IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005/2006</td>
<td>231</td>
<td>119</td>
<td>73</td>
<td>39</td>
</tr>
<tr>
<td>2006/2007</td>
<td>290</td>
<td>124</td>
<td>106</td>
<td>60</td>
</tr>
<tr>
<td>2007/2008</td>
<td>326</td>
<td>141</td>
<td>113</td>
<td>72</td>
</tr>
<tr>
<td>2008/2009</td>
<td>362</td>
<td>154</td>
<td>110</td>
<td>98</td>
</tr>
<tr>
<td>2009/2010</td>
<td>394</td>
<td>160</td>
<td>128</td>
<td>106</td>
</tr>
<tr>
<td>2010/2011</td>
<td>395</td>
<td>157</td>
<td>126</td>
<td>112</td>
</tr>
<tr>
<td>2011/2012</td>
<td>355</td>
<td>155</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2012/2013</td>
<td>149</td>
<td>74+2</td>
<td>42+1</td>
<td>29+1</td>
</tr>
<tr>
<td>2013/2014</td>
<td>287</td>
<td>115</td>
<td>74</td>
<td>98</td>
</tr>
</tbody>
</table>

On the course we have 6 overseas students.

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2 Three years for students who have not obtained their first degree in related field.
In these study programmes 110 students graduated in June 2013 (57 in Software Engineering, 28 in Computer and Communication Systems and Networks, 25 in Information Systems).

- “Magna cum laude”: Ján Súkeník
- “Cum laude”: Michal Fornádeľ, Filip Grznár, Marek Hlaváč, Róbert Horváth, Peter Krátky, František Kudlačák, Ján Laštinec, Štefan Mitrik, Ondrej Perešíni, Jakub Ševcech, Maroš Ubreži, Petra Vrablecová, Michal Žilinčík
- Dean’s Award for Excellent Master Thesis: František Kudlačák, Ján Súkeník, Michal Žilinčík
- Institute of Inf., Slovak Academy of Sciences Award for Excellent Master Thesis: Ondrej Perešíni, Jakub Ševcech
- Dean’s Commendatory Letter for Master Thesis: Filip Grznár, Martin Habďák, Marek Hlaváč, Róbert Horváth, Martin Hreha, Peter Krátky, Peter Macko, Ondrej Perešíni, Jakub Ševcech, Petra Vrablecová

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

3.3 Doctoral Study (PhD)

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

This trend has been slightly reversed in recent years. Number of applicants increased 1.5 times compared to year 2008 and for several years we maintain a stable number of accepted applicants. We worked towards motivating students to finish their theses. This resulted in increased number of defended dissertation theses – 7 this year (most doctoral students who finished their study this year started doctoral study more than three years ago).

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

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Num of students</td>
<td>11</td>
<td>16</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>25</td>
<td>30</td>
<td>34</td>
<td>43</td>
<td>48</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

In 2013 two accredited study programmes were offered:

- Applied Informatics,
- Program Systems

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

In 2013 following dissertations were defended:

- Tomáš Kuzár: Clustering on Social Web (Software Systems, supervisor: Pavol Návrat)
- Peter Kajsa: Models of Software Systems: Design Pattern Support (Software Engineering, supervisor: Pavol Návrat)
– Jakub Šimko: Harnessing manpower for creating semantics (Software Engineering, supervisor: Mária Bielková)
– Martin Hrubý: Optimization of Network Traffic Flow (Applied Informatics, supervisor: Margaréta Kotočová)
– Michal Olšovský: Advanced Notification System for TCP Performance Increase (Applied Informatics, supervisor: Margaréta Kotočová)

3.4 Student Conferences and Competitions

The Faculty organised and supported in 2013 several student competitions and conferences. The importance of involvement of the students in such events is very high. Students took active participation in various technical and research activities (co)organised by the Faculty. We are proud to list also successes of our students in national and international competitions organized outside our university.

Imagine Cup
– 1st place, Slovak finals of the Imagine Cup 2013 competition: Peter Demčák, Ondrej Galbavý, Miroslav Šimek, Veronika Štrbáková (supervisor: M. Barla) advanced to the Imagine Cup 2013 Worldwide Finals, Saint Petersburg, Russia

IIT.SRC 2013 – Informatics and Information Technologies Student Research Conference
(to be mentioned in the following section in more detail)

NAG 2013 – national CISCO competition
– Viliam Straka – 3rd place in category PT
– Tomáš Boroš – 5th place in category UNI

Cross-Innovation Voucher
– Andrej Fogelton – 1st place with project EyeBlink.

Splendid Yong Businessmen
– Peter Demčák, Ondrej Galbavý, Miroslav Šimek, Veronika Štrbáková – 1st place with their project “Speekles” in the final of the competition of University projects “Excellent young enterprisers”, organized by JA SR in cooperation with Hyundai Motor Slovakia

ACM SPY – Student Project of the Year Czech and Slovak Competition
– Ján Súkeník – was among the winners of the winners and presented his project in the ACM SPY 2013 Finals, 4th place with diploma project Source Code Analysis Using Abstract Syntax Trees (supervised by P. Lacko)

Creativity and Innovation Challenge 2013
– Martin Nagy, Andrej Sedláček, Ivan Šimko – 1st place in a competition specialized on challenge solution in the field of international company marketing organized by JA SR in a cooperation with Microsoft Slovakia within the YouthSpark project
RoboCup, Soccer Simulation League
- Winners of the Slovak University of Technology RoboCup 2013, 3D Team Jimbros: Lukáš Ďurčík, Peter Paššák

Social Impact Award
- Andrej Fogelton – 2nd place with project EyeBlink

TP Cup
- Best Team of the year 2013 winners: Ľuboš Demovič, Eduard Fritscher, Jakub Kříž, Ondrej Kuzmík, Ondrej Proksa, Diana Vandlíková: Televido - My Personalized TV, supervisor: D. Zeleník

ACM ICPC
- 2nd place within participating slovak universities, advanced to Middle European regional round in Krakow (Filip Pakan, Adrian Kollár)
- 3rd place within participating slovak universities, advanced to Middle European regional round in Krakow (Ladislav Gallay, Jakub Kříž, Ondrej Proksa)

IAB Slovakia
- Róbert Móró – 3rd place with project Personalized Summarization of the Test

RobotChallenge 2013
- Andrej Lenčucha – 1st place in Lego Sumo category with robot MTS and 1st place in Line Follower Enhancef category with robot Lenco (Wien, Austria).

3.5 Awarded Theses

Excellent Bachelor Theses

Student name: Kamil Burda
Thesis title: Visualization of Communication in Computer and Communication Networks
Supervisor: Peter Magula, PhD.
Defended on: May 2013
Degree program: Computer and Communication Systems and Networks
Annotation: The bachelor thesis analyzes the concept of visualization of communication in computer and communication networks. The analytical part of the thesis contains a brief review of the use of visualization in practice, techniques to obtain data from networks and visualization approaches used to visualize obtained and processed data. Based on existing taxonomies of visualization approaches, a new taxonomy is defined in the thesis, categorizing approaches according to the visual representation of the obtained data. Network topologies corresponding with communication scenarios are created in simulation environment acting as a replacement for real networks, where the data generated in the simulation environment are visualized with several visualization approaches in visualization tools used in this thesis. These visualization tools are compared with each other in terms of their features and the visualization approaches they implement for each communication scenario.
STU Faculty of Informatics and Information Technologies

Student name: Miroslav Šimek
Thesis title: Innovative Application within an International Competition
Supervisor: Michal Barla, PhD.
Defended on: May 2013
Degree program: Informatics
Annotation: This bachelor’s thesis is innovative application within the Imagine Cup competition. Our project deals with speech disorder for children. It helps to prevent many potential problems these children would have had, if they didn’t succeed with their speech disorder therapy during childhood. The main idea of our project is motivation of children to practice in home environment. This practicing is actually the key part of speech disorder therapy. Visiting speech therapist is not enough. Parents today are becoming even busier than before and they simply don’t have enough time to spend with their children practicing for sufficient time. This problem is getting worse, but our solution solves both of these key problems by collection of interactive games designed for practicing sounds pronunciation and oral motor skills. Practicing oral motor skills is practicing the agility of tongue and it’s also very important part of speech disorder therapy. The team of four students is working on this project. The author of this thesis focused on core of the application, specifically on recognition of problematic sounds pronunciation (sibilants) and tongue tracking with Kinect and depth map. The author of this thesis bases the correctness of pronounced sound on sound wave and spectrogram analysis.

Student name: Patrik Polatsek
Thesis title: Blink Rate Tracking of Computer User
Supervisor: Andrej Fogelton
Defended on: May 2013
Degree program: Informatics
Annotation: This bachelor thesis deals with eye blink rate tracking of the user while working with computer. A user tends to decrease the blink rate in front of a computer screen, due to which the tear film is non adequately applied on the eye cornea. Lower blink rate causes eye redness and dryness. This commonly-occurring problem of computer users is called Dry Eye. The goal of the bachelor thesis is to design an eye blink detection algorithm. In future it can be used in dry eye prevention application, which will detect user’s blinks. We have analysed available techniques for eye blink detection and designed our own solutions based on histogram backprojection, optical flow, frame difference and FREAK descriptor method. We have tested our algorithms on different datasets under various lighting conditions. Centre Aligned Movement Detection method based on optical flow performs better than the other ones. We achieve higher recognition rate and much lower false positive rate in the Talking Face Video dataset than the state-of-the-art technique presented by Divjak and Bischof in 2009.
Excellent Master Theses

Student name: František Kudlačák  
Thesis title: *Synthesis of Asynchronous Sequential Circuits*  
Supervisor: Elena Gramatová, Assoc. Professor  
Defended on: May 2013  
Degree program: Computer and Communication Systems and Networks  
Annotation: The diploma thesis deals with design of asynchronous sequential circuits, which allows to design asynchronous representation of an automaton. This representation is composed from digital logic. Designed system loads the automat description in VHDL format, which is output format of the computer-aided design system HDL Designer. Output representation of the automat is in VHDL syntax, and it is possible to simulate output in the simulation environment ModelSim. Implementation of designed system includes implementation for the parallel super computing. Communication in the parallel system is provided by the communication library MPI. The thesis also contains formal description of the implemented method for design of state coding. The black box testing approach was used during the function tests, and outputs were simulated in the simulation environment ModelSim. Effectiveness of parallel implementation for super computing, was tested with different sizes of input automat, and with different numbers of computing nodes in the super computing system.

Student name: Ondrej Perešíni  
Thesis title: *Experimental Embedded System for Intelligent Actuators Control through the Internet.*  
Supervisor: Tibor Krajčovič, Assoc. Professor  
Defended on: May 2013  
Degree program: Computer and Communication Systems and Networks  
Annotation: Diploma thesis analyses the current available options of intelligent house actuators realization and propose new own solution, which is less expensive, more robust and more secure against intrusion. The proposed solution is opened and therefore ready for the future improvements. The theoretical part of diploma project characterises chosen hardware, encryption algorithm and the mutual communication of the independent modules. Moreover the project suggests new communication protocol at the application layer of the network stack. Separate part of project is dedicated to the description and realisation of some modules with defined specifications. These modules react with environment according to the established rules, which can be easily altered trough the user interface of the central unit. Communication interface is secure against common types of attacks and also user friendly for the better user experience. The result of this diploma project is experimental prototype of the proposed solution, which is suitable for the direct deployment in the modern households.

Student name: Ján Súkeník  
Thesis title: *Source Code Analysis Using Abstract Syntax Trees*  
Supervisor: Peter Lacko, PhD.
Nowadays we use information from many different tools to support the process of software development, for example source code repositories, bug tracking systems, etc. The most accurate source of such information is the code of the software itself. We can analyze the source code, for example in order to find parts that may contain bugs. During such analysis, abstract syntax trees can enable us to ignore all the details related to text representation of the code. Duplicated code is very common source of bugs, or at least source of increased costs during software development and maintenance. According to the existing research, its aggressive refactoring can be redundant or sometimes even harmful. We therefore propose a method which enables developers to actively and continuously track duplicates during the development. It is designed so that the results can be immediately updated right after every change of the source code (small or large). We tested the method on real software projects. Based on the results, we are confident that our tool has the potential to increase quality of software projects and reduce development costs.

Currently we experience a great expansion of various services allowing us to bookmark documents and annotate them. Such annotations can be used to improve navigation, document retrieval, recommendation of documents and so on. In our work, we aim to improve navigation between documents by searching documents related to studied document using its content and attached annotations. We use annotations such as highlights and comments as indicators of user’s interest in particular part of the document. Using document content and attached annotations, we are creating a query that we are using to search for related documents. When creating the query, we use an assumption that by creating annotations, user highlights parts of document, that he is most interested in. We proposed a method for using different types of annotations in creation of query to search related documents. We evaluated the proposed method by creating a tool for collecting annotations and for searching related documents using these annotations in the domain of digital libraries.
Annotation: Diversity of content created by users of Twitter social network provides an interesting source of information. But the diversity itself and the small space for textual content create issues for information retrieval tasks. Existing methods focus on ranking the relevance and quality of microblogs in order to make it easier for user to find interesting content. They often attempt to find the best combination of characteristics and their weights in ranking functions experimentally. This master's thesis proposes new method for exploratory search on Twitter. Instead of discovering a new ranking function that uses fixed parameters, it focuses on inventing a method for modelling user's preferences in real time. This means that during browsing content, user provides implicit and explicit feedback for tweets and based on this feedback, user's preference model for current session is trained and used for classification of unread tweets into interesting or not interesting.

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

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

- intelligent information analysis and processing in large information spaces, e.g. the World Wide Web,
- personalized context-aware information and knowledge retrieval and recommendation for the adaptive social semantic web,
- Big Data analytics,
- methods for distributed information processing,
- advanced methods and tools for software systems design, development and integration,
- computer vision and computer graphics in virtual and augmented reality systems,
- advanced methods of computational intelligence oriented to “echo state” neural networks, recurrent neural networks, evolutionary algorithms,
- methods and tools for security and administration of network and mobile computer systems,
- methods and tools for mobile computing,
- formal specification and automated engineering tasks in the area of HW/SW co-design of the mobile computing systems,
- security, reliability and fault tolerance in distributed computer systems and mobile computer networks,
- methods for improvement of quality of service in the Next Generation Networks,
- design of digital systems and embedded systems.
FIIT STU recognizes as part of its mission to serve the broader academic community in Slovakia and also internationally in promoting cooperation in relevant fields. In 2013 FIIT STU supported the Slovak ACM Chapter activities. FIIT STU supported also the publishing Bulletin “Information Sciences and Technologies” – a web based scientific journal, activity initiated and executed by the ACM Slovakia Chapter.

4.2 Scientific Activities

In the year 2013, FIIT STU has organised or co-organised several scientific events:

- scientific conference Cognition and Artificial Life XIII,
- scientific conference Znalosti 2013,
- IEEE international conference ICETA 2013,
- scientific workshop WIKT 2013 – Workshop on Intelligent and Knowledge Oriented Technologies,
- World Usability Day 2013 (organized at FIIT STU),
- regular scientific seminar on Artificial Intelligence (organized at FIIT STU),
- regular scientific seminar on Vision and Computer Graphics (FIIT STU),
- regular scientific seminar on Personalized Web (organized at FIIT STU).

