Faculty of Informatics
and Information Technologies

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ANNUAL REPORT
2016

STU
FIIT

Faculty of Informatics and Information Technologies
Slovak University of Technology in Bratislava
Ilkovičova 2
842 16 Bratislava, Slovakia

Visit FIIT STU on the Web: www.fiit.stuba.sk

Executive Editor: Katarína Mršková
Copy Editor: Soňa Breznenová, Lucia Falbová

Text Design & Composition: Katarína Mršková

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MESSAGE FROM THE DEAN

Informatics and information technologies became during several last decades extremely important for the whole society. IT specialists are needed everywhere, in industry, in services and also in academy. Slovak industry reports critical shortness of IT specialists. More than 10 000 IT specialists are missing in Slovakia. Faculty of Informatics and Information Technologies STU is recognized as one of places where the best IT specialists rise. We are proud with of this. Even though the shortness of IT specialists originated big disprepancy also in academic staff preparing new IT specialists, we as one of the best IT faculty in Slovakia continually work on improving and so attracting the best secondary school students to become FIIT students and the best IT specialists to become FIIT teachers and researchers.

As we well remember, the year 2015 was for the FIIT STU a year when results of complex accreditation process proved that our faculty is among the best in Slovakia (marked by A category), faculty started several new industry cooperations also based on four new research laboratories established in 2015 as a part of the University Science Park, our auditoria were finally completed, and we continued in our activities towards maintaining and developing role of the faculty as one of the leading Slovak educational and research institutions in the field of informatics sciences and information and communication technologies and compete for increasingly significant international recognition.

All these activities designated a very good startpoint for the past year 2016. New auditoria have even more opened our building along its primary educational purpose also for the community meeting purposes including various workshops serving for developing new skills in changing technologies.

The most significant change was a change in the faculty organizational structure. Now we have two institutes with fields they cover explicitly named in their title, i.e. the Institute of Informatics, Information Systems and Software Engineering and the Institute of Computer Engineering and Applied Informatics. We established new Center for Industrial Research, which aims at development of research collaboration with industry also through research labs as ESET lab, Siemens lab, Molpir lab, User Experience and Interaction Lab, Embedded Systems Lab or Computer Networks Lab. We devoted enormous effort to establish new strategy for collaboration academia and industry. This endeavor resulted into a definition of opportunities for collaboration on various levels of intensity including platinum, gold and silver partnerships. Etic codex of academia industry collaboration was stated. We continued with CISCO Academy, which is now part of the Center for Further Education.

Year 2016 was year of preparing record number of research projects proposals in various grant schemas. We submitted more than 30 projects among which were 5 APVV projects, 6 VEGA and 4 KEGA projects, 17 EDRR projects (all national grant schemes), 5 projects in H2020 schemas and 2 Eurostars projects. Even though we were not successful in H2020, it is important that ranging of the projects get higher, so I believe we will be successful while continuing this effort.

Current situation at Slovak universities is influenced by a decreasing number of students in basic and secondary schools. Declining demographic curve delivers a lower number of secondary school students, who continue their studies at universities. Almost all schools in Slovakia recorded the loss of perspective university students. So we are glad that our faculty still keeps the number of students interested in the studies. In

spite of this fact, for academic year 2016/17 we admitted 10% less applicants, mainly due to our capacity as our priority is to keep and increase quality of the study. Moreover, we devoted a lot of effort to help applicants to makeright decision regarding selected study programme – 3 years or 4 years according their level of knowledge (particularly in math) as we try constantly decrease students failure rate in bachelor study.

To the next period we expect several challenges related also to the number of students. We should concentrate on gaining more well motivated applicants for study, raise interest of applicants in computer engineering (Internet technologies study programme), keep our students to study challenging, as well as work hard for acquiring research grants, especially in frame of Horizon 2020 programme, all with aim to continue providing the quality education and research in informatics and information technologies, to generate new knowledge and educate professionals capable to take leading industry and research positions.

Prof. Mária Bieliková
Dean of the FIIT STU

FACULTY

I. FACULTY MANAGEMENT BODIES

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

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

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

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.

I.1 Members of the Academic Senate

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

Chair
Peter Lacko, PhD.

Chairman of the employee section
Peter Trúchly, PhD.

Chairman of the student section
Lukáš Csóka

Secretary of the Academic Senate
Viera Danišová

Members
Vanda Benešová, PhD.
Peter Kapec, PhD.
Alena Kovárová, PhD.
Peter Lacko, PhD.
Jakub Šimko, PhD.
Peter Trúchly, PhD.
Jozef Tvarožek, PhD.
Valentino Vranić, Assoc. Professor

Members of the student section
Lukáš Csóka
Marek Galinski
Barbora Pavlíková
Juraj Petrík

Activities of the Academic Senate

The Academic Senate of the Faculty of Informatics and Information Technologies in 2016

- 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,
- approved the annual report on activities and annual financial report of the Faculty,
- submitted the annual report on its activity to the academic community of the Faculty,
- approved new members of the Disciplinary Commission of the Faculty,
- elected the chairman of the student section,
- elected the chairman of the employee section and chair of the Academic Senate

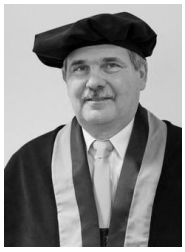
Dean

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 20, 2015 and appointed by the Rector to his office on December 2, 2015 for a four year office term. Vice-Deans were approved by the Academic Senate in December 2015.


Mária Bieliková, Professor


Daniela Chudá, Assoc. Professor


Peter Pištek, PhD.


Pavol Návrat, Professor


Viera Rozinajová, Assoc. Professor


Marián Šimko, PhD.

Dean and Vice-Deans

Dean
Mária Bieliková, Professor

Vice-Deans
Human Resources and International Cooperation
Pavol Návrat, Professor

Research, Projects and Cooperation with Industry
Viera Rozinajová, Assoc. Professor

Doctoral Studies and Coordination of Mobilities
Daniela Chudá, Assoc. Professor

Bachelor Studies and Study Advertising
Peter Pištek, PhD.

Master Studies and Collaboration with Alumni
Marián Šimko, PhD.

Advisors
Faculty Development and Information Technologies
Tibor Krajčovič, Assoc. Professor

Cooperation with Industry
Ivan Kotuliak, Assoc. Professor

Scientific Board of the Faculty

Members of the Scientific Board

Chair of the Scientific Board
Mária Bieliková, Professor

Deputy chair of the Scientific Board
Pavol Návrat, Professor

Members from the academic community of the Slovak University of Technology
Mária Bieliková, Professor
Pavel Čičák, Professor
Ladislav Hudec, Assoc. Professor
Daniela Chudá, Assoc. Professor
Gabriel Juhás, Professor
Ivan Kotuliak, Assoc. Professor
Tibor Krajčovič, Assoc. Professor
Mária Lucká, Assoc. Professor
Radko Mesiar, Professor
Oliver Moravčík, Professor
Pavol Návrat, Professor
Miloš Oravec, Professor
Gregor Rozinaj, Assoc. Professor
Viera Rozinajová, Assoc. Professor
Valentino Vranić, Assoc. Professor

External members
Ladislav Hluchý, Assoc. Professor
- *Institute of Inf., Slovak Academy of Sciences*

Emil Kršák, Assoc. Professor
- *University of Žilina*

Daniel Olejár, Assoc. Professor
- *Comenius University in Bratislava*

Jiří Šafařík, Professor
- *University of West Bohemia in Pilsen*

Pavel Tvrdík, Professor
- *Czech Technical University in Prague*

Liberios Vokorokos, Professor
- *Technical University in Košice*

Pavel Zemčík, Professor
- *Brno University of Technology*

Activities of the Scientific Board

The Scientific Board of the Faculty of Informatics and Information Technologies in 2016:

- 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 2016/17 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.

Disciplinary Commission 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.

Chair
Ladislav Hudec, Assoc. Professor

Members
Anna Bou Ezzeddine, PhD.
Ján Hudec, PhD.
Ivan Kapustík

Members - students
Jozef Filipek – doctoral degree programme
Ladislav Gallay – bachelor degree programme
Martin Janík – master degree programme
Jana Podlucká – master degree programme

II. INSTITUTES

Institute of Computer Engineering and Applied Informatics

Director of the Institute
Katarína Jelemenská, PhD.
e-mail: katarina.jelemenska@stuba.sk

Deputy Director:
Ivan Kotuliak, Assoc. Professor
e-mail: ivan.kotuliak@stuba.sk

Ladislav Hudec, Assoc. Professor
e-mail: ladislav.hudec@stuba.sk

Secretary of the Institute:
Tatiana Šípková
Tel: +421 2 210 22 506

The Institute of Computer Engineering and Applied Informatics contributes through its research to development of knowledge in science and technologies in the areas related to computer engineering and applied informatics. It offers undergraduate and graduate study programmes covering a broad range of courses that 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, digitaland embedded systems design, cyber sequrity, computer graphics and vision.

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

- Information Security (bachelor degree),
- Internet Technologies (bachelor degree),
- Internet Technologies (master degree).

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

- Communication networks,
- Information and Cyber Security,
- Computer Vision and Computer Graphics, and
- Embedded Systems.

Institute of Informatics, Information Systems and Software Engineering

Director of the Institute
Pavol Návrat, Professor
e-mail: pavol.navrat@stuba.sk

Deputy Director:
Peter Lacko, PhD.
e-mail: peter.lacko@stuba.sk

Alena Martonová (Kovárová), PhD.
e-mail: alena.martonova@stuba.sk

Secretary of the Institute:
Eva Džupinová, PhD.
E-mail: eva.dzupinova@stuba.sk

Assistant of the Director
Zuzana Macková
Tel: +421-2-21 022 306

The main mission of the Institute of Informatics, Information Systems and Software Engineering is to contribute to the mission of Slovak University of Technology and to the mission of the Faculty of Informatics and In-formation 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),
- Intelligent Information Systems (doctoral degree).

The Institute fulfills 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. Currently, main areas of research are

- Data analysis. The area includes Data Streams and Batch Data, Data Clustering, Anomaly Detection, Prediction, Big Data, Specific kinds of data, e.g. those generated in bioinformatics research
- Information Processing: Intelligent methods. The area includes Recommender Systems, User Modelling and Personalization, User Experience and Interaction, Human Computing, Information Retrieval and Exploratory Search, Natural Language Processing
- Information Processing: Spreading and privacy. The area includes Web of People, Human Web Interaction, Opinion Sharing, Information Reliability and Trustworthiness, User Identification and Privacy, Behavioral Biometric, Visualization
- Knowledge acquisition and discovery. The area includes Data Mining, Machine Learning, Neural Networks, Nature and Biology Inspired Computing
- Representing and reusing software knowledge. The area includes Interrelating and Visualizing Heterogeneous Software Knowledge, Multidimensional Software Modeling, Agile and Lean People, Organization, Software Processes, Social Connotations, Software Product Lines and Variability, Software Patterns
- Software Comprehension and Quality. The area includes Intent Comprehensibility, Use Case Driven Modularization, Advanced/Aspect-Oriented Modularization, Software Quality, Refactoring, Automated Testing and Continuous Revisions, Software Modeling Beyond Software Development, Education for Software Development and Supported by Software Development, Visualization of Software Properties

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, the Institute is part of the international consortium of research institutions devoted to Web Intelligence. The Institute represents Slovakia in the consortium and contributes to promoting research in Web In-

telligence worldwide. In 2009 the Institute has become partner of European Network of Excellence on Aspect-Oriented Software Development, AOSD-Europe, which integrates and co-ordinates 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.

III. CENTRES

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,
- offers research consultation service to faculty, staff, and students.

The library catalogue contains more than 10 000 items, which are freely available in the Library. The catalogue can be found on kis.cvt.stuba.sk/arl-stu/. The Library purchased and acquired thanks to donation 20 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/IET Electronic Library, Springer Link, Science Direct, Scopus, ISI Web of Knowledge, Wiley Online Library which are the part of a national project NISPEZ.

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

Computing and Communication Services

The Centre for Computing and Communication Services at the Faculty of Informatics and Infor-mation Technologies provides the following ser-vices 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 information systems,
- new servers, computers, printers, scanners etc. installation,
- operating systems and specialized software installation,
- upgrading and maintenance of computers,
- user support,
- 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 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.

The faculty is connected into the Inter-net through the SANET (Slovak Academic Net-work) with 10 Gbps transfer speed. The faculty computer network is based on a structured cable system and it is using 1 Gbps transfer speed.

The current computer facili-ties 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. In 2015 was put into operation the cloud computing system that consists 766 processor cores, 11 TB operation memory and 115 TB disk array.

All students of the FIIT have access to the computers in the education laboratories. In addition, students have access to selected education and research laboratories outside the educational process in order to solve individual or team projects.

All students of the FIIT have access to the Internet by the wire or wireless connections. All areas of the faculty are covered by the WiFi signal. On the floor 1 are freely accessible computer kiosks with Internet connection.

Center for Further Education

Center for Further Education was established at the Faculty of Informatics and Information Technologies of Slovak University of Technology in Bratislava in 2016. It aims to provide students of not only Slovak University of Technology but other universities and faculties by other additional education and trainings to obtain certification from various industrial areas of expertise. It is ready to establish the Academies of worldwide companies. There were established independent financially self-supporting part of FITT to provide education. The first and essential part of the Center for Further Education is Networking Academy.e-mail: info@cisco.fiit.stuba.sk

Networking Academy

e-mail: info@cisco.fiit.stuba.sk
Web: www.cisco.fiit.stuba.sk
Tel: +421 2 210 22 224
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 Internet Technologies and for education of courses related to Computer Networking of the study programs Informatics and Information Security.