The Faculty took part in providing technical and scientific programmes, especially through the work in programme committees of more than 35 conferences, mostly international:

- ACIIDS, Asian Conference on Intelligent Information and Database Systems,
- ADBIS, East-European Conference on Advances in Databases and Information Systems,
- ASONAM, International Conference on Advances in Social Networks Analysis and Mining,
- BCI, Balkan Conference in Informatics,
- CASoN, International Conference on Computational Aspects of Social Networks,
- CompSysTech, International Conference on Computer Systems and Technologies,
- Datakon, Annual Conference on the Current Trends in Databases and Information Systems,
- DDECS, IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems,
- ECBS-EERC - Eastern European Regional Conference on the Engineering of Computer Based Systems,
- ENASE, International Working Conference of Evaluation of Novel Approaches to Software Engineering,
- ETS, IEEE European Test Symposium,
- EWDTs - East-West Design & Test Symposium,
- HPCC 2013 – 15th International Conference on High Performance and Communications,
- HT, ACM Conference on Hypertext and Hypermedia,
– ICCCI, International Conference on Collective Intelligence Technologies and Applications,
– ICETA, International Conference on Emerging E-Learning Technologies and Applications,
– ICWL, International Conference on Web-based Learning,
– IEEE International Conference on Information Technology,
– Informatics, International Scientific Conference on Informatics,
– International Conference on Soft Computing Models in Industrial and Environmental Applications,
– ITAT, Workshop on Information Technologies – Applications and Theory,
– LMPCNA International Workshop on Learning Methodologies and Platforms,
– MCCIS-ISA, IADIS International Conference, Intelligent Systems and Agents Conference,
– MENDEL, International Conference on Soft Computing,
– Nostradamus conference,
– NWESP, International Conference on Next Generation Web Services Practices,
– PAD, Czech and Slovak Seminar on Computer Architectures and Diagnostics,
– PALE, International Workshop on Personalization Approaches in Learning Environments,
– SAMI, International Symposium on Applied Machine Intelligence and Informatics,
– SERA, International Conference on Software Engineering Research, Management and Applications,
– SMAP, International Workshop on Semantic Media Adaptation and Personalization,
– SNAA, International Workshop on Social Network Analysis and Applications,
– SOFSEM, Annual Conference on Current Trends in Theory and Practice of Informatics,
– UMAP, International Conference on User Modelling, Adaptation and Personalization,
– VERFE, Workshop on Dependability and Fault Tolerance,
– WEBIST, International Conference on Web Information Systems and Technologies,
– WIKT, Workshop on Intelligent and Knowledge oriented Technologies,
– WWW, Web Engineering Track – International World Wide Web Conference,
– WWW/Internet – IADIS International Conference on WWW/Internet,
– Znalosti, Annual Conference on Knowledge Acquisition, Representation and Exploitation.
In 2013, FIIT STU organised or co-organised several events aimed at exhibition of students’ research work. Above all, the most important event was the 9th *Informatics and Information Technologies Students Research Conference – IIT.SRC 2013*, which was held on April 23, 2013.

At IIT.SRC 2013 were accepted 76 (12 bachelor, 31 master, 33 doctoral students as authors) submitted by 88 student authors, which bears as a consequence that roughly 13% of all students are actively engaged in research to the extent they are able to write a paper on it.

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

The conference was organized in five sections:
- Software Engineering,
- Intelligent Information Processing,
- Web Science and Engineering,
- Computer Graphics and Computer Vision,

The Conference was opened by a keynote of A Min Tjoa (Vienna University of Technology, Austria) titled: “The Use of Open Linked Data for Decision Making”.

The excellent student papers were awarded. The best paper award was conferred to:
- *category of doctoral students* – Michal Olšovský (Advanced Notification System for TCP Congestion Control, supervisor M. Kotočová)
- *category of master students* – Ján Súkeník (Detection of Code Clones: Necessity or a Myth?, supervisor P. Lacko)
- *category of bachelor students* – Marek Jakab (Planar Object Recognition in an Augmented Reality Application on Mobile Devices, supervisor V. Benešová)

Dean’s award was the highest appreciation. It was conferred to:
- **Daniel Soós** (Optimization Algorithm Inspired by Social Insect Behaviour in Comparison with Hill Climbing, supervisor D. Chalupa)
- **Peter Krátky** (What Makes the Best Computer Game? How Game Features Affect Game Play, supervisor J. Tvarožek)
- **Jakub Ševecech** (Related Documents Search Using User Created Annotations, supervisor M. Bielíková)
- **Karol Rástočný** (Usability of Anchoring Algorithms for Source Code, supervisor M. Bielíková)
- **Michal Kottman** (Improving Binary Feature Descriptors Using Spatial Structure, supervisor M. Šperka)

Besides the 76 papers presented at the conference in two poster sessions several accompanied events were organized

- **RoboCup Exhibition**, where students presented interesting results in simulated league both 2D and 3D; RoboCup is an attractive project with free participation,
designed to support education and research in artificial intelligence, robotics and information technologies,

- **TP-Cup Showcase**, where eleven teams presented their projects; TP-Cup is a competition of master students’ teams aimed at excellence in development information technologies solutions within two semester long team project module in master study programs.

IIT.SRC 2013 accompanying events included also programming competition, FiitaPixel – photo contest best pictures exhibition, games with a purpose tournament, RoboCup, and JUNIOR IIT.SRC.

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

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

in beginning of 2010. The ACM SPY 2013 Finals were organized in November 2013 in Prague, where 9 best master student projects were presented. The finalists projects were selected by the judges from the best thesis submitted by 13 Czech and Slovak universities based on 1513 successfully defended master thesis in 2012/13.

The project

- **Source Code Analysis Using Abstract Syntax Trees** authored by Ján Súkeník (supervisor P. Lacko) won the 4th prize.

In September 2013 we actively participated in “The Night of Researcher”, event supported by European Commission. This event was organized in more than 150 European cities. Researchers in many countries prepared presentations from the field of science and research for the laic public.

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

- **NeverGetLost.apk** – Michal Dorner, Alena Kovárová
- **Innovative Computer Games** – Eduard Kuric, Karol Rástočný, Jakub Šimko
- **Speekle - speech therapy is a game** – Veronika Štrbáková, Miroslav Šimek, Ondrej Galbavý, Peter Demčák, Michal Barla
- **“How does the telecommunications operator work?”** – Miroslav Babják, Martin Nagy, Dominik Tamaškovič
- **Fun during traveling** – Martin Polák, Jan Mato, Viliam Straka, Andrej Kincel, Rastislav Bencel
- **Elevator simulator** – Jaroslav Abaffy, Maroš Žuriček
- **Can a computer see?** – Martin Geier, Marek Račev
- **“Control everything by everything” : Configurable human-device interaction; any event can be used to control any action** – Ivana Bohunická, Martin Čertek, Matúš Ujhelyi, Zuzana Ujhelyiová
4.3 Publications

Results of our research were published in 246 publications. 220 scientific contributions were published in conference proceedings, 85 out of which were published in reviewed proceedings of international conferences. 23 scientific contributions were published in scientific journals and we have authors (co-authors or editors) of 3 books or book chapters.

FIIT STU is a co-publisher of the international scientific journal “Computing and Informatics” (until 2001 Computers and Artificial Intelligence). Three faculty staff members, P. Návrat, V. Kvasnička and J. Pospichal were active in the editorial team in 2013 – P. Návrat as an Associate Editor and V. Kvasnička, J. Pospichal as members of Editorial Board. Moreover, the faculty participates in editorial and advisory boards of eleven other scientific journals.

4.4 Research Projects

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

<table>
<thead>
<tr>
<th>Number of publications in 2013</th>
<th>UAPI</th>
<th>UISI</th>
<th>UPSS</th>
<th>FIIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books and parts of books published by international/national publisher</td>
<td>1/-/</td>
<td>0/-</td>
<td>1/1</td>
<td>-2/1</td>
</tr>
<tr>
<td>Scientific works published in international/national scientific journals</td>
<td>2/-/4</td>
<td>9/-6</td>
<td>1/1</td>
<td>12/11</td>
</tr>
<tr>
<td>Scientific works published in international conference proceedings</td>
<td>15</td>
<td>36</td>
<td>34</td>
<td>85</td>
</tr>
<tr>
<td>Scientific works published in national or local conference proceedings</td>
<td>26</td>
<td>95</td>
<td>14</td>
<td>135</td>
</tr>
<tr>
<td>Conference proceedings editors</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overview of other most significant activities in 2013</th>
<th>UAPI</th>
<th>UISI</th>
<th>UPSS</th>
<th>FIIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership in editorial boards of scientific journals</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Membership in programme committees of international scientific conferences</td>
<td>7</td>
<td>28</td>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>Membership in programme committees of national or local scientific conferences</td>
<td>10</td>
<td>27</td>
<td>12</td>
<td>49</td>
</tr>
<tr>
<td>Membership in steering committees of scientific conferences</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

3 UAPI – Institute of Applied Informatics
UISI – Institute of Informatics and Software Engineering
UPSS – Institute of Computer Systems and Networks
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 2013

- nine VEGA projects were progressed and three new projects were prepared for funding in 2014-2016,
- two APVV projects were progressed, and five new projects were prepared for funding in 2014-2017, (three of them were prepared in cooperation with FEI STU in Bratislava, FEI TU in Košice and R-DAS, s.r.o. in Žilina),
- one project of the Cultural and Educational Grant Agency of the Ministry of Education of Slovak Republic (KEGA) were progressed and four projects were prepared for funding in 2014-2016 (one of them was prepared in cooperation with Faculty of Electrical Engineering and Informatics, Technical University in Košice).

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

The Faculty under the leadership of I. Kotuliak, E. Gramatová and D. Chudá participated in three international projects.

<table>
<thead>
<tr>
<th>Number of projects funded in 2013</th>
<th>UAPI</th>
<th>UISI</th>
<th>UPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGA*</td>
<td>3*</td>
<td>3</td>
<td>4*</td>
</tr>
<tr>
<td>KEGA</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>APVV</td>
<td>-</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>European Structural Funds</td>
<td>-</td>
<td>2†</td>
<td>1†</td>
</tr>
<tr>
<td>International projects</td>
<td>-</td>
<td>-1</td>
<td>2*</td>
</tr>
<tr>
<td>Others /Tatra banka, grants for young scientists</td>
<td>1</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

| FIIT STU                         | 4    | 8    | 7    |

† common projects

<table>
<thead>
<tr>
<th>Overview of funds (in Eur)</th>
<th>UAPI</th>
<th>UISI</th>
<th>UPSS</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEGA</td>
<td>10 124</td>
<td>37 549</td>
<td>18 546</td>
<td>66 219</td>
</tr>
<tr>
<td>KEGA</td>
<td>1 556</td>
<td>-</td>
<td>-</td>
<td>1 556</td>
</tr>
<tr>
<td>APVV</td>
<td>-</td>
<td>58 611</td>
<td>-</td>
<td>58 611</td>
</tr>
<tr>
<td>European Structural Funds</td>
<td>-</td>
<td>250 970</td>
<td>-</td>
<td>250 970</td>
</tr>
<tr>
<td>Others</td>
<td>2 300</td>
<td>6 000</td>
<td>9 800</td>
<td>18 100</td>
</tr>
<tr>
<td>FIIT STU</td>
<td>13 980</td>
<td>353 130</td>
<td>28 346</td>
<td>395 456</td>
</tr>
</tbody>
</table>

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* 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
In 2013 two institutes of the Faculty (UPSS, UISI) together with six other institutes of the University, the Institute of Informatics Slovak Academy of Sciences and International Laser Centre progressed continuing project SMART II – Centre of Excellence for Smart Technologies, Systems and Services approved within the call of the Agency of the Ministry of Education for the Structural funds of the European Union (ERDF) under the Operational Programme Research and Development with overall budget approx. 2 214 thousands Eur.

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

The projects are realized in our research laboratories (description can be found in the parts devoted to individual institutes). In 2013 the following laboratories were operated:

- Intelligent Systems Laboratory, manager: P. Návrat,
- Advanced Software and Web Technologies Laboratory, manager: M. Bieliková,
- Big Data Processing Laboratory, manager: V. Rozinajová,
- Networks Technology Laboratory I, manager: B. Dado,
- Networks Technology Laboratory II, manager: M. Kotočová,
- Embedded Systems Laboratory, manager: T. Krajčovič,
- Mobile Computing Laboratory, managers: M. Čerňanský, V. Vranič, I. Kotuliak,
- Digital Systems Design Laboratory, manager: K. Jelemenská,
- Communication Technologies Laboratory, manager: I. Kotuliak,
- FIIT – Molpir, Ltd. Laboratory, manager: P. Pištek,
- Grid Computing Laboratory, manager: L. Hudec,
- Laboratory of Computer Vision and Graphics, manager: V. Benešová.

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

5.2 Cooperation with Industry

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

Training and Consultation Activities

FIIT STU has been very successful in training and consultations in cooperation with the companies Cisco System Slovakia, GTEC and Microsoft Slovakia. In cooperation with Cisco the Faculty has been integrated into the world-wide academy programme oriented to training in network technologies. Nowadays FIIT STU Regional Networking Academy offers a full 4-semester programmes CCNA (Cisco Certified Networking Associate) and CCNP (Cisco Certified Networking Professional). Except above mentioned programmes FIIT STU offers programmes for IP Telephony, WiFi Communication, Network Security and other special courses. In co-operation with GTEC Common Training and Consultation Centre (CTCC) offers various programmes. The main purpose of this centre is to offer technical training for the non-academy sphere.
The Week of the Faculty and Partner Companies Cooperation
With the aim of improving cooperation with praxis the Faculty continued in a new form of cooperation with partner companies established in 2009. We organized one week serial of special lessons provided by our industry partners for our students. The second annual set of this activity was successful especially thanks to the following companies:

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

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

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

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

Aj Ty v IT (You too in IT)
Aj Ty v IT (You too in IT) is a successful project of our faculty focused on attracting high school girls choosing their study in informatics. This project is a reaction to the low percentage of girls studying at FIIT – only 3%.

Our faculty prepared for girls various activities, such as discussions with women working in IT sector, workshops oriented to acquirement of more knowledge in IT, mentoring as a possibility to see the real life of students and courses, faculty offers. The aim is to show them that working in IT means having an interesting job, cooperation with interesting people and growing professionally. This project wants to demonstrate that girls and women are welcome in IT sector and they are able to find their place there.

The project started in March 2013.

Digipoint
FIIT STU is persuaded about the necessity to present informatics, effort and results of our students to the public, make an education point for them. For this purpose the faculty opened DIGIPOINT – a space for education in IT, presentations of new devices, debates about different subjects related to IT and the study at our faculty. DIGIPOINT was opened
in October 2013 in a Polus shopping center in Bratislava and allowed us to communicate with different target groups.

**IT Crowd**

Our career center started its activities on 1st October 2013. First workshops, explaining the necessity of a development of non-technical skills, were realized immediately. Enrolments for language courses and the web portal www.fiit-crowd.sk started as well. 13 workshops connected to the development of non-technical skills were organized in winter term with a participation of more than 130 students.

Students and employees had an opportunity to be a part of language courses under the leadership of a professional lector. In winter term, 8 weeks long courses were opened for 4 languages (English, German, Spanish, and Japanese).

Our career center initiated many meetings with IT and Telecommunication companies for the purpose of raising partnerships and support activities. Our successful cooperation with industry leads into these results:

- successful running of the course “Architecture of mobile networks” in partnership with the company Ericsson Slovakia and Alcatel-Lucent Slovakia
- accomplishment of the lecture „Information Security Management in Large Enterprise Environment“ by the specialist from the company First Data Slovakia within the course “Principles of information security”
- cooperation with Christopher Larsson in the field of modelling and optimization of computer networks with the potential of an individual course, team projects, bachelor and diploma works as well as a common research cooperation with Slovak Telekom.

5.3 Mobility programmes

FIIT STU is using the cooperation within the mobility programme LLP/Erasmus. In year 2013, this programme was contracted with these European universities (Erasmus code included):

- The University of Rousse – BG ROUSSE01
- Aarhus University School of Engineering – DK ARHUS01
- Talinn University of Technology – EE TALLINN04
- Lahti University of Applied Sciences – SF LAHTI11
- Lancaster University – UK LANCAST01
- Ecole Pour l’Informatique et les Techniques Avancées – F BICETRE02
- Institut Catholique de Paris – F PARIS052
- Telecom SudParis – F EVRY01
- University of Piraeus – G PIREAS01
- Polytechnic of Zagreb – HR ZAGREB05
- University of Zagreb – HR ZAGREB01
- Brandenburgische Technische Universität Cottbus – D COTTBUS01
In 2013, 2 incoming Erasmus students have visited FIIT STU. In 2013, 17 students of our faculty were approved for Erasmus-mobility abroad for various destinations.

Assoc. Prof. Ivan Kotuliak
Vice-Dean for Public Relations
6 Faculty Services

6.1 Slovak Informatics Library

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

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

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

The library catalogue contains more than 9,000 items, which are freely available in the Library. The catalogue can be found on http://olib.cvt.stuba.sk. The Library purchased and acquired thanks to donation 30 titles of professional journals in various languages (5 out of them are in Slovak). Journals are located in the Study Room.

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

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

6.2 Computing and Communication Services

The Centre for Computing and Communication Services at the Faculty of Informatics and Information Technologies provides the following services for educational and research purposes at FIIT STU:
functioning of the faculty central servers and services,
functioning of the faculty system and network infrastructure,
functioning of the faculty information systems,
new servers, computers, printers, scanners etc. installation,
operating systems and specialized software installation,
upgrading and maintenance of computers,
services for faculty wire and wireless access points to the Internet,
functioning of the camera security system,
functioning of the IP telephony system,
data-projectors installation.

The faculty computer network is based on a structured cable system and it is using 100 Mbps, 1 Gbps and 10 Gbps transfer speeds. It consists of approximately 200 personal computers and notebooks of the faculty staff and PhD. students, 250 personal computers and workstations in the education and research laboratories and 30 specialized servers.

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

Assoc. Prof. Tibor Krajčovič
Head of Centre for Computing and Communication Services
Lucia Falbová
Slovak Informatics Library
7 Institute of Applied Informatics

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Web: http://www.uapi.fiit.stuba.sk/
Tel: +421 918 687 989
Fax: +421 2 654 20 587

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

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

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

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

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

The institute is responsible for the following degree programme:

- Applied informatics (doctoral degree).

7.1 Staff

Director
Ladislav Hudec, Assoc. Professor

Deputy Director
Jiří Pospíchal, Professor
Administrative Department
Katarína Pribišová

Teaching Staff
Vanda Benešová, PhD.
Michal Čerňanský, Assoc. Professor
Peter Drahoš, PhD.
Miroslav Galbavý
Ladislav Hudec, Assoc. Professor
Peter Kapec, PhD.
Vladimír Kvasnička, Professor
Matej Makula, PhD. (part time)
Jiří Pospichal, Professor
Viliam Solčány, PhD. (part time)
Branislav Steinmüller (part time)
Juraj Štefanovič, PhD.
Peter Trebatický, PhD. (till January 2013)

Full time PhD Students
Jakub Breier (till October 2013)
Ladislav Clementis
Andrej Fogelton
David Chalupa
Peter Jurík
Michal Kottman
Ján Kvak
Ján Laštinec (since September 2013)
Miroslav Makýš
Peter Marko
Juraj Pálfy
Rastislav Szabó
Ľubomír Varga (till August 2013)
Peter Vilhan

7.2 Teaching

Undergraduate Study (Bc.)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Credits</th>
<th>Lecturer</th>
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<tr>
<td>Algebra and Discrete Math.</td>
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<td>V. Kvasnička, J. Pospichal</td>
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<td>Human-Computer Interaction</td>
<td>Spring</td>
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<td>IT Security Management</td>
<td>Spring</td>
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<td>O. Strnád</td>
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<td>Mathematical Logic I</td>
<td>Spring</td>
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<td>Operating Systems</td>
<td>Autumn</td>
<td>6</td>
<td>V. Solčány</td>
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<tr>
<td>Parallel Programming</td>
<td>Autumn</td>
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<td>M. Čerňanský</td>
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<tr>
<td>Course</td>
<td>Semester</td>
<td>Credits</td>
<td>Lecturer</td>
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<tr>
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<td>Principles of Computer Graphics and</td>
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<td>P. Kapec</td>
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<td>Development</td>
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<tr>
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<td>P. Drahoš</td>
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<tr>
<td>Development</td>
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<td>J. Štefanovič</td>
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**Master Study (Ing.)**

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<td>J. Pospichal</td>
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<td>Evolutionary Algorithms</td>
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<td>Neural Networks</td>
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<td>M. Čerňanský</td>
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<td>Architecture of Computer Systems</td>
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<tr>
<td>Computer Vision</td>
<td>Spring</td>
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<td>V. Benešová</td>
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<tr>
<td>Image Processing, Graphics and Multimedia</td>
<td>Autumn</td>
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<td>V. Benešová</td>
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<tr>
<td>Security of Computer Systems</td>
<td>Autumn</td>
<td>6</td>
<td>L. Hudec</td>
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<td>Security in Internet</td>
<td>Spring</td>
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<td>L. Hudec</td>
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<td>Security and Management of Information Systems</td>
<td>Autumn</td>
<td>5</td>
<td>O. Strnád</td>
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<td>Advanced Methods of Computer Graphics</td>
<td>Autumn</td>
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<td>P. Drahoš</td>
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<td>Data Visualisation</td>
<td>Spring</td>
<td>6</td>
<td>P. Kapec</td>
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</tbody>
</table>

**7.3 Theses**

**Bachelor (Bc.) Theses – graduates 2013**

*Study Programme Informatics*

- Brndiarová, Gabriela: *The Combination of Deterministic and Force-directed Graph Layout Algorithms*. Supervisor: P. Kapec
- Bucko, Jaroslav: *Application for Creation and Management of Udev Rules on Linux Platform*. Supervisor: P. Vilhan
- Dobšovič, Rastislav: *Optical Music Recognition*. Supervisor: V. Benešová
Durčák, Dávid: *The Usage of Multiagent Evolutionary Algorithm in the Problem of Artificial Intelligence*. Supervisor: D. Chalupa

Gášpár, Roland: *Virtual Museum*. Supervisor: J. Štefanovič

Gloger, Michael: *Three Dimensional Griddlers Game*. Supervisor: P. Trebatický

Grešliková, Zuzana: *Evolutionary Clustering for Traveling Salesman Problem*. Supervisor: J. Pospíchal


Hlaváč, Patrik: *System for Children’s Box of Brick*. Supervisor: P. Trebatický

Jakab, Marek: *Augmented Reality on Mobile Device*. Supervisor: V. Benešová

Juranyi, Michal: *Automatic Documentation Generation from Source Codes*. Supervisor: P. Kapec

Kósa, Péter: *Generating Documentation from Source Code*. Supervisor: P. Kapec

Linner, Štefan: *Model Driven Evolution in Rule-Based System*. Supervisor: L. Clementis

Marcin, Jozef: *The Use of E-learning Tools for Preparing, Creating and Editing Schedules*. Supervisor: M. Galbavý


Novotná, Katarína: *Study of the Relationship between a Recurrent Neural Network with Logical Neurons and a Finite-state Machine (Automaton)*. Supervisor: V. Kvasnička

Oriskó, Patrik: *Generating Documentation from Source Code*. Supervisor: P. Kapec


Petrík, Juraj: *Computer Equipment Management Support*. Supervisor: B. Steinmüller

Podmajerský, Ján: *Interactive Whiteboard*. Supervisor: A. Fogelton

Polatsek, Patrik: *Blink Rate Tracking of Computer User*. Supervisor: A. Fogelton


Scholtz, Michael: *Augmented Reality Application*. Supervisor: M. Kottman

Soós, Daniel: *Study of the Contribution of Artificial Life in Optimization*. Supervisor: D. Chalupa


Štrba, Patrik: *Computer Equipment and Management Support*. Supervisor: B. Steinmüller

Šuba, Michal: *Synchronization of Text and its Audio Form*. Supervisor: P. Marko
− Šuster, Matej: *Tool for Process Visualization in Computer Vision.* Supervisor: M. Kottman
− Trégerová, Martina: *Deformation of 3D Geometry of Character While Animating with Dual Quaternions.* Supervisor: P. Drahoš
− Vojtuš, Miroslav: *Virtual Museum.* Supervisor: J. Štefanovič

**Master (Ing.) Theses – Graduates 2013**

**Study Programme Information Systems**
− Jalcová, Zuzana: *Use of the Multiagent Environment to Support the Creation of Timetables.* Supervisor: M. Galbavý
− Forus, Samo: *Automated Remote Desktop Supervision.* Supervisor: B. Steinmüller
− Hlavenka, Marián: *Design of Experimental Expert System for Risk Analysis and Management in the Field of Information Security.* Supervisor: M. Galbavý
− Holák, Peter: *Multi-Agent Environment in University Timetable Creation.* Supervisor: M. Galbavý
− Mačuga, Peter: *Coevolution as Intensification Factor in Evolutionary Algorithms.* Supervisor: V. Kvasnička
− Pomothy, Adam: *Qualified Electronic Signature via Mobile Phone.* Supervisor: J. Breier
− Tóth, Juraj: *Automated Remote Desktop Oversight.* Supervisor: B. Steinmüller
− Zálešák, Vladislav: *Using Multi-Agent Systems for Image Segmentation.* Supervisor: V. Benešová

**Study Programme Software Engineering**
− Aufricht, Igor: *A Strategy of Movement in an Action Game.* Supervisor: L. Varga
− Florek, Tomáš: *Intelligent Agent Navigation in 3D Space.* Supervisor: L. Varga
− Gajdoš, Martin: *Movement Prediction within Action Game Environment.* Supervisor: L. Varga
− Grznár, Filip: *Visualization of Dynamics of Program Written in C# Language.* Supervisor: P. Kapec
− Hašto, Branislav: *Initialization of Communication via the Gestures by Movements with Mobile Devices.* Supervisor: M. Čerňanský
− Hlaváč, Marek: *Using Grammatical Swarm for Evolving Agent in the Game Robocode.* Supervisor: J. Pospíchal
− Hurban, Tomáš: *Hair Simulation and Visualization Using GPU.* Supervisor: P. Drahoš
− Jendrej, Maroš: *A Man on the Scene with Augmented Reality.* Supervisor: J. Štefanovič
− Kuka, Radovan: *Gesture Recognition.* Supervisor: V. Benešová

Annual report 2013

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Doctoral (PhD.) Theses

Student name: Jakub Breier
Degree program: Applied Informatics
Supervisor: Ladislav Hudec, Associate Professor
Defended on: October 25, 2013
Annotation: Information security plays a key role in protection of organization's assets. There exist a number of standards and guidelines providing huge lists of security controls that, if properly used, might be useful against cyber threats. However, these standards leave the process of controls selection to the organizations. Security manager has to carry out a decision on implementation of security controls. Deciding which controls should be encompassed and which bypassed could be tough and indeterminate, since different sources usually prefer another solutions. This work presents motivation for using metrics as an instrument for a risk analysis. The main goal of this work is to define proper security evaluation model for an organization, based on the score of security mechanisms. We present a mathematical model of evaluation, which minimizes subjectivity in this process and it should lead to more automatized risk analysis and make the results of the analysis more comparable. Our work is based on the ISO/IEC 27002 standard on which is built our evaluation model.
7.4 IIT.SRC Students' Papers

Full papers
- Fogelton, Andrej: *Superpixel Image Clustering*. Supervisor: V. Benešová
- Chalupa, David: *Asymptotical Sparseness of a Slovak Social Network*. Supervisor: J. Pospíchal
- Kottman, Michal: *Improving Binary Feature Descriptors Using Spatial Structure*. Supervisor: M. Šperka
- Polatsek, Patrik: *Eye Blink Detection*. Supervisor: A. Fogelton
- Soós, Daniel: *Optimization Algorithm Inspired by Social Insect Behaviour in Comparison with Hill Climbing*. Supervisor: D. Chalupa

Extended abstracts
- Kvak, Ján: *Creating and Recognizing Visual Words Using Sparse Distributed Memory*. Supervisor: J. Štefanovič

TP CUP Competition

7.5 Research Laboratories

Mobile Computing Laboratory

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

*Contact:* michal.cernansky@stuba.sk

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

**Grid Computing Laboratory**

*Manager:* L. Hudec  
*Contact:* ladislav.hudec@stuba.sk  
*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, Globus Toolkit software and VMWare software. The second part is production grid equipped 40 CPUs, 1Gb network connection, front-end server with UPS, Globus Toolkit software and VMWare software. Grid is connected to Internet and is going to be as a part of SlovakGrid national grid structure.

**Laboratory of Computer Vision and Graphics**

*Manager:* V. Benešová  
*Contact:* benesova@fiit.stuba.sk  
*Web:* vgg@fiit.stuba.sk  
*Description:* Laboratory of computer vision and graphics serves for the teaching as well as for the research. Students and team work projects activities cover the field of computer vision, computer graphics, virtual reality, augmented reality and new methods of Human-Computer Interaction. The laboratory provides the facility for the research of Augmented reality systems using a large-sized transparent projection foils, multiple projectors, four Kinect sensors, and cameras such as power-full PC with NVIDIA GPU.