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 Internet Technologies. Within the education process ITC FIIT STU prepares instructor trainings and prepares students for CCNA and CCNP certification exams.

Staff

- **Director:** Pavel Čičák, Professor, CCNA
- **Administrative Department:**
  Marušincová Zuzana
- **Instructor Staff**
  Andrej Binder, CCNA, CCNP, ITQ
  Martin Čechvala, CCNP, CCIE
  Pavol Helebrandt, PhD., CCNA
  Martin Hrubý, PhD., CCNA, CCNP, CCIE, CCIP
  Katarína Jelemenská, PhD.
  Ján Lúčanský, CCNA
  Dominik Macko, PhD., CCNA, ITQ
  Ján Skalný, CCNA, CCNA Security, CCNP, ITQ
  Viktor Šulák, CCNA
- **Engineering Staff**
  Dušan Bernát
  Roman Stovíček, PhD.

Study programmes

- Study program for preparation for certification exam CCNA (200-125 CCNA)

- Study program for preparation for certification exam CCNP (300-101 ROUTE, 300-115 SWITCH, 300-135 TSHOOT)
- Study program for preparation for certification exam CCNA Security (210-260 IINS)

Cooperation

- Academy Support Centre, Faculty of Electrical Engineering and Information Technology, Technical University in Košice
- Instructor Training Centre, Faculty of Management Science and Informatics, University of Žilina
- DATALAN, Ltd.
- CISCO Systems Slovakia, Ltd.
- SOITRON, Ltd.
- DITEC, Ltd.
- Tempest, Ltd.
- Hewlett-Packard Slovakia, Ltd.
- IBM Slovakia, Ltd.
- Microsoft Slovakia, Ltd.
- Cisco Networking Academy, Czech University of Technology, Prague, Czech Republic
- Cisco Networking Academy, Faculty of Information Technologies, Technical University in Brno, Czech Republic

Center of Industrial Research

Center of Industrial Research is a newly created unit, which coordinates all activities associated with industrial cooperation. The main focus is on the research and innovation projects, which are solved jointly with companies. Other forms of collaboration have been also evolved – recently we have prepared the process of partnership establishment. The center coordinates the sponsorship of faculty events (student research conference, dean´s award, programming competitions, etc.) and thus ensures their good progress. The activities of the center include also organizing of conferences as well as interesting lectures about new IT trends for the students.

STUDY

I. UNDERGRADUATE STUDY (Bc)

In the academic year 2015/16 two accredited study programmes with regular length three or four years were offered:

Informatics
The study programme leads to a complete undergraduate level university education in Informatics/Computer Science in an engineering profession oriented chiefly to software systems and processes. The graduate will acquire deep knowledge from theoretical foundations of Computer Science, data structures, programming languages, analysis and design of software systems and their management, and architecture of computer systems and networks. The graduate is able to analyse, design, implement and verify software systems, to work effectively as a member of a development team, to work with tools used in developing and documenting of software. The graduate is prepared for a possible postgraduate study or for a direct entry into the labour market. The graduate is able to assume responsibility as a software system designer, programmer or maintenance specialist of information technologies systems. The graduate is aware of the social, legal and economical context of the profession.

Internet Technologies
The graduate masters various skills in the field of Computer Engineerig. During the study he gains theoretical knowledge, practical abilities and skills in the field of Internet Technologies, and much additional knowledge, capabilities and skills with the similar branches. The graduate is able to work as expert in the field of computer systems and networks and its components, expert on deployment and installation of modern information technologies, system expert creating configuration, realization of installation of computers and computer networks, the member of team performing support activities for complex design and projecting of control and information systems and its implementation environment, manager, consultant, dealer or distributor in the information technologies market network, educational position in non university institutions aimed on informatics. The graduate is also prepared for possible second level university study.

In June 2016 the students defended their bachelor theses and passed the final examination.

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

- *Rector's Award:* Martin Ilavský
- *"Magna cum laude":* Ondrej Čičkán, Veronika Gondová, Martin Ilavský, Andrej Švec, Jaroslav Tóth, Matúš Salát
- *"Cum laude":* Martin Olejár, Zuzana Bobotová, Norbert Danišík, Rastislav Krchňavský, Mária Dragúňová, Tomáš Juhaniak, Tomáš Liščák, Matej Víťaz, Jakub Senko
- *Dean's Award for Excellent Bachelor Thesis:* Veronika Gondová, Jaroslav Tóth, Matúš Salát
- *Dean's Commendatory Letter for Bachelor Thesis:* Ondrej Čičkán, Zuzana Bobotová, Mária Dragúňová, Sandra Kostova, Martin Šrank, Richard Kakaš, Dávid Buhaj

II. MASTER STUDY (Ing)

In 2016, FIIT STU offered two accredited study programmes with regular length two or three years[1]:

Software Engineering (SI)
Study programme leads to a complete graduate level university education in the area of Computing and Information Technologies in an engineering profession dealing with analysing, designing, developing and maintaining large software systems. The graduate will acquire deep knowledge enabling to manage teams, to lead independently large projects and assume responsibility for complex solutions. The graduate is able to devise and present own solutions, develop, modify or implement contemporary information technologies. The graduate will work efficiently individually and also as a member or a leader of a software team. The graduate is able to analyse critically and apply a whole range of concepts, principles and practices of software engineering. The graduate is aware of the social,

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

moral, legal and economical context of the profession. The graduate is also prepared for a possible doctoral study.

Information Systems (IS)
Study programme leads to a complete graduate level university education in the area of Computing and Information Technologies in an engineering profession dealing with analysing, designing, developing and maintaining large information systems. The graduate is able to devise and present own solutions in research, development and construction of information systems. The graduate is able apply creatively knowledge on technological, software and business processes to enhance ways to achieve organisation's goals and improve its productivity. The graduate is able to work individually and also as a member or a leader of a software or information system team. The graduate has deep knowledge enabling to manage teams, to lead independently large projects and assume responsibility for complex solutions. The graduate is also prepared for a possible doctoral study.

In these study programmes the students graduated in June 2016.

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

- *Rector's Award:* Peter Gašpar
- *"Magna cum laude":* Peter Gašpar, Juraj Šimek, Martin Tamajka, Lukáš Markovič
- *"Cum laude":* Miroslav Šafárik, Tomáš Morvay, Roman Cekovský, Veronika Olešová, Ján Švarc, Filip Mazán, Matúš Pikuliak, Martin Šustek
- *Dean´s Award for Excellent Master Thesis:* Juraj Šimek, Martin Tamajka, Lukáš Markovič
- *Dean's Commendatory Letter for Master Thesis:* Adam Lieskovský, Jaroslav Liebl, Filip Šoltés, Michal Valiček

III. 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 2 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 – 10 this year (most doctoral students who finished their study this year started doctoral study more than three years ago).

In 2016 two accredited study programmes were offered:

Applied Informatics
Study programme Applied Informatics in the third (doctoral) level of university education creates for students a space to build up and to profound knowledge and abilities of methods and tools of informatics and their applications in a broad spectrum of areas. It is built up on study programmes where students get basic methods and tools of informatics from specification of problems, through design and implementation of their algorithmic and non algorithmic solutions, analysis of solution properties, up to properties of program and technical tools of informatics. The methods of scientific work, current state of research in a particular area, looking for open problems and research work is a part of the study as well. The graduate is able to solve scientific problems in a broad scale of applied informatics areas independently, utilize advance methods and tools of design and development of information technologies applications creatively. The graduate can enter trade market directly as well.

Inteligent Information Systems
Doctoral studies in Inteligent Information Systems lead towards highest university education in the area of Computing and Information Technologies particularly in the field of Inteligent Information Systems, dealing with analysing, designing, developing and maintaining large software systems. The study programme Inteligent Information Systems is a continuation of the programme Software and Information Systems which has been offered before. Students can orient in their research towards any of open research problems related to the concept of software system in general, its properties and methodology of its development. In particular, research concentrates on such software systems that embody some information system, whereas the information systems themselves are usually designed for an environment of heterogeneous information sources, including internet. The

graduate is able to solve independently difficult scientific problems of its field, having acquired its theoretical principles and methodology.

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

Numbers of the full-time bachelor programme students

Academic year	1st year	2nd year	3rd year	4th year[2]
2006/2007	332 (221/111)	269 (192/77)	246 (163/83)	19
2007/2008	290 (195/95)	272 (188/84)	266 (186/80)	1
2008/2009	265 (181/84)	229 (159/70)	308 (215/93)	-
2009/2010	291 (189/102)	169 (124/45)	244 (170/74)	-
2010/2011	253 (172/81)	196 (143/53)	190 (141/49)	-
2011/2012	444 (291/153)	173 (123/50)	198 (142/56)	-
2012/2013	492 (305+52+110+25)	214 (161/53)	156 (109/47)	-
2013/2014	501 (258+67+127+49)	262 (177+55+18+12)	199 (142+57)	-
2014/2015	436 (241+124+71+0)	321 (192+70+39+20)	254 (174+14+54+12)	-
2015/2016	416 (261+85+43+27)	274 (176+59+39+0)	288 (183+50+42+13)	16(5+11)
2016/2017	355 (202+66+33+18+21+15)	274 (176+59+39+0)	288 (183+50+42+13)	16(5+11)

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

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

	all	SI	CSN or CCSN	IS
2006/2007	290	124	106	60
2007/2008	326	141	113	72
2008/2009	362	154	110	98
2009/2010	394	160	128	106
2010/2011	395	157	126	112
2011/2012	355	155	100	100
2012/2013	149	74+2	42+1	29+1
2013/2014	287	115	74	98
2014/2015	298	74+1+2	73+1	143+4
2015/2016	327	117+1	51+1	156+1
2016/2017	313	145+4	-	161+2

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

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Num of students	24	25	30	34	43	48	47	47	61	53	68

[2] Only the students in study programme Informatics.

IV. STUDENT CONFERENCES AND COMPETITIONS

The Faculty organised and supported in 2016 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.

IIT.SRC 2016

- Informatics and Information Technologies Student Research Conference (to be mentioned in the following section in more detail)

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

- Martin Tamajka – 3rd place with diploma project Segmentation of Anathomical Organis in Medical Data. (supervised by V. Benešová)

TP Cup

- Best Team of the year 2016 winners: Róbert Cuprík, Peter Dubec, Patrik Gajdošík, Roman Roba, Monika Sanyová, Jakub Vrba, Tomáš Žigo: sUXess - Online Usability Testing Tool, supervisor: R. Móro

Assoc. Prof. Daniela Chudá
Vice-Dean for doctoral study and mobility coordination

Dr. Peter Pištek
Vice-Dean for bachelor study and study promotion

Assoc. Prof. Marián Šimko
Vice-Dean for magister study and alumni cooperation

RESEARCH

I. 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:

- Data Analysis,
- Information Processing: Intelligent Methods,
- Information Processing: Spreading and Privacy,
- Knowledge Acquisition and Discovery,
- Representing and Reusing Software Knowledge,
- Software Comprehension and Quality,
- Communication Networks,
- Information and Cyber Security,
- Embedded Systems,
- Computer Vision and Computer Graphics.

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 2016 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.

DATA ANALYSIS

The main directions of our research include predictive modeling, cluster analysis, anomaly detection and resembling tasks, whereby we focus on intelligent adaptive approach. The methods range from statistics to machine learning methods, for some kind of problems we have also used biologically inspired computing. We work with static as well as with stream data, in both cases our datasets meet the requirements of Big Data. Currently we perform our experiments in the domain of energy and on datasets generated in bioinformatics research.

Researchers

Rozinajová, Viera - covers by her research interests data science in broader sense, in particular she concentrates on advanced methods of predictive modeling, cluster analysis, anomaly detection and optimization.

Lucká, Mária - focuses in her research on efficient algorithms and processing of big data sets, with applications in bioinformatics and energy data. Intelligent data analysis methods include clustering of big data, parallel methods and high performance computing.

Bou Ezzeddine, Anna - explores bio-inspired optimization methods, intelligent data processing techniques with a focus on stream data, self-adapting methods.

Bieliková, Mária - aims her research to human interactions on the Web with special emphasis on user modelling and personalization, context awareness, collaborations and usability. This includes research of methods for automated analysis and modelling user feedback, and its evaluation by (multi/group) user studies employing eye trackers.

Grmanová, Gabriela - her research is oriented on the field of Data mining. She explores mainly advanced methods of clustering and predictive modeling.

Lacko, Peter - his research interests include artificial intelligence, neural networks and parallel and distributed computing.

Ševcech, Jakub - focuses in his research on time series data analysis, specifically on representation and feature extraction from time series data for various tasks of data analysis such as classification, anomaly detection or forecasting.

Srba, Ivan - covers by his research interests the area of web-based systems which utilize concepts of collaboration and collective intelligence, in particular he focuses on knowledge sharing (mainly in

Community Question Answering systems) and computer-supported collaborative learning.

Selected recent publications

[1] BLŠTÁK, Miroslav - ROZINAJOVÁ, Viera. Automatic question generation based on analysis of sentence structure. In *Text, speech and dialogue*. 19th international conference, TSD 2016 Brno, Czech Republic, Springer, 2016, pp. 223-230.

[2] BOU EZZEDDINE, Anna - LÓDERER, Marek - LAURINEC, Peter - VRABLECOVÁ, Petra - ROZINAJOVÁ, Viera - LUCKÁ, Mária - LACKO, Peter - GRMANOVÁ, Gabriela. Using biologically inspired computing to effectively improve prediction models. In *International Journal of Hybrid Intelligent Systems*. Vol. 13, no. 2 (2016), pp. 99-112. ISSN 1448-5869.