### 7.6 Research Projects

**Security in Distributed Computer Systems and Mobile Computer Networks (VEGA, 1/0722/12)**

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

**EyeBlink – Frequency Detection of Eye Blinks of Computer User (2012et009)**

*Project leader:* A. Fogelton  
*Members UAPI:* V. Benešová, M. Kottman  
*Supported by:* Tatra banka Foundation  
*Duration:* February 2013 – November 2013  
*Description:* The goal of our applied research is the development of the original application eyeBlink, which will be able to detect eye blinks of computer user by ordinary webcam. Frequency of eye blinks will be evaluated with the purpose to help people with dry eye syndrome. It is a very common disease, about 70% of people who work with computer every day complaints about symptoms (about 40% of Europeans work with computer every day more than 4 hours). It is so, because humans blink subconsciously less in front of the monitor and the eyes are not moistened sufficiently with the tear film. This causes the eye to dry and to lose its natural protection. Innovative application will monitor the eye blink frequency of the given computer user and based on this frequency user will be notified to blink consciously to protect his eyes from drying. There will be several students participating on this project. Their subtasks will contribute to the final result. After a year we assume the algorithm precision about 70-80%. Students will communicate not only with supervisors but also between themselves. They will cooperate with experts from ophthalmology clinic on evaluating the eye blink frequency and determining the notification characteristics to relieve symptoms of dry eye. Prototype will be placed at ophthalmology clinic with the purpose of further research to study the relation between the eye blink frequency and the dry eye syndrome. This research should also help us to provide user further information how conscious blinks can help them with dry eye syndrome.

**Extension of Theory of Multi-agent Systems by Collective Memory (VEGA 1/0458/13)**

*Project leader:* V. Kvasnička  
*Members UAPI:* L. Clementis, D. Chalupa, J. Pálfy, J. Pospichal, P. Trebatický  
*Supported by:* Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences  
*Duration:* January 2013 – December 2015  
*Description:* The goal of the proposed project is an extension of a standard theory of multiagent systems by a notion of collective memory, which serves as an important acceleration factor of adaptation of multiagent systems. The principle of collective memory approach was adopted from social sciences, where Halwachs idea of collective serves as an im-
important part of explanation of cohesion of social groups. One can state, that multiagent approach towards presentation of collective memory creates an important innovative element in explanation of its importance. The presented approach is an original first attempt for application of artificial intelligence in social science for a construction of a theoretic model of collective memory of Halbwachsian type.

New Methods of Reinforcement Learning for Cooperative Multiagent Systems (VEGA 1/0553/12)

Project leader: J. Pospíchal
Members UAPI: L. Clementis, A. Fogelton, D. Chalupa, V. Kvasnička, J. Pálfy, P. Trebatický
Supported by: Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration: January 2012 – December 2014
Description: The goal of the proposed project is the development and application of new methods of reinforcement learning. As a new element in this learning, we will include the enhanced possibility of cooperation between agents, which should substantially increase the applicability of learning compared to the classical methods of reinforcement learning. The inclusion of cooperation in the reinforcement learning represents an important element of innovation that will extend opportunities for learning in multiagent systems towards emergence of division of labor, which should significantly increase the resulting effectiveness of agents.


Project leader: V. Benešová
Supported by: Cultural and Educational Grant Agency of the Slovak Republic (KEGA) Ministry of Education SR
Duration: January 2011 – December 2013
Description: The main goals of the project are: (i) redaction of all courses in the field of Visual Information Processing on both universities with the aim of conformity of their syllabus, (ii) new modern textbook in the Slovak language – this is the most important deliverable of this project. A teaching textbook for courses in the field of "Digital Image processing" and "Computer vision" is still missing in slovak language, (iii) Multimedia teaching materials inclusive exercises on DVD and online platform, (iv) English-Slovak glossary of tech. terms in these fields, which currently lacks a frequently used English version dates.

7.7 Publications

Journals


**International Conferences**


Selected Local and National Conferences


7.8 Cooperation

Cooperation in Slovakia

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

**International Cooperation**
– University of Zagreb, Croatia
– Institute of Software Technology and Interactive Systems, Vienna University of Technology, Austria
– Institute Supérieur 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 Deutschland, Germany
– Brno University of Technology, Czech Republic
– Technical University of Liberec, Czech Republic
– Technical University of Ostrava, Czech Republic
– Morgan Stanley Hungary

**Visits of Staff Members**
– **J. Breier:** The 2013 Asian Conference on Availability, Reliability and Security Asia, ARES 2013, Yogyakarta, Indonesia, March 25-29, 2013
– **D. Chalupa:** EvoStar 2013, Vienna, Austria, April 3-4, 2013
– **J. Pospichal:** Brno University of Technology, Czech Republic, May 15, 2013
– **R. Szabó:** International Conference on Computer Systems and Technologies Compstech’13, Ruse, Bulgaria, June 27-30, 2013
– **D. Chalupa, L. Clementis:** GECCO: 2013 Genetic and Evolutionary Computation Conference, Amsterdam, The Netherlands, July 5-10, 2013
– **J. Breier:** Congress ARES 2013, Regensburg, Germany, September 1-7, 2013
– **J. Pálfi:** TSD 2013, 16th International Conference on Text, Speech and Dialogue, Pilsen, Czech Republic, September 1-5, 2013
7.9 Membership in Professional Organisations and Societies

Slovak Professional Organisations and Societies

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

Vanda Benešová
- ACM, Association for Computing Machinery (member, since 2013)
- EEE, Institute of Electrical and Electronic Engineers (member, since 2013)

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

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

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

International Professional Organisations and Societies

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

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

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

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

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

7.10 Other Activities

- Artificial Intelligence Seminar – V. Kvasnička (organizer)
  www.fiit.stuba.sk/~kvasnicka/Seminar_of_AI
- Journal of Computing and Information Technology – V. Kvasnička (since 2005): members of advisory board
- Information Sciences and Computing – V. Kvasnička, editor
- Journal of Electrical Engineering – L. Hudec, editor
– MATCH Communications in Mathematical Chemistry – V. Kvasnička (since 1998): member of advisory board
– Neural Network World – V. Kvasnička (since 2001): member of advisory board
– Croatica Chimica Acta - V. Kvasnička (since 2002): member of advisory board
– Computing and Informatics (CAI) – V. Kvasnička, J. Pospíchal: members of editorial board
– Inter. Conf. on Soft Computing Models in Industrial and Environmental Applications, Salamanca, September 2013 – J. Pospíchal: member of programme committee
– Symposium on Emergent Trends in Artificial Intelligence & Robotics, September 15-17, 2013 Kosice, Slovakia – V. Kvasnička, J. Pospíchal: member of programme committee
– IEEE 11th International Symposium on Applied Machine Intelligence and Informatics, SAMI 2013, January 31 - February 2, 2013, Herľany, Slovakia – V. Kvasnička: member of programme committee
– Researchers’ Night – September 27, 2013, Bratislava, Slovakia – V. Benešová: presentations of research
– Organisation of regular scientific seminars on Artificial Intelligence (at FIIT STU)
– Organisation of regular scientific seminar on Vision and Computer Graphics (at FIIT STU)
8 Institute of Computer Systems and Networks

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

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

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

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

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

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

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

Director
Katarína Jelemenská, PhD.

Deputy Director
Elena Gramatová, Assoc. Professor
Tomáš Kováčik, PhD. (since June 2013)

Administrative Department
Alena Grúberová

Teaching Staff
Pavel Čičák, Assoc. Professor
Boris Dado
Barbara Drnajová (since August 2013)
Jana Flochová, PhD.
Elena Gramatová, Assoc. Professor
Pavol Horváth, Professor (part time)
Ján Hudec
Katarina Jelemenská, PhD.
Margaréta Kotočová, Assoc. Professor
Ivan Kotuliak, Assoc. Professor
Tomáš Kováčik, PhD.
Tibor Kraľovič, Assoc. Professor
Peter Magula, PhD. (part time)
Mária Pohronská, PhD. (part time, till June 2013)
Elena Tomalová (part time)
Peter Trúchly, PhD.

Researchers
Dušan Bernát

External Lecturers
Peter Palúch, PhD.
Matúš Turcsány, PhD.

Full time PhD Students
Jaroslav Abaffy
Ján Balažia
Andrey Binder
Roman Broniš
Maroš Ďuriček
Tomáš Halagan
Pavol Helebrandt
Martin Hrubý (till November 2013)
Peter Jombík
Matej Jurikovič
Štefan Krištofík
František Kudlačák
Dominik Macko
### 8.2 Teaching

#### Undergraduate Study (Bc.)

<table>
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<th>Course</th>
<th>Semester</th>
<th>Credits</th>
<th>Lecturer</th>
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<td>Computer Engineering Principles</td>
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<td>Computer Application Design</td>
<td>Spring</td>
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<td>P. Čičák</td>
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<td>Computers Architectures</td>
<td>Spring</td>
<td>6</td>
<td>T. Krajčovič</td>
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<td>Computer and Communication Networks</td>
<td>Spring</td>
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<td>M. Kotočová</td>
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<td>Convergence of Mobile and Wired Networks</td>
<td>Autumn</td>
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<td>I. Kotuliak</td>
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<td>Digital Systems Description</td>
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<td>K. Jelemenská</td>
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<td>Final Bachelor Project I-II</td>
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<td>P. Čičák</td>
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<td>Introduction to Computer Systems</td>
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<td>T. Kováčík</td>
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<td>Logic Circuits</td>
<td>Autumn</td>
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<td>J. Hudec</td>
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<td>Machine Level Programming</td>
<td>Spring</td>
<td>6</td>
<td>P. Čičák</td>
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<tr>
<td>Microcomputers</td>
<td>Spring</td>
<td>7</td>
<td>T. Krajčovič</td>
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<tr>
<td>Peripheral Devices</td>
<td>Autumn</td>
<td>6</td>
<td>P. Horváth</td>
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<tr>
<td>Principles of Communication Systems</td>
<td>Autumn</td>
<td>6</td>
<td>P. Trúchly</td>
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<tr>
<td>Switching and routing in IP networks</td>
<td>Autumn</td>
<td>6</td>
<td>P. Palúch</td>
</tr>
<tr>
<td>WAN Technologies</td>
<td>Spring</td>
<td>6</td>
<td>P. Palúch</td>
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</table>

#### Master Study (Ing.)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Credits</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture of Computer Systems</td>
<td>Autumn</td>
<td>6</td>
<td>D. Bernát</td>
</tr>
<tr>
<td>Communication Services and Networks</td>
<td>Autumn</td>
<td>6</td>
<td>M. Kotočová</td>
</tr>
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<td>Computing Systems Research</td>
<td>Autumn</td>
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<td>E. Gramatová</td>
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<td>Digital Systems Design</td>
<td>Spring</td>
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<td>K. Jelemenská</td>
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<td>Digital Systems Testing and Reliability</td>
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<td>6</td>
<td>E. Gramatová</td>
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<td>Diploma Project I-III (Computer and Communication Systems and Networks)</td>
<td>Autumn</td>
<td>8-12-20</td>
<td>P. Čičák</td>
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<td>Embedded Systems</td>
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<td>Network Security</td>
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<td>P. Magula</td>
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<td>NGN Networks, Services and Protocols</td>
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<td>I. Kotuliak</td>
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<td>Satellite Systems</td>
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<td>P. Trúchly</td>
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<td>Systems on Chip Design</td>
<td>Autumn</td>
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<td>V. Stopjaková</td>
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<td>Team Project I-II (Computer and Communication Systems and Networks)</td>
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<td>7-5</td>
<td>J. Hudec</td>
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<td>Wireless Communication Systems</td>
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<td>6</td>
<td>I. Kotuliak</td>
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</tbody>
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### 8.3 Theses

**Bachelor (Bc.) Theses – graduates 2013**

*Study Programme Computer and Communication Systems and Networks*

- Adámik, Martin: *Schematic Synchronization Code Generator.* Supervisor: D. Bernát
- Baláž, Jozef: *Multimedial Application for Hybrid IP and DVB-T Architectures.* Supervisor: J. Murányi
- Balga, Peter: *A Software System for Supporting Education in Subjects LO and PPI.* Supervisor: Š. Krištofík
- Boros, Tomáš: *Content Delivery Network Design and Implementation.* Supervisor: A. Binder
- Burda, Kamil: *Visualization of Communication in Computer and Communication Networks.* Supervisor: P. Magula
- Dukát, Marek: *EPROM Emulator.* Supervisor: T. Krajčovič
- Filip, Filip: *Performance of Transport Layer Protocols.* Supervisor: M. Olšovský
- Jurkovič, Peter: *Visualization of Hazards in Combinational Part of Asynchronous Circuits.* Supervisor: E. Tomalová
- Karabin, Andrej: *VHDL Code Compare Algorithm.* Supervisor: E. Tomalová
- Kohútka, Lukáš: *Reduction of Binary Decision Diagrams.* Supervisor: P. Pištek
- Križan, Matúš: *Design and Development of a Mobile Application.* Supervisor: J. Balážia
- Lenčič, Lukáš: *Comparing Graphs.* Supervisor: B. Dado
- Lúčanský, Ján: *Reduction of Binary Decision Diagrams.* Supervisor: P. Pištek
- Mikuš, Martin: *Algorithm for Comparing VHDL Codes.* Supervisor: E. Tomalová
- Močkoř, Adam: *Edge Element of VoIP Network.* Supervisor: J. Murányi
- Nagy, Gabriel: *Application for Manipulation with Digital I/O Signals.* Supervisor: B. Dado
Annual report 2013

- Ondruš, Vladimír: *Design of Logic Combinational Circuits with Multiplexers*. Supervisor: P. Pištek
- Pivarník, Martin: *Proof of Concept IPv6 Testbed Setup SIP Interworking*. Supervisor: S. Schumann
- Polák, Martin: *Usage of GPS on Funtoro Devices*. Supervisor: P. Pištek
- Rybár, Matej: *Retrospective Analysis of the State Graphs of Petri Nets*. Supervisor: M. Siebert
- Tkáč, Timotej: *Analysis of Covert Communication via DNS Server*. Supervisor: D. Bernát
- Trávníček, Tomáš: *Visualization of Security in Computer and Communication Networks*. Supervisor: P. Magula
- Urbán, Dávid: *TCP Protocols in MANET Network*. Supervisor: P. Trúchly

Study Programme Informatics
- Sabol, Róbert: *The Connection between TV Broadcast and Social Networks*. Supervisor: I. Kotuliak

Master (Ing.) Theses – Graduates 2013

Study Programme Computer and Communication Systems and Networks
- Blesák, Viktor: *Testing Service Quality in Communication Networks*. Supervisor: M. Kotočová
- Fodora, Martin: *Network Traffic Generator*. Supervisor: M. Hrubý
- Hreha, Martin: *Design and Optimization of Networks with Maximum Redundancy*. Supervisor: M. Olšovský
- Hyben, Martin: *An Analyzer of Transport Streams in DVB-S*. Supervisor: P. Trúchly
- Jančiga, Tomáš: *Centralized Management of Access Points Allowing Seamless Roaming in IEEE 802.11 Networks*. Supervisor: J. Balážia
- Jasovský, Peter: *Smart Devices Management System*. Supervisor: A. Binder


Klobušický, Ivan: Quality of Service in Mobile Ad-Hoc Networks. Supervisor: P. Magula

Kokolevský, Tomáš: Extension of a Hybrid Broadcast Broadband TV Platform. Supervisor: T. Kováčik

Kováč, Štefan: Application in HBB and DVB Systems. Supervisor: P. Trúchly


Kvasnička, Igor: QoS Simulator in Communication Networks. Supervisor: M. Oľšovský


Martinický, Rastislav: Improving Communication by Optimizing the Transport Layer. Supervisor: M. Oľšovský

Matuška, Tomáš: Universal Embedded System for Intelligent Objects Management. Supervisor: T. Krajčovič

Perešini, Ondrej: Experimental Embedded System for Intelligent Actuators Control through the Internet. Supervisor: T. Krajčovič


Ščepka, Daniel: Access of Wireless Mobile Stations to IEEE 802.11 Networks with Centralized Management. Supervisor: J. Balážia

Šuhaj, Lukáš: Intelligent Infrastructure Solution for Office. Supervisor: P. Horváth

Šuľtý, Karol: Optimization of Multiplexer Trees. Supervisor: P. Pištek


Doctoral (PhD.) Theses

Student name: Martin Hrubý
Degree program: Applied Informatics
Thesis title: Optimization of Network Traffic Flow
Supervisor: Margaréta Kotočová, Associate Professor
Defended on: November 25, 2013
Annotation: This project deals with traffic engineering in computer networks. We provide an overview of traffic engineering and current issues which we face in large heterogeneous networks. We analyze the area of QoS together with QoS objectives and most important principles. Well known and widely used approaches to providing QoS in heterogeneous networks are described. The project is focused on service provider backbone networks. We propose a model for gathering and statistical
modeling of network performance parameters based on multivariate normal distribution. The proposed model is implemented as part of a system for traffic flow optimization in backbone MPLS networks. Experimental topologies are proposed, in which experiments are carried out to verify the functionality of our implemented system, in a laboratory environment.