[3] FARKAŠ, Tomáš - KUBÁN, Peter - LUCKÁ, Mária. Effective Parallel Multicore-Optimized K-mers Counting Algorithm. In *SOFSEM 2016*: Theory and Practice of Computer Science, Lecture Notes in Computer Science, Vol. 9587, Springer, 2016, pp. 469-477.

[4] GRMANOVÁ, Gabriela - LAURINEC, Peter - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna - LUCKÁ, Mária - LACKO, Peter - VRABLECOVÁ, Petra - NÁVRAT, Pavol. Incremental Ensemble Learning for Electricity Load Forecasting. In *Acta Polytechnica Hungarica.* Vol. 13, No. 2 (2016), pp. 97-117. ISSN 1785-8860.

[5] GRMANOVÁ, Gabriela - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna - LUCKÁ, Mária - LACKO, Peter - LÓDERER, Marek - VRABLECOVÁ, Petra - LAURINEC, Peter. Application of biologically inspired methods to improve adaptive ensemble learning. In *NaBIC 2015*. Proc.s of the 7th World congress on nature and biologically inspired computing (NaBIC 2015), 2016, pp. 235-246.

[6] LAURINEC, Peter - LÓDERER, Marek - VRABLECOVÁ, Petra - LUCKÁ, Mária - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna. Adaptive Time Series Forecasting of Energy Consumption using Optimized Cluster Analysis. In *Proceedings 16th IEEE International Conference on Data Mining Workshops (ICDMW 2016)*, IEEE, 2016, pp. 398-405.

[7] LAURINEC, Peter - LUCKÁ, Mária. Comparison of Representations of Time Series for Clustering Smart Meter Data. In *Proceedings of the World Congress on Engineering and Computer Science 2016 Vol. I. WCECS 2016*, Hong Kong : IAENG, 2016, pp. 458-463.

[8] NEMEC, Radoslav - ROZINAJOVÁ, Viera - LÓDERER, Marek. Prediction of Power Load Demand Using Modified Dynamic Weighted Majority Method. In *Advances in system science*: proc. of the International Conference on Systems Science 2016 (ICSS 2016), Springer, 2016, pp. 36-49.

[9] VRABLECOVÁ, Petra - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna. Incremental Time Series Prediction Using Error-Driven Informed Adaptation. In *Proceedings 16th IEEE International Conference on Data Mining Workshops (ICDMW 2016)*, IEEE, 2016, pp. 414-421.

[10] SRBA, Ivan - BIELIKOVÁ, Mária. Why is Stack Overflow Failing? Preserving Sustainability in Community Question Answering. In *IEEE Software*. Vol. 33, no. 4 (2016), s. 80-89.

Industry collaboration

- ATOS Research and Innovation, Madrid, Spain (Tomas Pariente Lobo)
- Predictive modeling of power load demands using real datasets from Slovakia (common project with ATOS IT solutions and services, Ltd., Sfera, Inc.)

Academy collaboration

- Faculty of Electrical Engineering and Informatics, Technical University Košice (prof. Ján Paralič)
- Fraunhofer Institute for Industrial Mathematics, Kaiserslautern, Germany (Dr. Valeria Bartsch)
- University of Minho, Portugal (Prof. Isabel Ramos)
- University of J.J. Strossmayer, Osijek, Croatia (Prof. dr.sc. Snjezana Rimac-Drlje)
- City University Dublin (Dr. Gabriel-Miro Muntean)
- National Technical University of Ukraine, Applied Mathematics (Assoc. Prof. Yevgeniya Sulema)

INFORMATION PROCESSING: INTELLIGENT METHODS

Researchers cover topics of new trends in design, development and usage of adaptive social web-based systems including analysis of user logs and user's behaviour prediction. We explore novel recommenders design and application. Hand by hand with the user generated content increase, we explore the sentiment analysis and various methods for discriminative keyword extraction with focus

on neural networks. We research novel methods for information extraction by incorporating natural language processing. The UX in one of the essential sources of information about user's behavior, thus studies examining the user's behaviour and experience during the use of information systems, web/mobile applications and multimedia support our research outputs.

Researchers

Bieliková, Mária - aims her research to human interactions on the Web with special emphasis on user modelling and personalization, context awareness, collaborations and usability. This includes research of methods for automated analysis and modelling user feedback, and its evaluation by (multi/group) user studies employing eye trackers.

Chudá, Daniela - covers by her research interests the area of information systems, quality of information systems, security and privacy, user modelling, in particular she focuses on similarity of texts and behavioral biometric authentication.

Kompan, Michal - aims his research at problems in the recommender systems and users' behavior prediction.

Barla, Michal - covers by his research interests an area of clickstream data analysis for user modeling with a special focus on unsupervised methods, including neural networks.

Kuric, Eduard - dedicates his research to user modelling, user experience and web personalization. In particular, he focuses on user characteristics acquisition based on (semi)automatic analysis of user's feedback, research of methods for automatic identification of usability problems, designing qualitative/quantitative usability studies, online/remote usability testing, and designing user interfaces.

Tvarožek, Jozef - is particularly interested in applying intelligent approaches and creating online learning experiences for students mainly via active problem solving and collaborative approaches. Additionally, he is using eye tracking for research in program comprehension.

Šimko, Jakub - dedicates his research to the intersection of fields of human computation, eye-tracking and user modeling. In particular, he is interested in automatic assessment of quality of user (study participant) work using eye trackers. He is also interested in user experience studies conduction and support.

Šimko, Marián - focuses on information extraction and knowledge discovery from text-based content, by employing ontology engineering and natural language processing. His interests include processing of resources in Slovak language.

Srba, Ivan - covers by his research interests the area of web-based systems which utilize concepts of collaboration and collective intelligence, in particular he focuses on knowledge sharing (mainly in Community Question Answering systems) and computer-supported collaborative learning.

Selected recent publications

[1] GALLAY, Ladislav - ŠIMKO, Marián. Utilizing Vector Models for Automatic Text Lemmatization. In Lecture Notes for Computer Science, Vol. 9587, *SOFSEM 2016:* Theory and Practice of Computer Science, Springer, 2016, pp. 532-543.

[2] GAŠPAR, Peter - ŠIMKO, Jakub. Linking multimedia to microblogs for metadata extraction. In *ENIC 2016*. Third European Network Intelligence Conference, IEEE, 2016, pp. 90-97.

[3] GONDOVÁ, Veronika - LABAJ, Martin - BIELIKOVÁ, Mária. Personalized Rooms Based Recommendation as a Mean for Increasing Students' Activity. In *Adaptive and Adaptable Learning*. ECTEL 2016, Lecture Notes in Computer Science, Vol. 9891, Springer, 2016, pp. 591-594.

[4] JUHANIAK, Tomáš - HLAVÁČ, Patrik - MÓRO, Róbert - ŠIMKO, Jakub - BIELIKOVÁ, Mária. Pupillary Response: Removing Screen Luminosity Effects for Clearer Implicit Feedback. In *UMAP 2016* - Extended Proceedings. 24th ACM Conference on User Modeling, Adaptation and Personalisation (UMAP 2016), CEUR-WS, 2016, [2] p.

[5] KAŠŠÁK, Ondrej - KOMPAN, Michal - BIELIKOVÁ, Mária. Personalized hybrid recommendation for group of users: Top-N multimedia recommender. In *Information Processing and management*. Vol. 52, Iss. 3 (2016), pp. 459-477. ISSN 0306-4573.

[6] KAŠŠÁK, Ondrej - KOMPAN, Michal - BIELIKOVÁ, Mária. Short-term User Behaviour Changes Modelling. In *New Trends in Databases and Information Systems*: Short Papers and Workshops, BigDap, DCSA, Springer, 2016, pp. 223-228.

[7] KAŠŠÁK, Ondrej - KOMPAN, Michal - BIELIKOVÁ, Mária. Student behavior in a web-based educational system: Exit intent prediction. In *Engineering Applications of Artificial Intelligence.* Vol. 51, no. May (2016), pp. 136-149. ISSN 0952-1976.

[8] KOMPAN, Michal - BIELIKOVÁ, Mária. Enhancing existing e-learning systems by single and group recommendations. In *International Journal of Continuing Engineering Education and Life-Long*

Learning. Vol. 26, no. 4 (2016), pp. 348-404. ISSN 1560-4624.

[9] KOŠÚT, Matúš - ŠIMKO, Marián. Improving Keyword Extraction from Movie Subtitles by Utilizing Temporal Properties. In Lecture Notes for Computer Science, Vol. 9587, *SOFSEM 2016:* Theory and Practice of Computer Science Springer, 2016, pp. 544-555.

[10] KRÁTKY, Peter - CHUDÁ, Daniela. Estimating gender and age of web page visitors from the way they use their mouse. In *Proceedings of the 25th International Conference Companion on World Wide Web. WWW'16 Comapnion*. ACM, 2016, pp. 61-62.

[11] KRÁTKY, Peter - TVAROŽEK, Jozef - CHUDÁ, Daniela. Big Five Personality in Online Learning and Games: Analysis of Student Activity. In *International Journal of Human Capital and Information Technology Professionals*. Vol. 7, iss. 3 (2016), pp. 33-46. ISSN 1947-3478.

[12] KURIC, Eduard. Automatic Estimation of Software Developer's Expertise. In *Information Sciences and Technologies.* Bulletin of the ACM Slovakia. Vol. 8, no. 1 (2016), pp. 1-5. ISSN 1338-1237.

[13] MATLOVIČ, Tomáš - GAŠPAR, Peter - MÓRO, Róbert - ŠIMKO, Jakub - BIELIKOVÁ, Mária. Emotions Detection Using Facial Expressions Recognition and EEG. In *SMAP 2016*. Proceedings of the 11th International Workshop on Semantic and Social Media Adaptation and Personalization, pp. 18-23.

[14] MÓRO, Róbert - VANGEL, Máté - BIELIKOVÁ, Mária. Identification of Navigation Lead Candidates Using Citation and Co-Citation Analysis. In Lecture Notes for Computer Science, Vol. 9587, *SOFSEM 2016*: Theory and Practice of Computer Science Springer, 2016, pp. 556-568.

[15] RYBÁR, Metod - BIELIKOVÁ, Mária. Automated Detection of User Deception in On-line Questionnaires with Focus on Eye Tracking Use. In *SMAP 2016.* Proceedings of the 11th International Workshop on Semantic and Social Media Adaptation and Personalization, pp. 24-28.

[16] SRBA, Ivan - BIELIKOVÁ, Mária. A Comprehensive Survey and Classification of Approaches for Community Question Answering. In *ACM Transactions on the Web*. Vol. 10, iss. 3 (2016), Article 18 [18:1-18-63]. ISSN 1559-1131

[17] SRBA, Ivan - BIELIKOVÁ, Mária. Design of CQA systems for flexible and scalable deployment and evaluation. In Lecture Notes in Computer Science, Vol. 9671, *Web engineering: Proceedings*. 16th international conference, ICWE 2016, Springer, 2016, pp. 439-447.

[18] TVAROŽEK, Jozef - JURKOVIČ, Peter. Student-Generated Content Improves Online Learning of Programming. In *International Journal of Human Capital and Information Technology Professionals.* Vol. 7, iss. 4 (2016), pp. 79-92. ISSN 1947-3478.

[19] TVAROŽEK, Jozef - KONÔPKA, Martin - NÁVRAT, Pavol - BIELIKOVÁ, Mária. Studying various source code comprehension strategies in programming education. In *Eye movements in programming: models to data*: proceedings of the third international workshop. University of Eastern Finland, Joensuu. 2016, pp. 25-26.

[20] VIRIK, Martin - ŠIMKO, Marián - BIELIKOVÁ, Mária. Blog style classification: refining affective blogs. In *Computing and Informatics*. Vol. 35, no. 5 (2016), pp. 1027-1049. ISSN 1335-9150.

[21] VRABLECOVÁ, Petra - ŠIMKO, Marián. Supporting Semantic Annotation of Educational Content by Automatic Extraction of Hierarchical Domain Relationships. In *IEEE transactions on learning technologies.* Vol. 9, iss. 3 (2016), pp. 285 - 298. ISSN 1939-1382.

Industry collaboration

- Personalised recommendation for a discount portal
- TV User behavior analysis for a telecom company
- Platform for TV program recommendation (in collaboration with a media agency and a telecom company)
- News recommendation for major Slovak newspaper (scalability for the real-time, heavily dynamic environment)
- Studies examining user behaviour and user experience during the use of information systems, web/mobile applications and multimedia for several Slovak banks and an e-shop
- Sentiment analysis on a social network in cooperation with a communication and PR agency serving as their customers' business analysis tool (comprehensive language models employing specifics of social content were trained)

Academy collaboration

- Askalot - the first educational and organizational CQA system; deployed in collaboration

with Harvard University as a part of MOOC system edX (a course with more than 5000 students); used on the additional three universities Europe-wide (Slovak University of Technology in Bratislava; University of Lugano, Switzerland; University of Novi Sad, Serbia)
- Adaptive and collaborative learning platform ALEF (1500 students as users to date, Special prize of the Minister of Education, Science, Research and Sport of the Slovak Republic)
- Faculty of Arts, Comenius University (prof. Jela Steinerová, prof. Jaroslav Šúšol, assoc. prof. Milica Schraggeová, assoc. prof. Anton Heretik, Jr.)
- Faculty of Electrical Engineering and Informatics, Technical University Košice (prof. Ján Paralič)
- Faculty of Informatics, Lugano University (prof. Cesare Pautasso)
- School of Information Sciences, University of Pittsburgh (prof. Peter Brusilovsky)
- Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic (prof. Peter Vojtáš)
- Faculty of Science, University of Novi Sad (prof. Mirjana Ivanovic)
- Eindhoven University of Technology (prof. Paul de Bra)
- Humanities Lab, Lund University (prof. Kenneth Holmqvist)

INFORMATION PROCESSING: SPREADING AND PRIVACY

People are ever more connected to Web. Their communication takes place in a digital space in human - Web interaction. We investigate how people spread information in Web environment by passing, sharing, commenting etc. either in original or similar form. Research focuses on trustworthiness of the spreaded information and respect for human privacy. Spreading, sharing of information should be dependable. Information, which has an inherently interactive behaviour, should be as comprehensible as possible to people - users (new interaction and visualization metaphors).