Student name: Michal Olšovský  
Degree program: Applied Informatics  
Thesis title: Advanced Notification System for TCP Performance Increase  
Supervisor: Margaréta Kotočová, Associate Professor  
Defended on: November 25, 2013  
Annotation: This paper provides an overview of the current performance of the information transmission from the transport layer’s point of view by means of using the dominant transport protocol TCP. The attention is paid to TCP’s variants used in wired and wireless networks. First part of this work includes characteristics of the key elements affecting the TCP performance. For further design work factors and assumptions which were used while creating the original TCP were clarified. Conclusion of the overview is done not only from the point of performance and development but from the point of used mechanisms and techniques as well. Practical part of this document introduces our new advanced notification system ACNS. Design part of this document is dedicated to the description of the four key features of the new ACNS system as well as to ACNS integration into IPv4 and TCP. Implementation part describes the principles using pseudo codes. End of the document belongs to the functional and performance ACNS testing. These tests prove the correct ACNS behavior as well as the TCP performance improvement when used in combination with ACNS.

8.4 IIT.SRC Students’ Papers

Full papers
- Hreha, Martin: Advanced GLBP Load-balancing (GLBP+). Supervisor: M. Olšovský
- Hrubý, Martin: Traffic Engineering Based on Statistical Modeling. Supervisor: M. Kotočová
- Krištofík, Štefan: Efficient Repair Rate Estimation of Redundancy Analysis Algorithms for Embedded Memories. Supervisor: E. Gramatová
- Kudláček, František: *Atmospheric Modelling via Flying Platform.* Supervisor: M. Pohronská
- Maruniak, Marián: *Binary Decision Diagram Optimization Method Based on Multiplexer Reduction Methods.* Supervisor: P. Pištek
- Nagy, Martin: *New Security Architecture for Mobile Data Networks.* Supervisor: I. Kotuliak
- Olšovský, Michal: *Advanced Notification System for TCP Congestion Control.* Supervisor: M. Kotočová
- Tkáč, Timotej: *Analysis of Covert Communication via DNS.* Supervisor: D. Bernát
- Vojtko, Martin: *Modular Operating System.* Supervisor: T. Krajčovič

Extended Abstracts
- Jombik, Peter: *Reduce the Power Consumption by Selecting the Appropriate Processor.* Supervisor: T. Krajčovič
- Siebert, Miroslav: *PNets – the Verification Tool based on Petri Nets.* Supervisor: J. Flochová

### 8.5 Research Laboratories

**Networks Technology Laboratory I**
- **Manager:** B. Dado
- **Contact:** boris.dado@stuba.sk
- **Description:** The research and teaching laboratory is used in practical lessons within several network courses, as well as for networking courses of Cisco Networking Academy, established at our faculty. The students 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 also used by the Instructor Training Centre which is a part of Cisco Networking Academy. The available hardware equipment helps students and other staff in their research during practical experiments while working on research projects, bachelor, master, or doctoral thesis. Laboratories are equipped with several network interconnecting devices, like switches and routers. All devices are originated mainly in Cisco company.

**Networks Technology Laboratory II**
- **Manager:** M. Kotočová
- **Contact:** margareta.kotocova@stuba.sk
- **Description:** This research and teaching laboratory is dedicated to teaching WAN technologies to undergraduates, communication services and networks and network security to graduates in the study programme Computer
and communication systems and networks. Students gain and prove their practical and theoretical skills. The skills are developed that enable students to design, implement, and troubleshoot scalable local and wide-area networks, create and deploy a global intranet, using routers and switches for multiprotocol client hosts and services. Students are also involved in design, implementation and verification of applications for computer networks and parallel processing. For teaching and testing wireless communication the laboratory is equipped with wireless access points, wireless network cards are available and necessary software tools.

**Embedded Systems Laboratory**

*Manager:* T. Krajčovič  
*Contact:* tibor.krajcovic@stuba.sk  
*Description:* The laboratory is focused on the embedded system research. It is equipped with all necessary equipment for design, implementation and testing of applications for embedded systems based on modern microprocessors, one-chip microcomputers and soft-core processors, including real-time applications. It contains specialized equipment, such as development kits based on monolithic microprocessors and one-chip microcomputers with RISC and CISC architectures, FPGA and CPLD development kits, logical analyzers, in-circuit and JTAG emulators, digital oscilloscopes and other development tools.

**Digital Systems Design Laboratory**

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

**Communication Technologies Laboratory**

*Manager:* I. Kotuliak  
*Contact:* ivan.kotuliak@stuba.sk  
*Description:* The research and teaching laboratory is intended for perspective research topics in the area of communication networks. These topics cover network routing controlled by software (Software Defined Networking – SDN) that is applied to both fixed and mobile networks, to be more specific. In the area of wireless networks we are engaged in decreasing energy consumption during communications to utilise batteries more effectively. Important research topics are also associated with a delivery of multimedia applications to users. So called Content
Delivery Networks (CDN) are raising more and more attention in coming years.

**FIIT – Molpir, Ltd. Laboratory**

*Manager:* P. Pištek  
*Contact:* peter.pistek@stuba.sk  
*Description:* The main purpose of the laboratory is research of multimedia applications oriented towards transport. The research is dedicated to the possibility of applying IT in transport and their usefulness and application in practice. Research is conducted using the specialized equipment specially developed for use in cars, buses, trains etc. The aim is to develop the novel applications aimed at leveraging existing hardware that will bring the user new functionality in the specific domain. Technologies such as GPS, ultrasonic sensor, touch screens, dedicated servers for transport etc. are currently available in the lab. With these technologies it is possible to work using various operating systems (FreeBSD, Windows 6.0, Windows XP Embeded, Android 1.5, Android 2.3, Android 4.0). The aim is to create useful applications for passengers, drivers, or owners of means of transport. The laboratory was established as a result of cooperation with Molpir, Ltd. It is also opened to students working on research projects, bachelor, master thesis, and team projects.

### 8.6 Research projects

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

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

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

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

Design Optimization of Low-power Digital and Mixed Integrated Systems (VEGA 1/1008/12)
Project leader: E. Gramatová
Supported by: Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration: January 2012 – December 2015
Description: The project is focused on basic research and technologies in low-power digital and mixed system design methods and algorithms optimized for low-power electronic device applications. The power supply consumption is an important parameter in nowadays battery-operated mobile electronic devices. This aspect has to be taken into account during the whole design process, in using design for testability and reliability techniques as well. The main project target is to develop methods, techniques and algorithms for top-down design of digital and mixed circuits integrated into a single chip using accessible CMOS technologies while focusing on the low-power parameter.

Network Architectures for Multimedia Services Delivery with QoS Guarantee (VEGA 1/0676/12)
Project leader: I. Kotuliak
Supported by: Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration: January 2012 – December 2014
Description: This project aims to follow up the FP7 HBB-Next project goals and with regard to the designs for the Future Generation Internet in three areas:

i) accelerating the roaming in WiFi networks to enable effective provision of multimedia services as well as to address routing problems in the case of ad-hoc networks
ii) improving the provision of quality services by streamlining routing, message queues in nodes and modifications of fourth layer protocols for BIC, CUBIC networks
iii) modification of existing architectures for providing multimedia services and sharing between operators and providers, effective de-
livery through clouds and content distribution through the hybrid technologies

**FP7 HBB Next Project: FP7-287848 HBB-NEXT**

*Project leader:* I. Kotuliak for UPSS  
*Members:* T. Kováčik, R. Broniš  
*Supported by:* EC Seventh Framework Programme (FP7/2007-2013) under Grant Agreement no 287848  
*Duration:* October 2011 – March 2014  
*Description:* The project will deliver a web-based framework for device-independent applications that can syndicate content from multiple sources for real-time content composition. Content may also be distributed across users in geographically distinct areas. HBB-NEXT seeks to facilitate the marriage of the broadcast and Internet world by researching user-centred technologies for enriching the TV-viewing experience: Multi-user tailored content recommendations and seamless access to content via multiple devices are centre stage while social media features or user generated content round off the picture.

**Manufacturable and Dependable Multicore Architectures at Nanoscale (COST Action IC 1103)**

*Project leader:* E. Gramatová  
*Members:* J. Hudec, K. Jelemenská, T. Krajkovič, P. Pištek, M. Pohronská  
*Supported by:* COST, EU Framework Programme  
*Duration:* January 2013 – December 2015  
*Description:* The project topics can be divided into the next fields: - Design: tasks oriented to low-power design techniques for digital circuits and hazard-free asynchronous circuits design. - Testing: development of new techniques and architectures for built-in self-testing and self-repairing RAMs with redundant memory locations for increasing memory manufacturing yields. - Verification: analysis of different techniques and approaches, languages for formal verification of digital systems design.

**Security and Management in Mobile Networks (2012et011)**

*Project leader:* M. Nagy  
*Members:* I. Kotuliak, J. Balazia, P. Helebrandt  
*Supported by:* Tatra banka Foundation  
*Duration:* February 2013 – November 2013  
*Description:* Mobile networks of GSM/GPRS/UMTS/LTE standards with over 5.5 billion connected devices are nowadays very popular topic and form the largest communications network in the world. Mobile devices like tablets and smart-phones are becoming a common part of our lives, yet we do not realize to what kinds of dangers we may be exposed through these devices. The project focuses on extending the experimental communication network present on Faculty of Informatics and Information Technologies, Slovak university of technology in Bratislava with OpenFlow based forwarder nodes and an access network based on GSM/GPRS/EDGE standard. This complex network will be used for research of mobile terminal security and new hot research
topic - SDN (Software Defined Networking). On this network, new approaches and methods that will address specific security issues of mobile networks (mainly lack of resources on the radio interface, vulnerability of mobile terminals, unavailability of host-based firewalls for mobile devices, etc.) will be designed, implemented and verified. Usability of SDN approach in mobile networks will be also examined with emphasis on the use of OpenFlow protocol.

**Finance in the Pocket (2012et006)**

*Project leader:* T. Kováčik  
*Members:* R. Broniš, B. Baranec, P. Bôžik  
*Supported by:* Tatra banka Foundation  
*Duration:* February 2013 – November 2013  
*Description:* The goal of the project is to enable a user or a group of users to reflect their economic behaviour for the purpose of its optimization. The output of the project is a mobile-television platform for processing of the data of the financial transactions of the users and for displaying aggregated information about them. The solution will contain a smartphone/tablet application, which, by using the capabilities of this device, will acquire and process the data about financial transactions from paper receipt. Afterwards, it will be able to show complete statistics about the flows of the money of a user or of a group of users. Consequently, they will be able to gain an overview on which types of commodities, services or activities they have spent their money on. The application will enable them to see their spending behaviour in time from above which therefore enable them an optimization of their budget for the present moment and their current priorities. What is more, our solution will be able to bring information about financial spending directly to the living room of the household to present them during the family budget discussion. This will be accomplished by interconnecting the mobile and the television platforms. During this period of the world-wide economic crisis proposed solution will help the user to differentiate between the less important expenses and actual priorities. Eventually this can lead to decrease of the economical and mental pressure put on the user or family.

**Weekend Hackathon (2012vs035)**

*Project leader:* I. Kotuliak  
*Members:* M. Maxian, M. Bieliková, L. Bubanová, M. Haruštiak, Z. Lipovská  
*Supported by:* Tatra banka Foundation  
*Duration:* January 2013 – November 2013  
*Description:* Hackathon is an event, where students pitch their ideas, and the best ones get realized with the help of professionals. The goal of the event is to improve the creativity of the students, and their ability to develop innovative ideas in a team. The even has a form of a workshop. It starts on Friday with the presentation of ideas, and forming of teams. Teams start working on their collective vision immediately. Over the weekend, they get feedback from professionals, who will evaluate the innovativeness of the idea, its feasibility, the form of realization, and the presentation of the final version of the idea. The final evaluation of
the projects is on Sunday evening. Teams present their final realizations to a committee, composed of successful people from IT-oriented companies, and people from the university management.