Researchers

Návrat, Pavol - his research interests range from information interactions of people on the Web as manifested by information recommendation or spreading within social networks, to social insect inspired computing and to modelling of software artifacts.

Chudá, Daniela - her research interests are in the area of information systems, quality of information systems, security and privacy, user modelling, in particular she focuses on similarity of texts and behavioral biometric authentication.

Kovárová, Alena - her research interest is human computer interaction including new or unusual devices/interfaces. Recently deals with beacons, which bring to the web and their users new dimension of interaction and information-gathering.

Selected recent publications

[1] FILÍPEK, Peter - KOVÁROVÁ, Alena. Indoor Localization Based on Beacons and Calculated by Particle Filter. In *CompSysTech 2016.* Proceedings of the 17th International Conference on Computer Systems and Technologies 2016, ACM, 2016, pp. 269-276.

[2] CHUDÁ, Daniela - BURDA, Kamil. Toward Posture Recognition with Touch Screen Biometrics. In *CompSysTech 2016*. Proceedings of the 17th International Conference on Computer Systems and Technologies 2016, ACM, 2016, pp. 293-299.

[3] KOVÁROVÁ, Alena - KONÔPKA, Martin - SEKERÁK, Lukáš - NÁVRAT, Pavol. Visualising Software Developers' Activity Logs to Facilitate Explorative Analysis. In *Acta Polytechnica Hungarica*. Vol. 13, No. 2 (2016), pp. 159-178. ISSN 1785-8860.

[4] KRÁTKY, Peter - CHUDÁ, Daniela. Fine-tuning Web Traffic Statistics by Deduplication and Splitting of Visitors Records Using Mouse Biometrics. In *CompSysTech 2016*. Proceedings of the 17th International Conference on Computer Systems and Technologies 2016, ACM, 2016, pp. 300-306.

[5] LISKOVEC, Matej - KOVÁROVÁ, Alena. Beacon Based Localization Refined by Outputs from Mobile Sensors. In *CompSysTech 2016.* Proceedings of the 17th International Conference on Computer Systems and Technologies 2016, ACM, 2016, pp. 277-284.

[6] MAZÁN, Filip - KOVÁROVÁ, Alena. Optimizing Artificial Neural Network for Beacon Based Indoor Localization. In *CompSysTech 2016*. Proceedings of the 17th International Conference on Computer Systems and Technologies 2016. ACM, 2016, pp. 261-268.

Academy collaboration

The consortium of 65 university departments from across Europe, joined the European project Future

Education and Training in Computing: How to support learning at anytime anywhere (FETCH). In particular, closer cooperation with:

- Assoc. Prof. Emeritus Stoyanka Smrikarova, University of Ruse, Bulgaria
- Prof. Leon Rothkrantz, Delft University of Technology, Nederland
- Prof. Mirjana Ivanovic, University of Novi Sad, Faculty of Sciences, Serbia
- Dr. Janusz Jabłonowski, Warsaw University, Polland

KNOWLEDGE ACQUISITION AND DISCOVERY

Nature provides a very valuable source of inspiration for computer science. We are adopting algorithms (e.g. evolutionary) and principles from biology and nature (e.g. bee hive) to achieve better results in various computational problems. Artificial neural networks model brain structures and neural networks of living beings, providing excellent results in classification, prediction and regression tasks. As a part of data mining, we also focus on text mining and knowledge discovery from text-based resources, including topics such as opinion mining.

Researchers

Návrat, Pavol - his research interests range from information interactions of people on the Web as manifested by information recommendation or spreading within social networks, to social insect inspired computing and to modelling of software artifacts.

Bieliková, Mária - aims her research to human interactions on the Web with special emphasis on user modelling and personalization, context awareness, collaborations and usability. This includes research of methods for automated analysis and modelling user feedback, and its evaluation by (multi/group) user studies employing eye trackers.

Lucká, Mária - focuses in her research on efficient algorithms and processing of big data sets, with applications in bioinformatics and energy data. Intelligent data analysis methods include clustering of big data, parallel methods and high performance computing.

Rozinajová, Viera - covers by her research interests data science in broader sense, in particular she concentrates on advanced methods of predictive modeling, cluster analysis, anomaly detection and optimization.

Barla, Michal - covers by his research interests an area of clickstream data analysis for user modeling with a special focus on unsupervised methods, including neural networks.

Bou Ezzeddine, Anna - explores bio-inspired optimization methods, intelligent data processing techniques with a focus on stream data, self-adapting methods.

Grmanová, Gabriela her research is oriented on the field of Data mining. She explores mainly advanced methods of clustering and predictive modeling.

Kompan, Michal - aims his research at problems in the recommender systems and users' behavior prediction.

Lacko, Peter - his research interests include artificial intelligence, neural networks and parallel and distributed computing.

Šimko, Marián - focuses on information extraction and knowledge discovery from text-based content, by employing ontology engineering and natural language processing. His interests include processing of resources in Slovak language.

Selected recent publications

[1] BOU EZZEDDINE, Anna - LÓDERER, Marek - LAURINEC, Peter - VRABLECOVÁ, Petra - ROZINAJOVÁ, Viera - LUCKÁ, Mária - LACKO, Peter - GRMANOVÁ, Gabriela. Using biologically inspired computing to effectively improve prediction models. In *International Journal of Hybrid Intelligent Systems*. Vol. 13, no. 2 (2016), pp. 99-112. ISSN 1448-5869.

[2] GRMANOVÁ, Gabriela - LAURINEC, Peter - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna - LUCKÁ, Mária - LACKO, Peter - VRABLECOVÁ, Petra - NÁVRAT, Pavol. Incremental Ensemble Learning for Electricity Load Forecasting. In *Acta Polytechnica Hungarica.* Vol. 13, No. 2 (2016), pp. 97-117. ISSN 1785-8860.

[3] GRMANOVÁ, Gabriela - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna - LUCKÁ, Mária - LACKO, Peter - LÓDERER, Marek - VRABLECOVÁ, Petra - LAURINEC, Peter. Application of biologically inspired methods to improve adaptive ensemble learning. In *NaBIC 2015*. Proceedings of the 7th World congress on nature and biologically inspired computing (NaBIC 2015), Springer, 2016, pp. 235-246.

[4] KAŠŠÁK, Ondrej - KOMPAN, Michal - BIELIKOVÁ, Mária. Short-term User Behaviour Changes Modelling. In *New Trends in Databases and Information Systems: Short Papers and Workshops*, BigDap, DCSA, DC, 2016, Proceedings. Springer, 2016, pp. 223-228.

[5] KAŠŠÁK, Ondrej - KOMPAN, Michal - BIELIKOVÁ, Mária. Student behavior in a web-based educational system: Exit intent prediction. In *Engineering Applications of Artificial Intelligence.* Vol. 51, no. May (2016), pp. 136-149. ISSN 0952-1976.

[6] KOMPAN, Michal - BIELIKOVÁ, Mária. Enhancing existing e-learning systems by single and group recommendations. In *International Journal of Continuing Engineering Education and Life-Long Learning*. Vol. 26, no. 4 (2016), pp. 348-404. ISSN 1560-4624.

[7] LAURINEC, Peter - LÓDERER, Marek - VRABLECOVÁ, Petra - LUCKÁ, Mária - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna. Adaptive Time Series Forecasting of Energy Consumption using Optimized Cluster Analysis. In *Proceedings 16th IEEE International Conference on Data Mining Workshops (ICDMW 2016)*, IEEE, 2016, pp. 398-405.

[8] RYBÁR, Metod - BIELIKOVÁ, Mária. Automated Detection of User Deception in On-line Questionnaires with Focus on Eye Tracking Use. In *SMAP 2016.* Proceedings of the 11th International Workshop on Semantic and Social Media Adaptation and Personalization, 2016, pp. 24-28.

[9] TVAROŽEK, Jozef - KONÔPKA, Martin - NÁVRAT, Pavol - BIELIKOVÁ, Mária. Studying various source code comprehension strategies in programming education. In *Eye movements in programming: models to data: proceedings of the third international workshop*. University of Eastern Finland, Joensuu. 2016, pp. 25-26.

[10] VRABLECOVÁ, Petra - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna. Incremental Time Series Prediction Using Error-Driven Informed Adaptation. In *Proceedings 16th IEEE International Conference on Data Mining Workshops (ICDMW 2016)*, Barcelona, Catalonia, Spain. IEEE, 2016, pp. 414-421.

[11] VRABLECOVÁ, Petra - ŠIMKO, Marián. Supporting Semantic Annotation of Educational Content by Automatic Extraction of Hierarchical Domain Relationships. In *IEEE transactions on learning technologies.* Vol. 9, iss. 3 (2016), pp. 285-298. ISSN 1939-1382.

Industry collaboration

- TV User behavior analysis for a telecom company
- Conversion prediction for major business platform for digital media (behavioral models for predicting conversions of readers info paying customers)

REPRESENTING AND REUSING SOFTWARE KNOWLEDGE

Enormous intellectual efforts are being invested into producing software in its executable form. Part of our research is devoted to software product lines and variability and software patterns. We explore how this heterogeneous software knowledge contained in various artifacts produced during software development can be efficiently represented and reused. For this, we search for a way to interrelate and visualize this knowledge employing multidimensional software modeling. We also seek for a way to make the knowledge of agile and lean people organization and software processes in general more accessible and explore its wider social connotations.

Researchers

Vranić, Valentino - explores different aspects of software development with a particular interest in preserving intent comprehensibility in code and models using use case driven and other advanced modularization approaches.

Návrat, Pavol - his research interests range from information interactions of people on the Web as manifested by information recommendation or spreading within social networks, to social insect inspired computing and to modelling of software artifacts.

Polášek, Ivan - explores refactoring and preserving intent comprehensibility in software artifacts using multidimensional modeling and visualization.

Rástočný, Karol - explores the possibilities of determining source code properties by tracking developer activity, using advanced software modeling and visualization for change management, and new ways of software testing.

Selected recent publications

[1] BYSTRICKÝ, Michal - VRANIĆ, Valentino. Development Environment for Literal Inter-Language Use Case Driven Modularization. In *MODULARITY*

2016: Proceedings of the 15th International Conference on Modularity, the School of Informatics of the University of Málaga, Spain, 2016. ACM, 2016, pp. 12-15.

[2] BYSTRICKÝ, Michal - VRANIĆ, Valentino. Literal Inter-Language Use Case Driven Modularization. In *MODULARITY 2016:* Proceedings of the 15th International Conference on Modularity, the School of Informatics of the University of Málaga, Spain, 2016. ACM, 2016, pp. 99-103.

[3] RÁSTOČNÝ, Karol. Metadata Management for Large Information Spaces. In *Information Sciences and Technologies.* Bulletin of the ACM Slovakia. Vol. 8, no. 1 (2016), pp. 1-4. ISSN 1338-1237.

[4] VRANIĆ, Valentino - LASLOP, Milan. Aspects and Roles in Software Modeling: A Composition Based Comparison. In *Computer Science and Information Systems*. Vol. 13, no. 1 (2016), pp. 199-216. ISSN 1820-0214.

[5] VRANIĆ, Valentino - TÁBORSKÝ, Roman. Features as Transformations: A Generative Approach to Software Development. In *Computer Science and Information Systems*. Vol. 13, iss. 3 (2016), pp. 759-778. ISSN 1820-0214.

Industry collaboration

- Common international research project proposals with several industry partners: Atos Spain SA, Engineering Ingegneria Informatica S.p.A., Flexiant Limited, and EdTech Foundry
- Extensive collaboration in research and development projects with several Slovak software development companies: Gratex, Continental Automotive, mimacom, etc.

Academy collaboration

- Common international research project proposals with several academic partners: SINTEF (Dr. Alessandro Rossini), Leipzig University (Prof. Ulrich Eisenecker), Lancaster University (Prof. Awais Rashid)), Warsaw University of Technology (Prof. Michał Śmiałek), University of Cyprus (Prof. George Papadopoulos), etc.

SOFTWARE COMPREHENSION AND QUALITY

Software is not only difficult to create, but it is also difficult to understand. We explore the ways of preserving the comprehensibility of the intent with which software has been developed and how to achieve this directly in the corresponding code and model artifacts. Part of the solution to this problem lies in establishing and maintaining appropriate modularization. We focus on use case driven modularization and advanced (aspect-oriented) modularization. From the perspective of software quality, we explore using refactoring, automated testing, continuous revisions, and visualization of software properties. We also explore applying software development techniques beyond software development, in particular in education.

Researchers

Vranić, Valentino - explores different aspects of software development with a particular interest in preserving intent comprehensibility in code and models using use case driven and other advanced modularization approaches.

Polášek, Ivan - explores refactoring and preserving intent comprehensibility in software artifacts using multidimensional modeling and visualization.

Lang, Ján - explores extending and adapting techniques of software development to other areas with a particular interest in education.

Rástočný, Karol - explores the possibilities of determining source code properties by tracking developer activity, using advanced software modeling and visualization for change management, and new ways of software testing.

Kapec, Peter - research interests lie in the visualization of software and its properties, as well as in information visualization in general, including virtual and augmented reality, visual analytics, and novel interaction techniques in visualization.

Drahoš, Peter - explores software visualization, photorealistic representation in real time, and parallel programming.

Selected recent publications

[1] BYSTRICKÝ, Michal - VRANIĆ, Valentino. Development Environment for Literal Inter-Language Use Case Driven Modularization. In MODULARITY *2016:* Proceedings of the 15th International Conference on Modularity, the School of Informatics of the University of Málaga, Spain, 2016. ACM, 2016, pp. 12-15.

[2] BYSTRICKÝ, Michal - VRANIĆ, Valentino. Literal Inter-Language Use Case Driven Modularization. In *MODULARITY 2016:* Proceedings of the 15th International Conference on Modularity, the School of Informatics of the University of Málaga, Spain, 2016. ACM, 2016, pp. 99-103.

[3] LANG, Ján - HNOJČÍK, Tomáš. Information fragments' relationships mining and their mapping in ontologies. In *SAMI 2016*: IEEE 14th international conference Symposium on Applied Machine, Intelligence and Informatics. Herľany, Slovakia, IEEE, 2016, pp. 177-181.

[4] RÁSTOČNÝ, Karol. Metadata Management for Large Information Spaces. In *Information Sciences and Technologies.* Bulletin of the ACM Slovakia. Vol. 8, no. 1 (2016), pp. 1-4. ISSN 1338-1237.

[5] VRANIĆ, Valentino - LASLOP, Milan. Aspects and Roles in Software Modeling: A Composition Based Comparison. In *Computer Science and Information Systems*. Vol. 13, no. 1 (2016), pp. 199-216. ISSN 1820-0214.

[6] VRANIĆ, Valentino - TÁBORSKÝ, Roman. Features as Transformations: A Generative Approach to Software Development. In *Computer Science and Information Systems*. Vol. 13, iss. 3 (2016), pp. 759-778. ISSN 1820-0214.

Industry collaboration

- Common international research project proposals with several industry partners: Atos Spain SA, Engineering Ingegneria Informatica S.p.A., Flexiant Limited, and EdTech Foundry
- Extensive collaboration in research and development projects with Slovak software development companies such as Gratex, Continental, mimacom, and Infinit.

Academy collaboration

- Common international research project proposals with several academic partners: SINTEF (Dr. Alessandro Rossini), Leipzig University (Prof. Ulrich Eisenecker), Lancaster University (Prof. Awais Rashid)), Warsaw University of Technology (Prof. Michał Śmiałek), University of Cyprus (Prof. George Papadopoulos), etc.

COMMUNICATION NETWORKS

Research in the area of communication networks should develop following areas:

- Wired communication networks, which are the core of the networks including Internet. The main interest here is to Ethernet technologies, Optical communication, but also routing and switching
- Wireless technologies going from WiFi through Internet of Things technologies (e.g. LoRa) to mobile networks. The latest submitted project is oriented to 5G networks.
- Architecture for efficient content delivery - Content Delivery networks - CDN and advanced architectures based on Software Defined Networking - SDN and IP Multimedia Subsystem - IMS. The delivery in efficient manner includes virtualization using Network Function Virtualization - NFV.

The topic along whole research is security, which is omnipresent in ICT. Formal approach used for research includes mainly graph theory and Petri Nets.

Researchers

Kotuliak, Ivan - research interest lies at network performance, including NGN architecture, wireless and mobile networking, Internet of Things and Future Internet, security. In his research, he focus on architecture approach and system performance using Markov Chains and Petri Nets.He has been author and co-author of more than sixty scientific papers and leads and participates on several international and national research projects.

Trúchly, Peter - research interest lies at Software Defined Networking and its application in IoT, transport protocols performance in wireless (and satellite) networks, and traffic routing optimisation in IoT.

Macko, Dominik - research interest lies at digital-systems design automation, system-level specification, power optimization and estimation, and low-power communications connected with the Internet of Things.

Helebrandt, Pavol - research interest lies at Software Defined Networking, network design and management, and routing optimization in communication networks.

Selected recent publications

[1] BALAŽIA, Ján - BENCEL, Rastislav - KOTULIAK, Ivan. Architecture proposal for seamless handover in 802.11 network. In *2016 9th IFIP Wireless and Mobile Networking Conference (WMNC 2016)*. IEEE, 2016, pp. 95-102.

[2] HALAGAN, Tomáš - KOTULIAK, Ivan. NFV Federation. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 79-84.

[3] LEVY, David - KOTULIAK, Ivan. WLAN power saving using packet overhearing reduction. In *Telecommunication Systems*. Vol. 61, iss. 1 (2016), pp. 43-57. ISSN 1018-4864.

[4] LONDÁK, Juraj - PODHRADSKÝ, Pavol - TRÚCHLY, Peter. Security aspects in education oriented multimedia networks. In *IWSSIP 2016*: 23th International conference on systems, signals and image processing. STU, 2016, pp. 229-232.

[5] MACKO, Dominik - JELEMENSKÁ, Katarína - ČIČÁK, Pavel. Early-stage verification of power-management specification in low-power systems design. In *DDECS 2016*: 19th IEEE Int. symposium on design and diagnostics of electronic circuits and systems. IEEE, 2016, pp. 157-162.

[6] MACKO, Dominik. Adoption of Abstract Power-Management Specification to FPGA-Based Design. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 199-204.

[7] MARON, Ľubomír - MACKO, Dominik. Automated Formal Verification of the Refined Specification of Digital Systems in HSSL. *In ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 205-210.

[8] ROŠTECKÝ, Richard - KOTULIAK, Ivan - BINDER, Andrej. Practical Experience with CDN Interconnection. In *IWSSIP 2016*: 23th International conference on systems, signals and image processing. STU, 2016, pp. 1-5.

[9] ŠULÁK, Viktor - HELEBRANDT, Pavol - KOTULIAK, Ivan. Performance Analysis of OpenFlow Forwarders Based on Routing Granularity in OpenFlow 1.0 and 1.3. In *Proceedings 19th Conference of Open Innovations Association FRUCT*, IEEE, 2017, pp. 236-241.

[10] TRÚCHLY, Peter - ČERVIENKA, Juraj. Simple Visualization Tool for Analysis of Satellite Orbits and Constellations. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 359-364.

[11] TRÚCHLY, Peter - HELEBRANDT, Pavol - DANIELOVIČ, Lukáš. Implementation and Evaluation of IPv6 to IPv4 Transition Mechanisms in Network Simulator 3. In *IWSSIP 2016*: 23th International conference on systems, signals and image processing. STU, 2016, pp. 1-4.

Industry collaboration

- Pilot implementation and integration. Example is Virtual Customer Premises Equipment (vCPE) - SDN based CPE pilot project with telecommunication operator designed and proof-of-concept solution by the team of FIIT STU (including professors, PhD students and master students).
- Courses usually based on latest research (SDN, NFV), but also on CISCO Networking Academy courses.

Academy collaboration

- Joanna Tomasic, SUPELEC France
- Robert Bestak, FEL CVUT, Czech republic
- Yevgenij Koutcheriavy, University of Tampere, Finland

INFORMATION AND CYBER SECURITY

Information and cyber security is the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber environment and organization and user's assets. Organization and user's assets include connected computing devices, personnel, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment. Cybersecurity strives to ensure the attainment and maintenance of the security properties of the organization and user's assets against relevant security risks in the cyber environment. The general security objectives comprise the following: Availability, Integrity (which may include authenticity and nonrepudiation) and Confidentiality.

Researchers

Hudec, Ladislav - research interest lies at security in mobile ad-hoc networks, risk analysis and security evaluation, computational intelligence in web and network security.

Kotuliak, Ivan - research interest lies at network performance, including NGN architecture, wireless and mobile networking, Internet of Things and Future Internet, security. In his research, he focus on architecture approach and system performance using Markov Chains and Petri Nets.He has been author and co-author of more than sixty scientific papers and leads and participates on several international and national research projects.

Krajčovič, Tibor - research interest lies at embedded systems, based on monolithic processors and one-chip microcomputers, increasing of embedded systems reliability, and real-time embedded systems.

Chudá, Daniela - her research interests are in the area of information systems, quality of information systems, security and privacy, user modelling, in particular she focuses on similarity of texts and behavioral biometric authentication.

Pištek, Peter - research interest lies at security in applications for automotive industry with focus on passenger transportation as a partial problem of Smart cities.

Laštinec, Ján - research interest lies at security in embedded systems and networks, an automotive communication systems.

Selected recent publications

[1] BALAŽIA, Ján - BENCEL, Rastislav - KOTULIAK, Ivan. Architecture proposal for seamless handover in 802.11 network. In *2016 9th IFIP Wireless and Mobile Networking Conference (WMNC 2016)*, IEEE, 2016, pp. 95-102.

[2] FILIPEK, Jozef - HUDEC, Ladislav. Advances in Distributed Security for Mobile Ad Hoc Networks. In *CompSysTech 2016.* Proceedings of the 17th International Conference on Computer Systems and Technologies 2016, ACM, 2016, pp. 89-96.

[3] FILIPEK, Jozef - HUDEC, Ladislav. Securing Mobile Ad Hoc Networks Using Distributed Firewall with PKI. In *SAMI 2016*: IEEE 14th international conference Symposium on Applied Machine, Intelligence and Informatics. IEEE, 2016, pp. 321-325.

[4] HALAGAN, Tomáš - KOTULIAK, Ivan. NFV Federation. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. 2016. IEEE, 2016, pp. 79-84.

[5] KUDLAČÁK, František - KRAJČOVIČ, Tibor. Error behaviour in PID controll systems with dynamic processes. In *Applied electronics 2016*: International conference. University of West Bohemia, 2016, pp. 141-144. ISSN 1803-7232.

[6] LAŠTINEC, Ján. Comparative Analysis of TCP/IP Security Protocols for Use in Vehicle Communication. In *ICCC 2016:* 17th International carpathian control conference. Tatranská Lomnica, Slovak Republic. Danvers: IEEE, 2016, article 32.

[7] ROŠTECKÝ, Richard - KOTULIAK, Ivan - BINDER, Andrej. Practical Experience with CDN Interconnection. In *IWSSIP 2016*: 23th International conference on systems, signals and image processing. STU 2016, pp. 1-5.

[8] VOJTKO, Martin - KRAJČOVIČ, Tibor. Adaptability of an embedded operating system: a generator of a platform dependent code. In *2016 Cybernetics & informatics (K&I)* [elektronický zdroj]: 28th International conference. IEEE, 2016, p. [6].

Industry collaboration

- ESET, s.r.o., Bratislava
- ESET Research Lab - common lab with ESET
- Slovak University of Technology in Bratislava
- Comenius University in Bratislava

EMBEDDED SYSTEMS

Due to the increasing number of IoT devices and its future estimatations, the question of their reliability and safety, as well as the necessity of their mutual communication is gaining importance. For effective functioning, IoT devices must have sufficient bandwidth (typically slower transmission rates), but extremely energy-efficient. The research infrastructure allows to solve these issues for different platforms, on which the embedded systems for IoT devices are implemented.

The aim of research laboratory for the Embedded Systems is to increase the reliability and security of embedded systems, design and testing of embedded systems on various platforms (monolithic processors and microcontrollers, programmable hardware) and with different requirements (with the critical response time, without standard operating system). We also pay special attention to the research of designing energy efficient IoT devices, focusing mainly on the power management of IoT devices, automation of power management and energy efficient mutual communication.

Researchers

Krajčovič, Tibor - research interest lies at embedded systems, based on monolithic processors and one-chip microcomputers, increasing of embedded systems reliability, and real-time embedded systems.

Čičák, Pavel - Research interest lies at digital control systems design, new methods of computer communications, real-time systems, means of hardware (and software) specification, as well as other topics in Computer Engineering.

Jelemenská, Katarína - research interest lies at digital systems specification, design and verification.

Macko, Dominik - research interest lies at digital-systems design automation, system-level specification, power optimization and estimation, and low-power communications connected with the Internet of Things.

Hudec, Ján - research interest lies at digital system design, testing and verification, algorithms for functional testing systems on chip (SoC) in the devices of Internet of Things.

Selected recent publications

[1] JELEMENSKÁ, Katarína - ČIČÁK, Pavel - GAŽÍK, Michal. VHDL Models e-assessment in Moodie Environment. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 141-146.;

[2] KUDLAČÁK, František - KRAJČOVIČ, Tibor. Error behaviour in PID controll systems with dynamic processes. In *Applied electronics 2016*: International conference. University of West Bohemia, 2016, pp. 141-144. ISSN 1803-7232.

[3] MACKO, Dominik - JELEMENSKÁ, Katarína - ČIČÁK, Pavel. Early-stage verification of power-management specification in low-power systems design. In *DDECS 2016*: 19th IEEE Int. symposium on design and diagnostics of electronic circuits and systems. IEEE, 2016, pp. 157-162.

[4] MACKO, Dominik. Adoption of Abstract Power-Management Specification to FPGA-Based Design. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 199-204.

[5] MARON, Ľubomír - MACKO, Dominik. Automated Formal Verification of the Refined Specification of Digital Systems in HSSL. In *ICETA 2016*: 14th IEEE International conference on emerging elearning technologies and applications. IEEE, 2016, pp. 205-210.