8.7 Publications

Journals


International Conferences


Selected Local and National Conferences


Parts of Books


Textbooks

8.8 Cooperation

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

International Cooperation
- Department of Computers, Faculty of Electrical Engineering, Czech Technical University in Prague, Czech Republic
- Faculty of Information Technologies, Brno University of Technology, Czech Republic
Visits of Staff Members

- **E. Gramatová:** COST IC1103 project meeting, Berlin, Germany, January 19-21, 2013
- **E. Gramatová:** COST LD12036 project meeting, Brno University of Technology, Czech Republic, January 14, 2013
- **E. Gramatová:** Program Committee meeting of the 16th IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, DDECS 2013, Prague, Czech Republic, February 18-19, 2013
- **T. Kováčik:** HBB Next Integration Meeting, Friedberg, Germany, March 6-7, 2013
- **E. Gramatová:** IT4Innovations project meeting, Technical University of Ostrava, Czech Republic, March 21, 2013
- **K. Jelemenská, E. Gramatová, Š. Krištofík, D. Macko:** 16th IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, DDECS 2013, Karlovy Vary, Czech Republic, April 7-10, 2013
- **I. Kotuliak:** Université de Versailles, St-Quentin-En-Yvelines, France, April 9-10, 2013
- **P. Čičák:** Brno University of Technology, Czech Republic, April 17, 2013
– B. Dado, M. Hrubý, M. Olšovský: NETACAD 2013, Brno, Czech Republic, April 19, 2013
– P. Trúčky: LdV project IMProVET, final meeting, Maribor, Slovenia, May 15-18, 2013
– E. Gramatová: Brno University of Technology, Czech Republic, May 15, 2013
– Š. Kríštofík: Brno University of Technology, Czech Republic, June 7, 2013
– R. Broniš: HBB Next – Integration Workshop, Munich, Germany, June 24-26, 2013
– K. Jelemenská: Czech Technical University in Prague, Czech Republic, July 7, 2013
– E. Gramatová: Management Committee of the COST Action IC 1103 MEDIAN meeting, Rome, Italy, September 19, 2013
– J. Murányi: NGMAST’13, 7th International Conference on Next Generation Mobile Apps, Services and Technologies, Prague, Czech Republic, September 24-28, 2013
– A. Binder: 5th ngnlab International Workshop, Prague, Czech Republic, September 25-27, 2013
8.9 Membership in Professional Organisations and Societies

Slovak Professional Organisations and Societies

Pavel Čičák
- Slovak Centre of the IEE (member, since 1999)
- Slovak Society of Computer Science (member, since 2012)

Ivan Kotuliak
- Slovak Information Society (member, since 2013)

International Professional Organisations and Societies

Pavel Čičák
- IET, Institute of Engineering and Technology (fellow, since 2000)
- ECUK, Engineering Council UK (Chartered Engineer, since 2000)
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2013)

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

Elena Gramatová
- TTTC, Test Technical Technology Council (contact person for SR, since 1996)
- IEEE - Institute of Electrical and Electronic Engineers (member, since 2000)
- IEEE Computer Society Golden Core (member, since 2003)

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

Katarína Jelemenská
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2013)

Ivan Kotuliak
- IEEE, Communication Society IEEE, IFIP WG 6.8 (member, since 2012)

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

Dominik Macko
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2013)
Other Activities

- Newsletter of Cisco Networking academy in Slovakia – P. Čičák: members of editorial board
- Working Group of the Accreditation Commission of Slovakia for Information Sciences and Technologies – E. Gramatová, member
- Scientific Board of IT4 Innovation project – E. Gramatová, member
- ETS 2013 – 18th IEEE European Test Symposium, May 2013, Anecy, France – E. Gramatová: member of programme committee
- EWDTS 2013 – 11th East-West Design & Test Symposium, September 2013, Rostov-on-Don, Russia – E. Gramatová: member of programme committee
- HPCC 2013 – 15th International Conference on High Performance and Communications – I. Kotuliak: member of programme committee
- LMPCNA 2013 – The Fifth International Workshop on Learning Methodologies and Platforms used in the Cisco Networking Academy, March 2013, Lisbon, Portugal – P. Čičák: member of programme committee
- VERFE’13 – 9th Workshop on Dependability and Fault Tolerance, February 2013, Prag, Czech Republic – E. Gramatová: member of programme committee
9 Institute of Informatics and Software Engineering

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

Within the mission, the institute especially

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

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

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

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

Administrative Department
Zuzana Macková
Alexandra Zakálová

Teaching Staff
Nadežda Andrejčíková, PhD. (part time)
Michal Barla, PhD.
Mária Bieliková, Professor
Anna Bou Ezzeddine, PhD.
Iveta Dekýšová
Ján Genčí, Assoc. Professor (part time)
Marta Gnîpová (part time)
Daniela Chudá, Assoc. Professor
Jaroslav Jakubík, PhD. (part time)
Ivan Kapustík
Alena Kovárová, PhD.
Gabriela Kosková, PhD.
Rastislav Královič, Assoc. Professor (part time)
Peter Lacko, PhD.
Michal Laclavík, Assoc. Professor (part time)
Ján Lang, PhD.
Marián Lekavý PhD. (part time)
Eva Letovancová, Assoc. Professor (part time)
Mária Lucká, Assoc. Professor
Ľubomír Majtás, PhD. (part time)
Pavol Mederly, PhD. (part time)
Vladimír Mlynarovič, Assoc. Professor (part time)
Ľudovít Molnár, Professor
Pavol Návrat, Professor
Jozef Papula, Professor (part time)
Ivan Polášek, PhD.
Anna Považanová (part time)
Viera Rozinajová, Assoc. Professor
Petr Šaloun, Assoc. Professor (part time)
Ľubor Šešera, PhD. (part time)
Jakub Šimko, PhD. (since September)
Marián Šimko, PhD.
Marián Šuráb, Assoc. Professor (part time)
Jozef Tvarožek, PhD.
Valentino Vranič, Assoc. Professor
Michal Winczer, PhD. (part time)

External Lecturers
Danica Šoltésová, PhD.

Full-Time PhD Students
Zoltán Harsányi
Michal Holub
Peter Kajsa (till March)
Michal Kasan
Michal Kompan
Tomáš Kramár
Peter Krátky (since September)
Peter Kubán (since September)
Tomáš Kučečka
Eduard Kuric
Tomáš Kuzár (till March)
Martin Labaj
Róbert Móro
Aurel Paulovič
Karol Rástočný
Štefan Šabo
Ivan Srba
Márius Šajgalík
Roman Šelmeci
Jakub Šimko (till July)
Petra Vráblecová (since September)
Dušan Zeleník
Anushervon Ziyoev (since September)

### 9.2 Teaching

#### Undergraduate Study (Bc.)

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Credits</th>
<th>Lecturer</th>
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<tbody>
<tr>
<td>Artificial Intelligence</td>
<td>Spring</td>
<td>6</td>
<td>P. Návrat</td>
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<tr>
<td>Basics of Procedural Programming</td>
<td>Autumn</td>
<td>6</td>
<td>G. Kosková</td>
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<tr>
<td>Communication in Culture History</td>
<td>Spring</td>
<td>3</td>
<td>D. Šoltésová</td>
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<tr>
<td>Construction of Effective Algorithms</td>
<td>Spring</td>
<td>6</td>
<td>R. Královič</td>
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<td>Database Systems</td>
<td>Spring</td>
<td>6</td>
<td>M. Barla</td>
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<tr>
<td>Data Structures and Algorithms</td>
<td>Autumn</td>
<td>6</td>
<td>P. Návrat</td>
</tr>
<tr>
<td>Entrepreneurship and Management</td>
<td>Autumn</td>
<td>5</td>
<td>J. Papula</td>
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<tr>
<td>Final Bachelor Project 0–II</td>
<td>Autumn</td>
<td>3-3-9</td>
<td>P. Návrat</td>
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<td>Functional and Logic Programming</td>
<td>Spring</td>
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<td>M. Bieliková</td>
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<td>Information and Communication Technologies Law</td>
<td>Spring</td>
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<td>I. Dekýšová</td>
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<td>Introduction to Foundations of Mathematic</td>
<td>Autumn</td>
<td>6</td>
<td>M. Lucká</td>
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<tr>
<td>Management of Social Systems</td>
<td>Spring</td>
<td>3</td>
<td>E. Letovancová</td>
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<tr>
<td>Managerial Economics</td>
<td>Autumn</td>
<td>5</td>
<td>V. Mlynarovič</td>
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<td>Object-Oriented Programming</td>
<td>Spring</td>
<td>6</td>
<td>V. Vranic</td>
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<tr>
<td>Program Development for Java Platform</td>
<td>Spring</td>
<td>6</td>
<td>J. Jakubík</td>
</tr>
<tr>
<td>Principles of Information Systems</td>
<td>Autumn</td>
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<td>V. Rozinajová</td>
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<tr>
<td>Principles of Software Engineering</td>
<td>Spring</td>
<td>7</td>
<td>M. Bieliková</td>
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<tr>
<td>Procedural Programming</td>
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<td>A. Bou Ezzedine</td>
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<td>G. Kosková</td>
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<td>Research Seminar I-IV</td>
<td>Autumn</td>
<td>0-3-3-3</td>
<td>M. Bieliková</td>
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<td>Seminar of Mathematic</td>
<td>Autumn</td>
<td>3</td>
<td>M. Lucká</td>
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<tr>
<td>Software Systems Development</td>
<td>Spring</td>
<td>3</td>
<td>M. Bieliková</td>
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<tr>
<td>Specification Methods and Tools</td>
<td>Spring</td>
<td>5</td>
<td>V. Vranic</td>
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<tr>
<td>Social Connotations of Informatics and Information and Communication Technologies</td>
<td>Spring</td>
<td>3</td>
<td>M. Winczer</td>
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<tr>
<td>Theoretical Foundations of Informatics</td>
<td>Spring</td>
<td>6</td>
<td>D. Chudá</td>
</tr>
<tr>
<td>Web Publishing</td>
<td>Spring</td>
<td>6</td>
<td>P. Šaloun</td>
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Master Study (Ing.)

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

9.3 Theses

Bachelor (Bc.) Theses – graduates 2013

Study Programme Informatics

– Bádal, Matej: *Plugin to Thunderbird Email Client for Annotating Emails.*
  Supervisor: M. Laclavík

– Bednárik, Filip: *Application of Technologies of Web 3.0 in Commercial Sphere.*
  Supervisor: M. Liška
– Benkovič, Samuel: Planning a Simulated Robotic Football Player. Supervisor: I. Kapusták
– Blanárik, Michal: Named Entities Extraction from Text and Merge of Inflected Forms Named Entities. Supervisor: M. Laclavík
– Bošiak, Vladimír: Application Technologies of Web 3.0 in Commercial. Supervisor: M. Liška
– Cáder, Lukáš: Combined Use of Mobile Phone Sensors. Supervisor: V. Vranič
– Demčák, Peter: Innovative Application within an International Competition. Supervisor: M. Barla
– Galbavý, Ondrej: Innovative Application within an International Competition. Supervisor: M. Barla
– Hamar, Peter: Managing Citations. Supervisor: N. Andrejčíková
– Harinek, Jozef: Extracting Keywords from Educational Content. Supervisor: M. Šimko
– Hirjak, Tibor: Mobile Device as a Music Generator. Supervisor: A. Kovárová
– Chlebana, Matej: Software Utility for Making Interactive Exams. Supervisor: M. Lucká
– Janík, Martin: Combined Use of Sensors in Mobile Devices. Supervisor: V. Vranič
– Jánošík, Tomáš: Extracting Interesting Information from Social Media. Supervisor: P. Návrat
– Kalmár, Ján: Textual Entailment in Natural Language Processing. Supervisor: J. Tvarožek
– Kepič, Tomáš: Time Series Analysis. Supervisor: G. Kosková
– Kompas, Šimon: Characteristics of Small World Networks. Supervisor: G. Kosková
– Kostrab, Rastislav: Used M-Education. Supervisor: J. Lang
– Kubica, Stanislav: Modular System for Web Search. Supervisor: Š. Sabo
– Kuruc, Marián: Crowd Simulation. Supervisor: P. Lacko
– Londák, Martin: *Creating Natural Language Database Queries*. Supervisor: P. Lacko
– Maroňák, Matej: *Querying Large Web Repositories*. Supervisor: K. Rástočný
– Markech, Martin: *Semantic Wiki*. Supervisor: J. Šimko
– Mercz, Jakub: *Generation of Database Queries in Natural Language*. Supervisor: P. Lacko
– Mészáros, Michal: *Optimization Inner Data Structures of Graph Database SGDB*. Supervisor: M. Ciglan
– Mišíková, Kristína: *Context Based Searching of Information Using Thesaurus*. Supervisor: V. Rozinajová
– Molnár, Samuel: *Navigation by a Cloud of Important Terms*. Supervisor: M. Bieliková
– Nemeček, Tomáš: *Tool for Identifying Root Base of Slovak Word*. Supervisor: D. Chudá
– Noga, Matej: *Recommendation Based on Difficulty Ratings*. Supervisor: M. Labaj
– Páleník, Peter: *Road Network as a Complex Graph*. Supervisor: A. Bou Ezzeddine
– Sekerák, Lukáš: *Interactive Visualization of Information Network*. Supervisor: M. Laclavík
– Šimek, Miroslav: *Innovative Application within an International Competition*. Supervisor: M. Barla
– Štajer, Andrej: *Development of Software Systems with Use of Design Patterns*. Supervisor: P. Kajsa
– Štetiari, Matej: *RFID in the Library*. Supervisor: N. Andrejčiková
– Šuta, Erik: *Performance Monitoring of Java Applications*. Supervisor: P. Mederly
– Zápach, Radoslav: *Creating a Parallel Corpus from the Web, with Use in Statistical Machine Translation.* Supervisor: M. Laclavík
– Zbell, Pavol: *Source Code Search within Context.* Supervisor: M. Bieliková

**Master Theses – graduates 2013**

*Study Programme Information Systems*
– Bilevic, Roman: *Changes of User Interests in Time and its Use in Search Engines.* Supervisor: T. Kramár
– Bimbo, Miroslav: *User Modeling Based on Microblog Data.* Supervisor: M. Šimko
– Čorej, Tomáš: *Relational Database Systems Built on Top of Mapreduce Framework.* Supervisor: P. Lacko
– Ďurčák, Lukáš: *Agent Decision-Making Logic in Simulated Soccer.* Supervisor: I. Kapustík
– Immer, Michal: *Categorization of Unstructured Information on the Web.* Supervisor: T. Kuzár
– Jurčík, Peter: *Effective Work with Xpath in the Context of Integration of Information Systems.* Supervisor: P. Mederly
– Macko, Peter: *Unified Search of Linked Data on the Web.* Supervisor: M. Holub
– Másiar, Juraj: *Modular Network Analyzer.* Supervisor: M. Nehéz
– Mihalík, Adam: *Verifying the Existence of Citations in Similar Documents.* Supervisor: D. Chudá
– Pavlech, Lukáš: *Agent-Based Modeling and Simulation of Crowd Evacuation during Building Fire.* Supervisor: I. Budinská
– Sokol, Pavol: *Similarity in Short Text Snippets and Possibilities of its Application.* Supervisor: M. Barla
– Žilinčík, Michal: *Social Networks Exploratory Search Focused on Dynamical Criteria and Relationships of Metadata to Content.* Supervisor: P. Návrat
Study Programme Software Engineering

- Belanji, Juraj: *Diagramatic and Nondiagramatic Representation of Feature Models.* Supervisor: V. Vranič
- Beňo, Marián: *Adapting Multi-Agent Systems and Swarm Intelligence in Knowledge Management.* Supervisor: I. Polášek
- Betina, Timotej: *Information Retrieval with Structural Segmentation of Documents.* Supervisor: I. Polášek
- Burger, Roman: *Personalized Reading Resources Organization.* Supervisor: M. Bieliková
- Fejč, Adrián: *Use of Patterns for Modeling Service-Oriented Architecture.* Supervisor: R. Šelmeci
- Franta, Martin: *Processing Non-annotated Documents by Utilizing Semantics from Existing Metadata.* Supervisor: N. Andrejčíková
- Gelányi, Ľuboš: *Automation of Source Code Refactoring.* Supervisor: P. Kajsa
- Gomola, Alojz: *Interleaving of Feature Model with UML.* Supervisor: P. Kajsa
- Habdák, Martin: *Semantic Search in the Content of Cultural Institutions.* Supervisor: N. Andrejčíková
- Horváth, Róbert: *Augmenting the Web for Facilitating Learning.* Supervisor: M. Šimko
- Jaroszewicz, Kazimir: *Community Detection in Networks Using Node’s Attributes.* Supervisor: M. Ciglan
- Lačný, Jozef: *Personalized Recommendation of Learning Resources.* Supervisor: M. Kompan
- Lajčín, Tomáš: *Model-Driven Development of XSLT Transformations.* Supervisor: P. Mederly
- Lezo, Andrej: *Utilization of Semantic Relations for Information Searching in Culture Heritage Domain.* Supervisor: V. Rozinajová
- Macko, Peter: *Unified Search of Linked Data on the Web.* Supervisor: M. Holub
- Maruš, Matej: *Searching for the Meaning of the User’s Communication.* Supervisor: I. Kapustík
- Masný, Ľuboš: *Web Exploratory Search.* Supervisor: P. Návrat
- Meliško, Peter: *Obtaining Information from Semantic Data Using Queries Consisting of Keywords.* Supervisor: M. Ciglan
Michalko, Pavel: *Checking of Texts Similarity in the Web Resources.*
Supervisor: D. Chudá