[6] VOJTKO, Martin - KRAJČOVIČ, Tibor. Adaptability of an embedded operating system: a generator of a platform dependent code. In *2016 Cybernetics & informatics (K&I)* [elektronický zdroj] : 28th International conference. IEEE, 2016, p. [6].

COMPUTER VISION AND COMPUTER GRAPHICS

Computer vision is a science discipline with an ultimate goal to perceive, to interpret and to understand the natural images or other type of visual data. The research in the field of computer vision is focused mainly on:

- Medical image processing: CT and MRI radiological data processing, detection of anatomical anomalies, segmentation and 3D image registration.
- Prediction of visual human attention: development of model of human visual attention, generation of visual saliency map.
- Visual object detection and object recognition: development of novel methods of object detection and object recognition using 2D and 3D visual data.

In the area of information visualisation are the key research topics: novel interaction techniques in visualization, data visualization in virtual reality and augmented reality.

Research task in computer graphics are mainly photorealistic visualization, real-time rendering, light-field capture and manipulation.

Researchers

Benešová, Vanda - research interest lies at the fields of computer vision, image processing, signal processing and human-computer interaction.

Kapec, Peter - research interest lies at information and big data visualization, software visualization, graph visualization, visual analytics, novel interaction techniques in visualization, data visualization in virtual reality and augmented reality, source code analysis, software metrics and software representation via graph structures.

Drahoš, Peter - mainly focuses on topics related to computer graphics such as photorealistic visualization, real-time rendering, light-field capture and manipulation. Additional interests include virtual reality applications focusing on user interaction and presence as well as parallel processing.

Selected recent publications

[1] FOGELTON, Andrej - BENEŠOVÁ, Vanda. Eye blink detection based on motion vectors analysis. In *Computer Vision and Image Understanding*. Vol. 148, (2016), pp. 23-33. ISSN 1077-3142.

[2] ILČÍKOVÁ, Ivana - BENEŠOVÁ, Vanda - POLEC, Jaroslav - CSÓKA, Tibor. Texture aware image error concealment with fuzzy segmentation. In *IWSSIP 2016*: 23th International conference on systems, signals and image processing. STU, 2016, pp. 145-148.

[3] ILČÍKOVÁ, Ivana - POLEC, Jaroslav - BENEŠOVÁ, Vanda - CSÓKA, Tibor. Fuzzy segmentation for texture aware image error concealment. In *Aplimat 2016* [elektronický zdroj]: proceedings of the 15th conference on applied mathematics 2016. STU, 2016, CD-ROM, pp. 541-556.

[4] POLATSEK, Patrik - BENEŠOVÁ, Vanda - PALETTA, Lucas - PERKO, R. Novelty-based Spatiotemporal

Saliency Detection for Prediction of Gaze in Egocentric Video. In *IEEE Signal Processing Letters*. Vol. 23, iss. 3 (2016), pp. 394-398. ISSN 1070-9908.

[5] POLEC, Jaroslav - BENEŠOVÁ, Vanda - VARGIC, Radoslav - ILČÍKOVÁ, Ivana - CSÓKA, Tibor. Texture feature extraction using an orthogonal transform of arbitrarily shaped image regions. In *Journal of Electronic Imaging*. Vol. 25, Iss. 6 (2016), Art.no. 061413 [15] p. ISSN 1017-9909.

[6] TAMAJKA, Martin - BENEŠOVÁ, Vanda. Automatic Brain Segmentation Method based on Supervoxels. In *IWSSIP 2016*: 23th International conference on systems, signals and image processing. STU, 2016, online [4] p.

Industry collaboration

- Siemens Healthcare - research in the area of medical imaging
- QBSW - feasibility study of methods in video broadcasting (advertising detection)

Academy collaboration

- FEI STU - prof. Polec
- Fakulta matematiky, fyziky a informatiky UK - RNDr. Elena Šikudová, PhD., RNDr. Zuzana Černeková, PhD.
- TU Wien - assoc. prof Ivan Viola, Manuela Waldner

II. SCIENTIFIC ACTIVITIES

The activities are based on regular scientific seminars:

- Personalized Web,
- Big Data Analytics,
- Artificial Intelligence,
- Vision and Computer Graphics.

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

- ABIS – International Workshop on Adaptivity and User Modeling,
- ACIIDS – Asian Conference on Intelligent Information and Database Systems,
- ADBIS – East-European Conference on Advances in Databases and Information Systems,
- ADVANSD – Advanced Software Development Research Group seminar
- BCI – Balkan Conference in Informatics,
- BIS – International Conference on Business Information Systems,
- CompSysTech – International Conference on Computer Systems and Technologies,
- DATA a ZNALOSTI – Annual Conference on Data and Knowledge,
- DDECS – IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems,
- DSAA – International Conference on Data Science and Advanced Analytics,
- ECBS-EERC – Eastern European Regional Conference on the Engineering of Computer Based Systems,
- e-Learning – International Conference on e-Learning,
- ENIC – European Network Intelligence Conference,
- ECBS-EERC - Eastern European Regional Conference on the Engineering of Computer Based Systems,
- EWDTS - East-West Design & Test Symposium,
- HT – ACM Conference on Hypertext and Hypermedia,
- ICALT – IEEE International Conference on Advanced Learning Technologies,
- ICCCI – International Conference on Collective Intelligence Technologies and Applications,
- ICETA – International Conference on Emerging E-Learning Technologies and Applications,
- ICSLE – International Conference on Smart Learning Environments,
- ICWE – International Conference on Web Engineering,
- IDA – International Symposium on Intelligent Data Analysis,
- IKC – International KEYSTONE Conference,
- ISMIS – International Symposium on Methodologies for Intelligent Systems,
- ITAT – Workshop on Information Technologies – Applications and Theory,
- JCDL – Joint Conference on Digital Libraries, Knoxville,
- KDWEB – International Workshop on Knowledge Discovery on the Web,
- PAD – Czech and Slovak Seminar on Computer Architectures and Diagnostics,
- PALE@UMAP – International Workshop on Personalization Approaches in Learning Environments (UMAP 2016),
- PRASAE@ICSLE – International Workshop on Peer Review, Peer Assessment, and Self Assessment in Education (ICSLE 2016),
- RecSys – ACM Conference on Recommender Systems,

- SCLIT – Symposium on Computer Languages, Implementations and Tools,
- SQAMIA – Workshop on Software Quality Analysis, Monitoring, Improvement, and Applications,
- SMAP – International Workshop on Semantic Media Adaptation and Personalization,
- TPDL – International Conference on Theory and Practice of Digital Libraries,
- UMAP – International Conference on User Modelling, Adaptation and Personalization,
- WIKT – Workshop on Intelligent and Knowledge oriented Technologies,
- WMNC, IFIP Wireless and Mobile Networking Conference.

In 2016, FIIT STU organised or co-organised several events aimed at exhibition of students' research work. Above all, the most important event was the 12th Informatics and Information Technologies Students Research Conference – IIT.SRC 2016, which was held on April 28, 2019.

The conference was organized in seven sections:

- Web Science and Engineering
- Intelligent Information Processing
- Software Engineering
- Computer Networks, Computer Systems and Security
- Computer Graphics, Multimedia and Computer Vision
- Computer Science and Artificial Intelligence
- Innovative Applications.

The Conference was opened by a keynote of Geraldine Fitzpatrick (Technische Universität in Wien) titled: "How can we re-interpret 'requirements engineering' in this age of 'computers everywhere for everyone'?".

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

- **category of doctoral students** – Juraj Vincúr (Cluster-based Approach to Aspect Mining, supervisor: P. Návrat)
- **category of master students –** Juraj Šimek (DNA Short Reads Assembly, supervisor: G. Grmanová, A. Bou Ezzeddine)
- **category of bachelor students** – Mária Dragúňová (Considering Human Visual Search Abilities in Eye Tracking User Studies, supervisor: M. Bieliková)

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

- Štefan Šmihla (The Usage of Levenshtein Distance in Intrusion Detection on Web Serve, supervisor: L. Hudec)
- Martin Tamajka (Segmentation of Anatomical Organs in Medical Data Using Supervoxels and Classification, supervisor: V. Benešová)
- Ondrej Kaššák (User Model Specialized for Session Exit Intent Prediction Task, supervisor: M. Bieliková)
- Lukáš Csóka (Parallel Genetic Algorithm on Model-Based Gauss Cluster Analysis, supervisor: P. Laurinec)

Besides the 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 2016 accompanying events included also programming competition, FiitaPixel – photo contest best pictures exhibition, RoboCup and JUNIOR IIT.SRC 2016.

FIIT STU initiated in 2010 a join of two 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 in establishment of

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

The ACM SPY 2016 Finals were organized in December 2016 in Prague. The finalists' projects were selected by the judges from the best thesis submitted by Czech and Slovak universities based on successfuly defended master thesis in 2015/16.

The project

- Time and space model of significant features of human attention in videosequences authored by Patrik Polatsek (supervisor V. Benešová) won the 4th prize

In September 2016 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 general public.

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

- *Atmospheric probe* – **Peter Pištek**
- *FunCan – Check the condition of your car* – **Peter Pištek**
- *Experience the user experience testing* – **Jakub Šimko**
- *Sit like a hero* – **Jozef Gáborík, Jakub Šimko**

III. PUBLICATIONS

Results of our research were published in 94 publications. 71 scientific contributions were published in conference proceedings, 28 out of which were published in reviewed proceedings of international conferences. 20 scientific contributions were published in scientific journals (10 Publications in Web of Science Current Contents Connect Database).

FIIT STU is a co-publisher of the international scientific journal "Computing and Informatics" (until 2001 Computers and Artificial Intelligence). Two faculty staff members, P. Návrat and V. Kvasnička were active in the editorial team in 2016 – P. Návrat as an Associate Editor and V. Kvasnička as a member of Editorial Board. Moreover, the faculty participates in editorial and advisory boards of eleven other scientific journals.

IV. 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. Faculty research takes place in several directions, recently the growing segment is industrial research, which provides an increasing percentage of funding.

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

Number of publications	**UISI[3]**	**UPAI**	**FIIT**
Books and parts of books published by international/national publisher	-/-	-/-	-/-
Scientific works published in international/ national scientific journals	13/3	4/-	17/3
Scientific works published in international conference proceedings	26	5	28
Scientific works published in national or local conference proceedings	22	21	43
Conference proceedings editors	2	1	3

Overview of other most significant activities	**UISI**	**UPAI**	**FIIT**
Membership in editorial boards of scientific journals	6	1	14
Membership in programme committees of international scientific conferences	35	8	45
Membership in programme committees of national or local scientific conferences	29	8	37
Membership in steering committees of scientific conferences	3	1	4

[3] UISI – Institute of Informatics, Information Systems and Software Engineering
UPAI – Institute of Computer Engineering and Applied Informatics

Number of projects funded	UISI	UPAI
VEGA[4]	2	3
KEGA	1	-
APVV	1	2
International projects	4	-
Others /Tatra banka, grants for young scientif reseachers	12	5
FIIT STU	**20**	**10**

Overview of funds (in Eur)	UISI	UPAI	SUM
VEGA	33 436	20 009	53 445
KEGA	13 025	-	13 025
APVV	22 473	13 097	35 570
European Structural Funds	52 575	14 299	66 874
International projects	27 545	-	27 545
Others	17 418	8 590	26 008
FIIT STU	166 472	55 995	222 467

The projects are realized in our research laboratories (description can be found in the parts devoted to individual institutes). In 2016 the following laboratories were operated:

- 3D UML Laboratory (I. Polášek)
- Communication Technologies Laboratory (I. Kotuliak)
- Digital Systems Design Laboratory (K. Jelemenská)
- Embedded Systems Laboratory (T. Krajčovič)
- ESET Research Centre (L. Hudec)
- FIIT – Molpir, Ltd. Laboratory (P. Pištek)
- Grid Computing Laboratory (L. Hudec)
- Intelligent Systems Laboratory (P. Návrat)
- Laboratory of Computer Graphics, Vision and Interaction (University scientific park) (V. Benešová)
- Networks Technology Laboratory I and II (P. Trúchly)
- Siemens Research Laboratory (V. Benešová)
- User Experience and Interaction Research Center (M. Bieliková)
  - Engelbarts's Laboratory of User Experience Research (UX Lab)
  - Simon's Laboratory of personalized learning (UX Group)