Mitrík, Štefan: *Context-Aware Physical Activity Recommendation.*
Supervisor: M. Bieliková

Nagy, Balázs: *Metadata Collection for Effective Organization of Personal Multimedia Repositories Using Games with a Purpose.* Supervisor: J. Šimko

Paššák, Peter: *Optimization of Robot Motion in Simulated 3D Robotic Soccer Using Evolutionary Algorithms.* Supervisor: I. Kapustík

Pipík, Roman: *Support for Refactorization with New Approaches.*
Supervisor: I. Polášek

Sedláček, Andrej: *Leveraging In-Memory Data Management in Mission-Critical Business Scenarios.* Supervisor: A. Danko

Sládeček, Peter: *Article Clustering with Use HTML Tags.* Supervisor: T. Kučečka

Staráček, Ľuboš: *Development of Cross-Platform Applications for Mobile Devices.* Supervisor: V. Vranič

Supervisor: P. Lacko

Szórád, Anton: *Application of Patterns in Modeling Service-Oriented Architectures.*
Supervisor: R. Šelmeci

Šalmík, Jakub: *Personalized Recommendation with Considering of Social Aspects.*
Supervisor: M. Kompan

Ševcech, Jakub: *Web Navigation Based on Annotations.*
Supervisor: M. Bieliková

Supervisor: J. Tvarožek

Vacula, Matúš: *Information Retrieval Using Short-Term Context.*
Supervisor: D. Zeleník

Vrablecová, Petra: *Relationship Discovery from Educational Content.*
Supervisor: M. Šimko

**Doctoral (PhD.) Theses**

*Student name:* Tomáš Kuzár  
*Degree program:* Software Systems  
*Thesis title:* *Clustering on Social Web*  
*Supervisor:* Pavol Návrat, Professor  
*Defended on:* March 14, 2013  
*Annotation:*  
This thesis is focused on content clustering on social web, which increases its potential rapidly. Growing number of involved users lead to significant increase in amount of user-generated content. In our research, we focus on processing of unstructured textual content on social web in order to access relevant information in way that is more effective. We have designed and evaluated methods for building precise content clusters by mining social web data. Our findings indicate the need to encounter external knowledge and the internal relation-
ships between objects on social web to increase the accuracy of extracted knowledge. In user study, we demonstrate how the accurate content clusters augment the access to relevant information on the social web.

Student name: Peter Kajsa  
Degree program: Software Engineering  
Thesis title: Models of Software Systems: Design Pattern Support  
Supervisor: Pavol Návrat  
Defended on: March 14, 2013  
Annotation: The thesis is focused on the area of the design pattern support in the models of higher abstraction level and subsequent transformations to their platform specific forms and source code as well. The main core of the thesis is the method of the design pattern support which is based on a principle of suggestion of design pattern instances via the semantic marking of model elements or source code fragments and the subsequent transformations of this way marked models or source code. The transformations generate the missing structure of the suggested design pattern instances in the requested form. The method provides the support of design patterns at the three levels of abstraction and in this way it enables earlier application of the design patterns into models and it provides more abstract view on the instances. The emphasis is put also on the support of specialization, concretization and variability of design patterns. The method defines transformations between the supported model levels and the source code. Within the transformations the emphasis is put on the preserving of the visibility of pattern instances and on the preserving of the pattern support also at the lower abstraction levels till the source code. Moreover, the transformations are driven by models of patterns and they are designed in the way which provides great adaptability of the transformation results and easy extension of the support about new patterns or custom model structures. Thanks to the continual support of the design patterns at more levels of abstraction and thanks to the transformations between particular model levels and source code, the method tries to achieve the applicability in the area of the iterative, incremental and model driven development.

Student name: Jakub Šimko  
Degree program: Software Engineering  
Thesis title: Harnessing Manpower for Creating Semantics  
Supervisor: Mária Bieliková, Professor  
Defended on: July 4, 2013  
Annotation: The crowdsourcing and games with a purpose (GWAPs) have emerged as an alternative to expert-based and automated semantics acquisition approaches. We analyze role of GWAPs as tools for resource metadata and domain models acquisition and discuss their design aspects. For acquisition of lightweight term relationship network, we present a negative search query formulation game. For acquisition of (personal) image tags, we devised a memory and annotation card
game, where players identify identical play cards. For validation of music metadata, we devised a multi-choice question-based game, where players identify tag sets that are characteristic to music tracks they hear. We also present general improvements to GWAP design: “helper artifact” validation scheme, a posteriori cheating detection heuristics and approaches to measurement and use of player competences.

9.4 IIT.SRC Students’ Papers

Full papers

- Šúkeník, Ján: *Detection of Code Clones: Necessity or a Myth?* Supervisor: P. Lacko
- Bálik, Jaroslav: *Symmetric Aspect-Oriented Programming in JavaScript.* Supervisor: V. Vranic
- Šelmeci, Roman: *Structural Modelling of SOA Design Patterns with Attributed Graphs.* Supervisor: V. Rozinajová
- Lačný, Jozef: *Personalized Recommendation of Learning Resources.* Supervisor: M. Kompan
- Mitrik, Štefan: *Discovering and Predicting Human Behaviour Patterns.* Supervisor: M. Bieliková
- Sládeček, Peter: *Article Clustering with Usage of HTML Tags.* Supervisor: T. Kuččeka
- Kramár, Tomáš: *Multiple Sources of Search Context, their Influence and Applicability.* Supervisor: M. Bieliková
- Sabo, Štefan: *Social Insect Inspired Approach for Visualization and Tracking of Stories on the Web.* Supervisor: P. Návrat
- Srba, Ivan: *A Study on Influence of Students’ Personal Characteristics on Collaborative Learning.* Supervisor: M. Bieliková
- Feješ, Adrián: *Use of Design Patterns in Modeling Service Oriented Architecture.* Supervisor: R. Šelmeci
- Staráček, Luboš: *Using Aspect-Oriented Change Realization to Introduce and Document Changes in Object-Oriented Models.* Supervisor: V. Vranic
- Kuric, Eduard: *Activity-Based Programmer’s Knowledge Model for Personalized Search in Source Code.* Supervisor: M. Bieliková
- Demčák, Peter – Galbavý, Ondrej – Šimek, Miroslav – Štrbáková, Veronika: *Improving Speech Therapy by Motivational Home Exercises.* Supervisor: M. Barla
Harinek, Jozef: Extracting Keywords from Educational Content.
Supervisor: M. Šimko

Supervisor: A. Bou Ezzeddine

Supervisor: J. Tvarožek

Vrablecová, Petra: Relationship Discovery from Educational Content.
Supervisor: M. Šimko

Kompan, Michal: User’s Satisfaction Modelling in Personalized Recommendations.
Supervisor: M. Bieliková

Kučečka, Tomáš: Attacking the Performance of Okapi BM25 and Tf·Idf.
Supervisor: D. Chudá

Supervisor: M. Bieliková

Supervisor: M. Bieliková

Jánošik, Tomáš: Extracting Interesting Information from Social Media.
Supervisor: P. Návrat

Molnár, Samuel: Trending Words in Navigation History for Term Cloud-Based Navigation.
Supervisor: M. Bieliková

Bilevic, Roman: Changes of User Interests in Time and Their Application in Search Engines.
Supervisor: T. Kramár

Bimbo, Miroslav: User Interest Modelling Based on Microblog Data.
Supervisor: M. Šimko

Burger, Roman: Personalized Web Documents Organization through Facet Tree.
Supervisor: M. Bieliková

Macko, Peter: Preprocessing Linked Data in order to Answer Natural Language Queries.
Supervisor: M. Holub

Supervisor: D. Chudá

Ševcech, Jakub: Related Documents Search Using User Created Annotations.
Supervisor: M. Bieliková

Žilinčík, Michal: Exploratory Search on Twitter Utilizing User Feedback and Multi-Perspective Microblog Analysis.
Supervisor: P. Návrat

Supervisor: M. Bieliková

Šajgalík, Márius: Using Site Specificity to Build Better User Model from Web Browsing History.
Supervisor: M. Barla, M. Bieliková

Šimko, Jakub: Crowdsourcing in the Class. Supervisor: M. Bieliková
Extended abstracts

- Bednárik, Filip: *An Approach to Crawled Data Semantic Annotation from Selected Domain*. Supervisor: M. Liška


- Červeňák, Matej: *Promoting Educational Content by Use Cases*. Supervisor: J. Lang

- Červeňová, Dominika: *Emotion-Aware Movie Recommender Based on Genre Impact Analysis*. Supervisor: D. Zeleník

- Daniš, Igor: *An Approach to Triple Based User Activities Logging and Classification*. Supervisor: M. Liška


- Holub, Michal: *Modeling the Domain of Software Development to Represent Skills of Programmers*. Supervisor: M. Bieliková


- Labaj, Martin: *User Modelling based on Tabbed Browsing: Browsing Scenarios as a New Source*. Supervisor: M. Bieliková

- Markech, Martin: *Semantic Wiki for Research Groups*. Supervisor: J. Šimko

- Mojžiš, Ján: *SRelation – a Method for Relations Management and Navigation in Big Graph of Linked Data*. Supervisor: M. Láclavík


- Paulovič, Aurel: *Software Transactional Memory for Peer-to-Peer Systems*. Supervisor: P. Lacko

- Šalmík, Jakub: *Personalized Recommendation with Considering of Social Aspects*. Supervisor: M. Kompan

TP CUP Competition


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9.5 Research Laboratories

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

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

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

9.6 Research Projects

Contextual Information Search and Navigation in the Social Web (VEGA, 1/0675/11)
Project leader: M. Bieliková
Supported by: Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration: January 2011 – December 2014
Description: Considering today's information overload, caused by mass and dynamics of the accessible information, effective information search and navigation becomes an important and crucial task during activities with information needs. Project focuses on research of methods and techniques for information searching and navigation and on ways of their realization in the milieu of adaptive and social web with semantics with regard to problem-related software architectures (esp. service oriented architectures) methods of distributed processing of extensive data sources and to model-driven development of software including post-object paradigms.

Acquiring, Processing and Visualization of Textual Information Based on Analysis of Similarity Relations (VEGA, 1/0971/11)
Project leader: D. Chudá
Supported by: Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences
Duration: January 2011 – December 2014
Description: Web data acquisition is a highly topical task and despite several well-known methods, users struggle with poor quality (accuracy, relevance, and coverage) responses. The problem is to find methods to obtain relevant information on an issue that has a dynamic character, i.e. evolves over time. Acquired documents can be mined for more infor-
Advanced Methods in Software Evolution: Variants, Composition, and Integration (VEGA, I/1221/12)

Project leader: V. Vranić

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

Duration: January 2012 – December 2015

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

Virtual and Constructive Modelling, Training and Simulation of Crowd Behaviour in Urban Environment (APVV-0233-10)

Project leader: P. Lacko for FIIT STU
Members UISI: I. Kapustík, M. Labaj, J. Lang, A. Paulovič, K. Rástočný, V. Vranić

Supported by: Slovak Research and Development Agency

Duration: May 2011 – October 2014

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

Cognitive Traveling in Digital Space of the Web and Digital Libraries Supported by Personalized Services and Social Networks (APVV-0208-10)

**Project leader:** P. Návrat


**Supported by:** Slovak Research and Development Agency

**Duration:** May 2011 – October 2014

**Description:** Analyzing new phenomena connected with using web and digital libraries (esp. social networking) to improve information acquisition. Devising and verifying: - new models of information domains, documents and users facilitating expressing and working with at least partial descriptions of their semantics - new methods of targeted and exploratory information search that take into account personalization, common interests of different groups, suitable presentation and visualization.


**Project leader:** D. Chudá

**Members UISI:** M. Barla, J. Lang, P. Návrat, J. Tvarožek

**Supported by:** Lifelong Learning Programme

**Duration:** October 2013 – September 2016

**Description:** The main objectives of this proposal is to introduce innovative technologies in education, develop an integrated environment for computing education, which includes curricula, syllabi, e-learning, resources, student exhibition forums, which will significantly raise education quality. It will also propose a set of recommendations for future Digital Curricula in Computing Education and Training 2020 and will develop new didactical theories and learning models for using social media in education. The project involves 67 partners from 35 countries. All of them are active players in the field of Computing Education. Representatives of these partners will work on the re-organisation of the teaching process by changing teaching methods, developing new didactical theories and learning models for using social media in education and new Digital Curricula in Computing Education and Training. This will strengthen and further develop the European Higher Education Area in Computing.
Support of Building a Center of Excellence for Smart Technologies, Systems, and Services II (ITMS 26240120029)

**Project leader:** M. Bieliková for FIIT STU  
**Members UISI:** P. Návrat  
**Supported by:** European Structural Fund  
**Duration:** January 2010 – June 2014  
**Description:** The objective is to improve, build further, and put into operation the technological infrastructure that would enable to sustain the center of excellence of research and development for enterprise information source processing and presentation with the application of advanced distributed architectures for parallel processing of extensive sources of semistructured data and high performance computing for complex applications.

Research of Methods for Acquisition, Analysis and Personalized Conveying of Information and Knowledge (ITMS: 26240220039)

**Project leader:** M. Bieliková for FIIT STU  
**Supported by:** European Structural Fund  
**Duration:** January 2011 – January 2015  
**Description:** The purpose of the project is to develop new methods of acquisition, search, and recommendation of information and knowledge. The need for such methods comes from a huge range of the data available in different domains when their manual search for a human is not possible. Contemporary methods have enabled a remarkable move in this field, but they still do not enable to effective information providing so that this would include the context: the user, his or her goals, properties, and capabilities, as well as parameters of the environment in which information processing takes part (time, place, and technical resources).

9.7 Publications

**Journals**


International Conferences


Annual report 2013


Selected Local and National Conferences


Harsányi, Z. - Rozinajová, V.: Analysis of the Conference Quality Using Communities of Researchers. In: WIKT 2013. 8th Workshop on Intelligent and Knowledge ori-


Parts of Books


Book Editors


9.8 Cooperation

Cooperation in Slovakia

- Institute of Informatics, Slovak Academy of Sciences, Bratislava
- Department of Library and Information Science, Faculty of Letters, Comenius University, 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
- Asseco
- Ditec
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

- Institute of Software Technology and Interactive Systems, Faculty of Informatics, Vienna University of Technology

- Department of Software Technology and Methodology, Faculty of Informatics, Eötvös Loránd University, Budapest

- Faculty of Information Technologies, Czech University of Technology, Prague, Czech Republic

- 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
Visits of Staff Members

- L. Molnár: 2nd meeting of the open-ended tripartite working group, UNESCO, Paris, France, February 19-22, 2013
- V. Vranić: University of Novi Sad, Serbia, April 1, 2013
- M. Bieliková: Brno University of Technology, Czech Republic, May 15, 2013
- P. Návrat, V. Rozinajová: Vienna University of Technology, May 16, 2013
- P. Návrat: Vienna University of Technology, Vienna, Austria, June 13, 2013
- M. Bieliková, M. Lucká, P. Návrat, V. Vranić: Brno University of Technology, Czech Republic, June 17, 2013
• M. Barla, P. Demčák, O. Galbavý, M. Šimek, V. Štrbáková: Imagine Cup, Petersburg, Russia, July 8-13, 2013
• R. Móro: Reasoning Web Summer School, Mannheim, Germany, July 28 – August 3, 2013
• Š. Sabo: 5th World Congress on Nature and Biologically Inspired Computing, Fargo, North Dakota, USA, August 9-16, 2013
• L. Molnár: International Conference Internet and Socio-Cultural Transformations in Information Society, Yuzhno-Sakhalinsk, Russia, September 7-12, 2013
• J. Ševčech: 3rd International workshop on Advances in Semantic Information Retrieval (ASIR’13), Kraków, Poland, September 7-13, 2013
• P. Návrat: IFIP TC 12 (Artificial Intelligence) meeting, Graz, Austria, September 9, 2013
• J. Šimko: ICCCI 2013, 5th International Conference on Computational Collective Intelligence Technologies and Applications, Craiova, Romania, September 10-14, 2013
• R. Horváth, I. Srba: ECTEL 2013, 8th European Conference on Technology Enhanced Learning, Paphos, Cyprus, September 14-21, 2013
• L. Molnár: 192nd session of the Executive Board, UNESCO, Paris, France, September 23 – October 2, 2013
• P. Návrat: ECSS 2013, 9th European Computer Science Summit, Amsterdam, The Netherlands, October 7-10, 2013
• M. Bieliková, M. Barla, J. Šimko: Datakon, Ostrava, Czech Republic, October 13-15, 2013
• D. Chudá, V. Rozinajová: GRIFO 2013, University of West Bohemia, Pilsen, October 14-16, 2013
• L. Molnár, P. Návrat: Riga Global Meeting of Experts on the Ethical Aspects of Information Society, Riga, Latvia, October 15-18, 2013
• V. Rozinajová: Danube Region Business Forum, Vienna, Austria, November 14, 2013

– P. Lacko, T. Kučečka, I. Polášek, M. Ort: CINTI 2013, 14th IEEE International Symposium on Computational Intelligence and Informatics, Budapest, Hungary, November 18-21, 2013

– M. Bieliková: ACM Spy, Prague, Czech Republic, November 27-28, 2013

– M. Bieliková, D. Chudá: Vienna University of Technology, Vienna, Austria, November 28, 2013


– M. Bieliková, D. Chudá: Vienna University of Technology, Vienna, Austria, November 28, 2013

9.9 Membership in Professional Organisations and Societies

Slovak Professional Organisations and Societies

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

Mária Bieliková
– Accreditation Commission of Slovakia (member since 2012)
– Working group of the Accreditation Commission of Slovakia for Information Sciences and Technologies (chair, since 2012)
– Slovakia Chapter of the Association for Computing Machinery (member, since 2009)
– Slovak Artificial Intelligence Association (member, since 2000)
– Slovak Centre of the IET (member, since 1998)
– Slovak Society for Computer Science (member, since 1998; member of the executive committee, since 2000)

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

Michal Kompan
– Slovak Society for Computer Science (member, since 2012)

Tomáš Kramár
– Slovak Society for Computer Science (member, since 2012)

Eduard Kuric
– Slovak Society for Computer Science (member, since 2012)

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

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

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

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

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, till June)
- Slovak Artificial Intelligence Association (since 2000), member of the executive committee and vice chairman (since 2000)
- Slovak Association of Mathematicians and Physicists (member, since 1982)
- Slovak Centre of the IET (member, since 1996; chair, since 1997)
- Slovak Society for Computer Science (member, since 1992)

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

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

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

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

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

Valentino Vranič
Slovak Society for Computer Science (member, since 2001)

Dušan Zeleník
Slovak Society for Computer Science (member, since 2012)

International Professional Organisations and Societies

Mária 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)
- ACM SIGWEB, Special Interest Group on Hypertext the Web (member, since 2007)
- IFIP, International Federation for Data Processing (member of Technical Committee TC2 – Software: Theory and Practice, since 2008)
- ISWE, International Society for Web Engineering (member, since 2007)
- CaSTB, Czech and Slovak Testing Board, a member of ISTQB, International Software Testing Qualifications Board (member, since 2006)
- Datakon – Annual Conference on the Current Trends in Databases and Information Systems Series, standing Steering Committee (member, since 2003)
- SMAP – International Workshop on Semantic Media Adaptation and Personalization, standing Steering Committee (member since 2011)

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

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

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

Peter Lacko
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2008)
- IEEE Computer Intelligence Society (member, since 2008)
- ACM, Association for Computing Machinery (member, since 2010)
- ACM SIGHPC, Special Interest Group on High Performance Computing (member, since 2010)

Ľudovít Molnár
- IEEE, Institute of Electrical and Electronic Engineers (member, since 1991)
- ACM, Association for Computing Machinery (member, since 1991)

ICETA, member of honorary committee

Pavol Návrat

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

Karol Rástočný

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

Viera Rozinajová

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

Marián Šimko

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

Valentino Vranič

- IEEE, Institute of Electrical and Electronic Engineers (member, since 2011)
- IEEE Computer Society (member, since 2011)
- AOSD-Europe, European Network of Excellence on Aspect-Oriented Software Development (contact person at STU, since 2009)

Other Activities

- ACM SPY 2013 – Czech ACM Chapter & Slovak ACM Chapter Student Project of the Year competition, M. Bieliková: member of reviewers board

- ACM International Collegiate Programming Contest 2013 – Slovak University of Technology Contest – A. Považanová: event organiser
  http://www.fiit.stuba.sk/acm/
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International Journal of Intelligent Information and Database Systems – M. Bieliková: member of the editorial board

Journal of Web Engineering – M. Bieliková: member of the editorial board

Information Sciences and Technologies Bulletin of the ACM Slovakia – P. Návrat: Editor-in-Chief, M. Bieliková: Associate Editor-in-Chief

Informatica, An International Journal of Computing and Informatics – P. Návrat: member of the editorial board

Computing and Informatics – P. Návrat: associate editor

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


ACIIIDS 2013 – 5th Asian Conference on Intelligent Information and Database Systems, March 18-20, Kuala Lumpur, Malaysia – M. Bieliková: member of programme committee

ADBIS 2013 – 17th East-European Conference on Advances in Databases and Information Systems, September 1-4, 2013, Genova, Italy – M. Bieliková, P. Návrat: member of programme committee, P. Návrat: member of steering committee

ASONAM 2013 – International Conference on Advances in Social Networks Analysis and Mining, August 25-28, 2013, Niagara Falls, Ontario, Canada – M. Bieliková: member of programme committee

BCI 2013 – 6th Balkan Conference in Informatics, September 19-21, 2013, Thessaloniki, Greece – M. Bieliková, V. Vranič: member of programme committee

CASoN 2013 – 5th International Conference on Computational Aspects of Social Networks, August 12-14, 2013, Fargo, North Dakota, USA – M. Bieliková: member of programme committee

CompSysTech’13 – International Conference on Computer Systems and Technologies, 2013, Ruse, Bulgaria – P. Návrat: member of programme committee
- Datakon 2013 – Annual Conference on Current Trends in Databases and Information Systems, October 13-15, 2013, Ostrava, Czech Republic – M. Bieliková: member of steering committee, member of programme committee
- ICCCI 2013 – 5th International Conference on Collective Intelligence Technologies and Applications, September 11-13, 2013, Craiova, Romania – M. Bieliková: member of programme committee
- ICETA 2013 – 11th International Conference on Emerging e-learning Technologies and Applications, October 24-25, Starý Smokovec, High Tatras, Slovakia – M. Bieliková: member of programme committee
- ICWL 2013 – 12th International Conference on Web-based Learning, October 6-9, 2013, Kaohsiung, Taiwan – M. Bieliková: member of programme committee
- ITAT 2013 – Workshop on Information Technologies - Applications and Theory, September 11-14, 2013, Donovaly, Slovakia – M. Bieliková: member of programme committee
- MCCIS-ISA 2013 – IADIS Intelligent Systems and Agents, July 22-24, 2013, Prague, Czech Republic – M. Bieliková: member of programme committee
- NWESP 2013 – 9th International Conference on Next Generation Web Services Practices, December 7-8, 2013, Casablanca, Morocco – M. Bieliková: member of programme committee
- SERA 2013 – 11th International Conference on Software Engineering Research, Management and Applications, August 7-9, 2013, Prague, Czech Republic – M. Bieliková: member of programme committee
- SMAP 2013 – 8th International Workshop on Semantic Media Adaptation and Personalization, December 12-13, 2013, Bayonne, France – M. Bieliková: member of programme committee, member of steering committee
- SNAA 2013 – 3rd Workshop on Social Network Analysis and Applications at Int. Conf. on Advances in Social Networks and Mining (ASONAM 2013), August 25-28, 2013, Niagara Falls, Ontartio, Canada – M. Bieliková: member of programme committee

– SQAMIA 2013 – 2nd Workshop on Software Quality Analysis, Monitoring, Improvement, and Applications, September 15-17, 2013, Novi Sad, Serbia – V. Vranić: member of programme committee

– WEBIST 2013 – 9th International Conference on Web Information Systems and Technologies, May 8-10, 2013, Aachen, Germany – M. Bieliková: member of programme committee


– WWW/Internet 2013 – IADIS International Conference on WWW/Internet, October 22-25, 2013, Fort Worth, Texas, USA – M. Bieliková: member of programme committee

– Znalosti 2013 – Annual Conference on Knowledge Acquisition, Discovery, Accessing and Exploitation, October 13-15, 2013, Ostrava, Czech Republic – M. Bieliková, D. Chudá, V. Rozinajová, P. Návrat: members of programme committee, P. Návrat: member of steering committee
10 Networking Academy

E-mail: info@cisco.fiit.stuba.sk
Web: www.cisco.fiit.stuba.sk
Tel: + 421 2 602 91 689
Fax: + 421 2 654 20 587

In 2011 the former Regional Networking Academy (RCNA FIIT STU) was transformed into the Networking Academy (NA FIIT STU) and the Instructor Training Centre (ITC FIIT STU) was established. This centre consists of three multipurpose research and pedagogical laboratory facilities designated for education in the field of computer networks at two degrees of study programme Computer and Communication Systems and Networks and for education of subjects related to Computer Networking of the study programme Informatics.

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

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

Director
Pavel Čičák, Associate Professor, CCNA, CCAI-CCNA

Administrative Department
Marušincová Žuzana

Instructor Staff
Andréj Binder, CCNA, CCNP
Martin Čechvala, CCNP
Boris Dado
Pavol Helebrandt
Martin Hrubý, CCNA, CCNP
Adrián Chovan, CCNA, CCNP
Katarína Jelemenská, PhD.
Margaréta Kotočová, Associate Professor, CCNA, CCAI-CCNA
Dominik Macko
Ján Skalný, CCNA, CCAI-CCNA, CCNA Security
Viktor Šulák, CCNA

Engineering Staff
Dušan Bernát
Roman Stovíček, PhD.

10.2 Study programmes

– Study program for preparation for certification exam CCNA (200-120 CCNA)
– Study program for preparation for certification exam CCNP (642-902 ROUTE, 642-813 SWITCH, 642-832 TSHOOT)
– Study program for preparation for certification exam CCNA Wireless (640-722 IUWNE)
– Study program for preparation for certification exam CCNA Security (640-554 IINS)

10.3 Cooperation

Cooperation in Slovakia
– Regional Networking Academy, Faculty of Electrical Engineering and Information Technology, Technical University in Košice
– Regional Networking Academy, Faculty of Management Science and Informatics, University of Žilina
– CISCO Systems Slovakia, Ltd.
– GTEC, Ltd.
– SOITRON, Ltd.
– DITEC Ltd.
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– Hewlett-Packard Slovakia Ltd.
– IBM Slovakia Ltd.
– Microsoft Slovakia Ltd.
– Siemens Enterprise Communications Ltd.

**International Cooperation**

– Regional Cisco Networking Academy, Czech University of Technology, Prague, Czech Republic
– Regional Cisco Networking Academy, Faculty of Information Technologies, Technical University in Brno, Czech Republic
– Regional Cisco Networking Academy, Department of Computers, University of West Bohemia in Pilsen, Czech Republic
– Regional Cisco Networking Academy, Technical University in Ostrava, Czech Republic
– CATC Vienna, Austria
– CATC Birmingham, UK
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11th Anniversary of FIIT

Faculty of Informatics and Information Technologies was established on 1st October 2003, as the only faculty in Slovakia concerned with Informatics and Information Technologies separately. More than 1500 bachelors, more than 1200 engineers and 50 graduates finished studies at FIIT.

On 19th October 2013 we celebrated 10th Anniversary of establishment. On this occasion eminent individualities, who contributed to the establishment and development of our faculty were honoured during the hanging of a celebratory convocation of FIIT STU.

Ľudovít Molnár, the first dean of the faculty, handled a medal of Wolfgang Kempelen from the hands of a recent dean Pavel Čičák. This medal is delivered to the individualities, who contributed to development of the scientific knowledge in the field of Informatics and Information Technologies or for some extra dues related to the development of FIIT STU. The rector of STU delivered him aide-mémoire of arbor vitae as well. Aide-mémoire were delivered to another professors: Mária Bieliková, Pavol Horváth, Milan Kolesár, Vladimír Kvasnička, Ľudovít Molnár, Pavol Návrat and Jiří Pospíchal.

Aide-mémoire and letters of thanks as regards and token for some extra dues related to the development of FIIT STU were delivered to: Mária Bieliková, Norbert Frištacký (in memoriam), Ladislav Hudec, Milan Kolesár, Margaréta Kotočová, Tibor Krajčovič, Jana Minárová, Pavol Návrat, Jiří Šafářík, Martin Šperka, Vladimír Vojtek (in memoriam), Alexandra Bieleková, Alexander Haas, Mária Hricová a Valéria Šimáková.

On the occasion of the International Students’ Day, our students were awarded for the excellent study results, for the excellent bachelor and diploma works as well as for the excellent dissertation thesis.
12  Photo Gallery
13  FIIT Personnel

ABAFFY, Jaroslav, Ing.
ANDREJČÍKOVÁ, Nadežda, Ing. PhD.
ASTALOS, Róbert, Mgr.
BABINCOVÁ, Dana, PhDr.
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Annual Report 2013
Faculty of Informatics and Information Technologies
Slovak University of Technology in Bratislava
125 pages, 100 copies
Print Nakladateľstvo STU Bratislava
2014