Assoc. Prof. Viera Rozinajová
Vice-Dean for Research

[4] 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

APPENDICES

THESES

Bachelor (Bc.) Theses

Study Programme Informatics

- *Adam, J.:* Innovation Application in Context of International Competition. (J. Šimko)
- *Albert, G.:* Recursion Controlled e-Learning. (J. Lang)
- *Augustín, P.:* Using Bluetooth Low Energy in iOS Application. (R. Roštecký)
- *Balážová, V.:* User Experience on the Web. (R. Móro)
- *Balún, J.:* Search Engine Keyword Prediction based on User Need Derived from Eye Tracking. (E. Kuric)
- *Bariny, R.:* Personalized User Interface for Data Entry of experiment through Mobile Device. (A. Kovárová)
- *Belai, P.:* Text Documents Clustering. (M. Barla)
- *Belica, T.:* Education Support Driven by Complex Events. (J. Lang)
- *Beníčková, Z.:* Analyzing Problem Solving in Education. (J. Tvarožek)
- *Beňuš, P.:* Automatic Software Testing. (K. Rástočný)
- *Berger, P.:* Mind-controlled Application. (R. Móro)
- *Bíro, A.: Personalized Support for Publication Reports. (M. Kompan)*
- *Blaško, A.:* Designing of Selected Parts of a System for Monitoring Intelligent Mechanical Parts. (L. Majer)
- *Blažíček, J.:* Optimization Methods of Weighting in Ensemble Learning. (P. Laurinec)
- *Bobotová, Z.:* Image Processing and Computer Vision Methods Applied for Medical Data. (V. Benešová)
- *Bobovský, P.:* Analyzing Problem Solving in Education. (J. Tvarožek)
- *Brechtl, J.:* Analyze Data in Language "Julia". (D. Bernát)
- *Brilla, J.:* Source Code Similarity. (M. Kompan)
- *Bruchatý, M.:* Automatized Software Testing. (K. Rástočný)
- *Cvíčela, M.:* Electric Load Forecast Including External Factors. (M. Lóderer)
- *Černák, D.:* Embedded System (gateway) based on TI CC3100. (T. Krajčovič)
- *Červenka, M.:* Pupil Dilatation and Stress in User Studies. (M. Krupa)
- *Čičkán, O.:* Text-checking for Slovak Language. (M. Šimko)
- *Dekrét, Š.:* Application of Composite Structure Diagram. (V. Vranić)
- *Dragúňová, M.:* Evaluation of User Experience by Eye Tracking and Emotions Analysis. (M. Bieliková)
- *Ďurica, J.:* Classifying and Visualization of Households based on their Power Consumption. (A. Kovárová)
- *Filipčiková, M.:* Innovative Application within an International. (J. Šimko)
- *Findura, J.:* Personalized User Interface for Entering Data of the Experiment via Mobile Phone. (A. Kovárová)
- *Flamík, J.:* Overview of Implementation of Dynamic Data Set. (M. Bečka)
- *Frkáň, M.:* Extracting Keywords in Slovak Language. (M. Šajgalík)
- *Gabaš, P.:* Platform-dependent Implementation of Complex Event Processing System. (J. Lang)
- *Gáspár, M.:* Patterns Searching in Computer Mouse Data. (P. Krátky)
- *Gašparík, P.:* Processing of Expository Texts. (M. Blšták)
- *Ginter, J.:* Modern Security Systems in Access Management. (L. Majer)
- *Gondová, V.:* Support of Student's Activity in an e-Learning System. (M. Bieliková)
- *Gulis, I.:* Attacks on Plagiarism Detection. (D. Chudá)
- *Hagara, J.:* Supporting Tools for Visualization Software. (P. Kapec)
- *Hagara, L.:* Influence of Biometric Characteristics on User Experience Modeling. (D. Chudá)
- *Hamara, O.:* Three-dimensional Display of Alternative and Parallel Scenarios. (I. Polášek)
- *Haščič, M.:* Improvement of Simulated Robotic Goalkeeper. (I. Kapustík)
- *Hudoba, V.:* How to Teach Cuckoo to Search for a Path. (J. Pospíchal)
- *Hunka, M.:* Analysis of User Web Activities. (M. Labaj)
- *Hurajt, M.:* Analysis of User Activities in Web Browser. (M. Labaj)

- *Chynoranský, R.:* Visual Object Recognition. (V. Benešová)
- *Januška, P.:* Search Engine Keyword Prediction based on User Need Derived from Eye Tracking. (E. Kuric)
- *Javorka, P.:* Digital Archive - Long-term Preservation. (N. Andrejčíková)
- *Javorník, D.:* Load forecast by neural networks in an accumulating data environment. (M. Lucká)
- *Jesze, Ľ.: Web Interface for Multimedia System in Public Train Transport. (P. Pištek)*
- *Juhaniak, T.:* Measuring Cognitive Overload for Use of Software Applications. (M. Bieliková)
- *Kakaš, R.:* Analysis and Prediction in Numeric Data Streams. (A. Bou Ezzeddine)
- *Kalužník, M.:* Automated Distribution and Testing of Software Packages. (P. Drahoš)
- *Keszeli, M.:* Image Processing for Capturing ID Cards on Mobile Device. (V. Benešová)
- *Kindernay, O.:* Detection of Web Application Vulnerability based on Anomaly Detection. (L. Hudec)
- *Kipila, O.:* Image Recognition on Mobile Device. (P. Lacko)
- *Klempai, D.:* Similarity in Source Codes. (M. Kompan)
- *Kollár, M.:* Automatic Text Control for Slovak Language. (M. Šimko)
- *Kostova, S.:* Aspect-oriented Change Realization in Mobile Applications. (V. Vranić)
- *Košťan, V.:* Data Visualisation in Augmented Reality. (P. Kapec)
- *Kovalenko, M.:* Implementation of Jacobi Algorithm for Computing SVD. (M. Bečka)
- *Kráľ, M.:* Video Subtitles Processing. (M. Blšták)
- *Kren, M.:* Too to Assign Badges in CQA System Askalot. (I. Srba)
- *Krchňavý, R.:* Sentiment Analysis in Slovak Text. (M. Šimko)
- *Kučera, P.:* Image Recognition on Mobile Devices. (P. Lacko)
- *Kysucký, T.:* Shared Mobile. (J. Lang)
- *Labaj, Ľ.:* Machine Learning – a System for Automatic Creation and Testing of Derived Features. (M. Ciglan)
- *Lacek, M.:* Analysis of user Behavior Patterns in Transactional Applications. (D. Bernát)
- *Lačný, M.:* Enterprise Architecture as Means of Streamlining Processes in Organization. (V. Rozinajová)
- *Liščák, T.:* Prediction of Time Series. (P. Lacko)
- *Lülei, T.:* Relationship Modeling using Regression Analysis. (A. Bou Ezzeddine)
- *Makan, B.:* Impact of the External Environment on Energy Consumption. (N. Andrejčíková)
- *Matlovič, T.:* Mind-controlled Application. (R. Móro)
- *Matula, M.:* Parallel Methods of Counting the Frequency of Selected Length Strings. (P. Kubán)
- *Měkota, M.:* Source Code Search Acknowledging Reputation of the Developers. (E. Kuric)
- *Minárik, J.:* Using Augmented Reality for Navigation on Map. (L. Turský)
- *Mišák, D.:* Dynamic Datasets Clustering. (A. Bou Ezzeddine)
- *Mladoniczka, A.:* How does Graph of Greedy Pancake Flipping Look like? (J. Pospíchal)
- *Mocko, M.:* Trend Discovery in Web Portal Usage. (J. Ševcech)
- *Mokrý, M.:* Voice Control of Computer. (J. Ševcech)
- *Moravčík, O.:* Forecasting Electricity Production from Renewable Resources with External Factors Taken into Account. (V. Rozinajová)
- *Mura, M.:* Keyword Extraction in Slovak. (M. Šajgalík)
- *Nemček, M.:* Educational Texts Processing. (M. Blšták)
- *Neupauer, A.:* Creating UML Diagrams based on Text. (V. Vranić)
- *Olejár, M.:* Software Modelling Support for Small Teams. (K. Rástočný)
- *Olejník, F.:* Identification of Web User Behavioral Patterns. (O. Kaššák)
- *Ondik, J.:* Software Modelling Support for Small Teams. (K. Rástočný)
- *Pallo, M.:* Eey Blink Detection Using Webcam. (A. Fogelton)
- *Papp, D.:* Profile Editor for Platform Funtoro. (P. Pištek)
- *Pavlíková, B.:* Identification of Important Places in Source Code by Eye Tracking Programmers. (M. Konôpka)
- *Pavlovič, T.:* Modern Security Systems in Management and Access Control. (L. Majer)
- *Polakovič, M.:* Game for Linking Resources and Metadata in Multimedia Domain. (J. Šimko)

- *Pintér, R.:* Analysis of Changes in Data Streams. (P. Vrablecová)
- *Pomffyová, M.:* Usage of Prediction of Energy Consumption for Planning its Purchase. (V. Rozinajová)
- *Prekala, M.:* Tool to Support Creation of XML Documents in Web Portal. (M. Šimko)
- *Rác, M.:* Processing of Long-term Measurements of Selected Characteristics of the Internet. (D. Bernát)
- *Račko, L.:* Mobile Devices and their Usability for Indoor Navigation in Libraries. (N. Andrejčíková)
- *Rafajdus, A.:* Keyword Extraction in Slovak Language. (M. Šajgalík)
- *Randák, M.:* Universal Tool to Assign Badges in Online Communities. (I. Srba)
- *Randák, R.:* Processing of Transport Network Model. (D. Bernát)
- *Redajová, M.:* Universal Tool to Assign Badges in Online Communities. (I. Srba)
- *Repiský, T.:* Obtaining Implicit Feedback based on Control Devices Manipulation. (P. Krátky)
- *Roštár, M.:* Similarities in Source Code. (M. Kompan)
- *Salát, M.:* Organization and Recommendation of Study Duties. (J. Tvarožek)
- *Seman, E.:* Follow me – Multimedia Content Management System in Financial Sector. (T. Kováčik)
- *Senko, J.:* Decentralized User Model for Personalized Recommendation. (M. Kompan)
- *Schwartz, M.:* Automated Evaluation of Website Usability in Terms of User Experience. (E. Kuric)
- *Schwartz, Š.:* Shared Mobile. (J. Lang)
- *Sitarčík, J.:* Approximate String Matching in Large Data Bases. (M. Lucká)
- *Skala, L.:* Annotating the Web. (M. Holub)
- *Slovík, M.:* Shared Mobile. (J. Lang)
- *Sudora, S.:* Prediction of Electricity Generation from Renewable Resources with Consideration of External Factors. (V. Rozinajová)
- *Sumbal, J.:* Oregano - Social Networking Service Supporting Cultural Free Time Activities (P. Návrat)
- *Šidlo, M.:* Recommendation based on Pedestrian Movement in Time and Space. (A. Kovárová)
- *Šimek, L.:* User Recognition based on Touch Screen Usage. (P. Krátky)
- *Šimko, I.:* Mobile Devices and their Usability for Indoor Navigation in Libraries. (N. Andrejčíková)
- *Šmihla, J.:* An Impact of Biometric Characteristics for User Modeling. (D. Chudá)
- *Šrank, M.:* Automated Distribution and Testing of Software Packages. (P. Drahoš)
- *Šteffák, M.:* Graphical User Interface for Debugger DEBUGx86-S. (T. Krajčovič)
- *Švec, A.:* Innovative Application within an International Competition. (J. Šimko)
- *Urminský, M.:* Prediction of Electricity Consumption using Methods of Swarm Intelligence. (M. Lucká)
- *Vaško, M.:* Building a Database of Conferences. (N. Andrejčíková)
- *Víťaz, M.:* Support Tool for Teaching SQL Language. (M. Barla)
- *Vozár, F.:* Innovative Application within an International Competition. (J. Šimko)
- *Vrban, A. J.:* Design and Implementation of a Query Language for CMS BUXUS. (M. Krupa)
- *Zajac, P.:* Automatic Assessment of VHDL Models. (K. Jelemenská)
- *Žilka, D.:* Counting Appearance of Strings of Choosen Length, using Paralel Methods. (P. Kubán)
- *Žlnka, A.:* Recommendations based on Personalized Social Networks Statements. (A. Kovárová)

Study Programme Internet Technologies

- *Baránek, T.:* Working with GPS on Android Platform. (P. Pištek)
- *Buhaj, D.:* Embedded System for Protection against Impact. (F. Kudlačák)
- *Čičman, T.:* Visualisator of Positions of UAV Devices in FANET Networks. (V. Šulák)
- *Číkoš, M.:* Embedded System with Firmware Update via SPI. (T. Krajčovič)
- *Daniš ik, N.:* Internet of Things: Communication between Sensor/actuator and Embedded CPU. (V. Stopjaková)
- *Drábik, D.:* Bluetooth Low Energy Usage in iOS Apps. (R. Rošteckỳ)
- *Gočal, P.:* Selected Methods of Software Implemented Hardware Fault Tolerance. (M. Ďuríček)
- *Guráň, M.:* Position Visualizer of UAVs in VANETs. (V. Šulák)
- *Hatvani, D.:* Communication Module for SDN Controller. (P. Helebrandt)
- *Chalachán, J.:* Generator of Fault Maps for RAM Memory. (Š. Krištofík)

- *Ilavský, M.:* Testing Datasets for Security Technologies. (L. Hudec)
- *Ivanoc, M.:* Testing Subsystem for Development Kit EMP386EX. (T. Krajčovič)
- *Jom, D.:* Graphic Editor for Probability Automata and Diagnosers. (Š. Krištofík)
- *Jurika, M.:* Generation of State Machines for Power Consumption Management. (D. Macko)
- *Kadlečík, P.:* An Automated System for Measuring the Properties of Magnetic Materials at Defined Waveforms of Magnetic Quantities. (E. Ušák)
- *Kadlic, Š.:* System for Continuous Shooting of Physical Quantity. (D. Bernát)
- *Kubo, A.:* Interactive Study Materials for Online Support for Education of Electro-technical Study Subjects. (E. Ušák)
- *Kuťka, J.:* Modern Security Systems in Access Control and Management. (L. Majer)
- *Laco, M.:* Recognition and Solving of Newspaper Sudoku/word Search Puzzle. (L. Puchoň)
- *Mastiľak, L.:* Update Embedded System via SPI. (T. Krajčovič)
- *Mišík, J.:* Telemetry for Electric Monopost. (F. Kudlačák)
- *Mižička, V.:* Performance Comparison of VPN. (P. Helebrandt)
- *Oravský, M.:* Protocol TCP in Wireless Systems. (P. Trúchly)
- *Pánis, J.:* Battery with Fast Charging. (L. Puchoň)
- *Pisarovič, D.:* Recognition of Static Objects for Navigation Purposes of Autonomous Flying Robots. (P. Malík)
- *Pohančeník, M.:* Sensoric System for Android Platforms. (P. Pištek)
- *Poliak, M.:* Remote Programming of Embedded Systems. (J. Laštinec)
- *Potančok, P.:* Hardware Task Scheduler. (M. Vojtko)
- *Puk, M.:* Analysis of Data in Language "Julia". (D. Bernát)
- *Rak, M.:* Intelligent Sensors in Electromobile. (J. Laštinec)
- *Slovík, M.:* Living Bank – Automatic Detection of a User through a Mobile Device. (R. Bencel)
- *Sokolík, T.:* Analysis of Stability of Wireless Technology with Signal Loss. (L. Puchoň)
- *Škultéty, F.*: Open Architecture for Implementing Intelligent House. (O. Perešíni)
- *Toma, P.:* Web Interface for Remote Control of Automated Measuring Devices via Web Browser. (E. Ušák)
- *Tóth, J.:* Forecasting of Network Traffic Performance Parameters. (I. Hucková)
- *Urban, T.:* Intelligent House. (L. Puchoň)
- *Vaculčiak, A.:* Embedded System Firmware Update via SPI. (T. Krajčovič)
- *Visokai, L.:* Automatic Change of the Position of Device based on the Quality of Current Line. (V. Šulák)

Master (Ing.) Theses

Study Programme Information Systems

- *Balko, K.:* Keeping information tags valid and consistent. (K. Rástočný)
- *Bednárik, F.:* Information extraction from text. (M. Šimko)
- *Blanárik, F.:* Methods of lossless compression of DNA sequences. (M. Lucká)
- *Blanárik, M.:* Named Entity Recognition and Merging Inflected Forms of Named Entities. (M. Laclavík)
- *Cibula, M.:* Query Evaluation over Incoming Data Stream. (J. Ševcech)
- *Cymorek, D.:* User Modeling based on Usage of Computer Input Devices. (P. Krátky)
- *Čaja, M.:* Explanations of Personalized Recommendations. (M. Kompan)
- *Černák, M.:* Deduplication of Bibliographic Data, Including Authority Records. (N. Andrejčíková)
- *Číž, M.:* Predicting Interest in Information Sources on the Internet using Machine Learning. (M. Barla)
- *Demčák, V.:* News Recommendation using Implicit Feedback. (P. Návrat)
- *Dobšovič, R.:* Solving the new user problem in recommendation systems. (M. Kompan)
- *Drutarovský, T.:* Use of Convolutional Neural Networks Output as a Feature Descriptor. (A. Fogelton)
- *Ferenčík, A.:* Effective Google Glass Interface for Assistance Application. (M. Morávek)
- *Filipčík, R.:* Automatic Detection and Attribution of Quotations. (M. Šimko)
- *Filípek, P.:* Indoor Localization using Particle Filter and iBeacons. (A. Kovárová)
- *Gašpar, P.:* Linking Multimedia Metadata by Using Microblogging Network. (J. Šimko)
- *Horváth, P.:* Time Series Prediction using Neural Networks in Big Data. (M. Lucká)

- *Chomo, M.:* Recognition and Transcription Font Old Prints. (N. Andrejčíková)
- *Jamečná, E.:* Multiple Sequence Alignment by the Ant Colony Algorithm. (M. Lucká)
- *Juras, F.:* Detection of Relations and Types in Search Queries in Knowledge Bases. (M. Ciglan)
- *Jurík, I.:* Data Visualization and Interaction in Augmented Reality. (P. Kapec)
- *Katkó, D.:* Parallel Indexing and Error Recovery of Short DNA Sequences. (M. Lucká)
- *Kiš, P.:* Game-based Support of Online Learning of Programming. (J. Tvarožek)
- *Kloska, M.:* Support for Domain Model Authoring. (M. Šimko)
- *Kostrab, R.:* Processing of large volume of data. (A. Bou Ezzeddine)
- *Krivý, J.:* Semantics-based News Recommendation. (P. Návrat)
- *Kubinec, E.:* The Use of Business Analysis to Streamline Business Processes. (V. Rozinajová)
- *Kucek, M.:* Crowdsourcing Supported by Condition Detection of Annotators via Eyetracking. (J. Šimko)
- *Kučera, M.:* Application of Superpixel Segmentation for Detection of Moving Objects in Video. (P. Kapec)
- *Kudláč, M.:* Entity Linking in Knowledge Base. (M. Ciglan)
- *Kušnír, P.:* Superpixel-based Object Segmentation. (V. Benešová)
- *Liskovec, M.:* Beacon based Localization Refined by Outputs from Mobile Sensors. (A. Kovárová)
- *Loebl, J.:* Automatic Text Processing - Syntactic Analysis of a Sentence. (M. Šimko)
- *Lovasová, V.:* Content Recommendation from Archives of Questions Answered in Communities. (I. Srba)
- *Martinkovič, T.:* Assembly of DNA sequence. (G. Grmanová)
- *Mazán, F.:* Indoor Localization using Bluetooth LE Technology and Machine Learning. (A. Kovárová)
- *Melicher, T.:* User Model for Identification. (D. Chudá)
- *Melis, M.:* Search for Methods of Improvement in Existing Solutions to Information Extraction in Text. (M. Ciglan)
- *Mendel, P.:* Manipulation of Source Code using Graphic Elements. (P. Drahoš)
- *Mikle, F.:* Online Learning through a Game with a Virtual Helper. (J. Tvarožek)
- *Nemec, R.:* Prediction of Electricity Load Records. (V. Rozinajová)
- *Nemeček, T.:* Software Metrics for Determining the Source Code Readability. (D. Chudá)
- *Ogurčák, V.:* Electricity Load Forecasting. (G. Grmanová)
- *Olešová, V.:* Generating a Saliency Map using Depth Information. (V. Benešová)
- *Páleník, P.:* Big data quality in the energetics domain. (N. Andrejčíková)
- *Paľove, S.:* Automatic Organization of Collections of Personal Documents. (R. Móro)
- *Pikuliak, M.:* Ontology Learning from the Web. (M. Šimko)
- *Piliar, A.:* Prediction of Electricity Production. (V. Rozinajová)
- *Podlucká, J.:* Adaptation of Prediction Methods for Big Data Processing. (P. Vrablecová)
- *Poizl, D.:* Simulation of light in time. (P. Drahoš)
- *Polko, M.:* Animation of Subdivision Surfaces with Displacement Maps. (P. Drahoš)
- *Roštár, R.:* Context-aware Map Navigation and Traffic Dynamics Prediction. (D. Zeleník)
- *Rybár, M.:* Evaluation of User Explicit Feedback based on his Implicit Feedback Measurement. (M. Bieliková)
- *Segeč, M.:* Analysis of Biometrical Characteristics of a User for Assessment of his Emotional State under the Smartphone Platform. (D. Chudá)
- *Svrček, M.:* Presentation of Personalized Recommendations via Web. (M. Kompan)
- *Šárik, S.:* Big Data Stream Processing. (A. Bou Ezzeddine)
- *Šimek, J.:* DNA Short Reads Assembly. (G. Grmanová)
- *Šmihla, Š.:* Intrusion Detection on Web Server. (L. Hudec)
- *Šulek, M.:* Interactive Work with the Source Code using Graphical Elements. (P. Drahoš)
- *Šutarík, P.:* Usability of Comprehensive Visualization Software for Medical Purposes. (V. Benešová)
- *Tamajka, M.:* Segmentation of Anathomical Organis in Medical Data. (V. Benešová)
- *Truchan, P.:* Analysis and Measurement of User Behaviour in a Web Application. (M. Bieliková)
- *Uherek, P.:* Application of Machine Learning for Sequential Data. (M. Barla)
- *Viskup, M.:* Face Recognition with Utilization of 3D Information. (V. Benešová)

- *Vnenk, Ľ.:* Analysis of Human Work Activity on the Web. (M. Bieliková)
- *Volovár, M.:* Rendering High Detail Models from Displacement Maps. (P. Drahoš)
- *Zbell, P.:* Modeling Programmer's Expertise Based on Software Metrics. (E. Kuric)
- *Železňák, A.:* Classification Superpixels for the Purpose of Segmentation and Object Recognition. (V. Benešová)

Study Programme Software Engineering

- *Andrášik, D.:* Improving Intent Comprehensibility in UML Models. (V. Vranić)
- *Autner, F.:* Database Systems Integration. (T. Lajčin)
- *Baranec, B.:* Smartphone Application for Financial Flows Tracking. (T. Kováčik)
- *Barlog, I.:* SIP Single Port Extension. (J. Murányi)
- *Benkovič, S.:* Automated Scheduling of Industrial Processes. (M. Lekavý)
- *Bošiak, V.:* Publication Peer-to-peer System with Weak Consistency Data Model. (A. Paulovič)
- *Brisuda, R.:* Processing Large Amounts of Data in Bioinformatics. (P. Lacko)
- *Brocková, B.:* Automated Scheduling of Tasks in Software Project Management. (M. Lekavý)
- *Buocik, M.:* Security of Mobile Devices. (T. Kováčik)
- *Cekovský, R.:* System for Remote Programming of Embedded Devices. (M. Baláž)
- *Cihák, M.:* Monitoring User Interaction with Mobile Application. (L. Turský)
- *Csóka, B.:* Recommendations of Experts for Software Related Tasks based on Topics. (E. Kuric)
- *Červienka, J.:* An interactive Educational Tool for Satellite Systems. (P. Trúchly)
- *Daniš, I.:* Multidimensional UML Support for Agile Software Development. (I. Polášek)
- *Egriová, J.:* Extraction of Information Using Multi-agent Systems. (Š. Sabo)
- *Filip, F.:* Use of Artificial Intelligence in Computer Security. (L. Hudec)
- *Fránik, M.:* Identifying Network Devices Attacked by Malware. (P. Košinár)
- *Fülöp, P.:* Process Memory Access Tracking. (D. Bernát)
- *Gajdoš, M.:* Utilisation of a Multi-agent Approach for the Management of Agricultural Machinery. (M. Lekavý)
- *Galinski, M.:* Multimedia Sessions Optimization using SIP Single Port. (I. Kotuliak)
- *Gallik, P.:* Detection of Vulnerabilities in Source Code of Web Applications using Machine Learning. (L. Hudec)
- *Garaj, M.:* Software Evolution Visualization in 3D Captured in Revisions. (P. Kapec)
- *Grežo, R.:* Network Traffic Management in Software Defined Networks based on End Application Requirements. (M. Nagy)
- *Hirjak, T.:* Interface for Communication between Experimental Software-defined Mobile Networks. (M. Nagy)
- *Horniak, D.:* Data Mining based on Decentralized Multiagents Systems. (Š. Sabo)
- *Horváth, Š.:* Software Visualization as Three-dimensional City. (P. Kapec)
- *Hošková, D.:* Information System for the Funtoro Platform. (P. Pištek)
- *Kalčok, M.:* Tool for Covert Communication via DNS Cache. (D. Bernát)
- *Kaššay, M.:* Distributed Solution of Time Series Forecast in Energy Load. (P. Lacko)
- *Kobza, L.:* Securing Embedded Devices against Network Attacks. (P. Košinár)
- *Križan, M.:* Fully Connected TV, Smartphone and Tablet Experience. (I. Kotuliak)
- *Kunštár, V.:* An Authentication System based on Proximity Technology with Encryption. (M. Baláž)
- *Kyseľ, P.:* Conceptual Modeling in E-learning and its Impact on Content Quality. (J. Lang)
- *Ľalík, V.:* Evaluation of Application Usability using Gaze-tracking. (J. Šimko)
- *Lenčéš, M.:* Applying Dynamic Behaviour to Translation of UML Models into Code. (P. Lacko)
- *Lieskovský, A.:* Personalized Scalable Recommendation System. (M. Kompan)
- *Lipovský, M.:* Automatic Fault Simulator for Digital Circuits. (E. Gramatová)
- *Marković, S.:* Intrusion Detection Systems in MANET Networks. (L. Hudec)
- *Markovič, L.:* Refactoring of Software Systems using XML Technologies. (I. Polášek)
- *Masár, L.:* Web System Intrusion Detection using Methods of Computational Intelligence. (L. Hudec)
- *Matejov, E.:* Mobile Device Identification. (T. Kováčik)
- *Morvay, T.:* Home Network Security. (L. Hudec)
- *Oriskó, P.:* Aspect-oriented Modeling based on Established Practices. (V. Vranić)

- *Poljak, P.:* Recommendation of Applications' Versions. (P. Návrat)
- *Prágai, A.:* Functional Test Generation Methods and Output Sorting Automatized Test Generation for Processors. (J. Hudec)
- *Pribul, D.:* Detecting Text Similarity in Complex Event Processing Architecture. (J. Lang)
- *Protuš, P.:* Detection of Network Attacks to Embedded Devices. (P. Košinár)
- *Putala, L.:* Biological Analysis of Image Data from the Microscope. (P. Lacko)
- *Repka, R.:* Protocol TCP in Wireless Systems. (P. Trúchly)
- *Sabol, R.:* Use of Parallelism for Searching in Transportation Networks on Mobile Devices. (M. Čerňanský)
- *Siro, M.:* Synthesis of Hardware Power-management Specification. (D. Macko)
- *Sovič, R.:* Processing of Long-term Measurements of Selected Characteristics of the Internet. (D. Bernát)
- *Spurný, M.:* Control Unit for Testing and Repair of RAM Memories. (Š. Krištofík)
- *Staňo, F.:* Distributed Software Transactional Memory. (A. Paulovič)
- *Sýkora, T.:* Transformation of UML Diagrams in a Multidimensional Space. (I. Polášek)
- *Šafárik, M.:* Recommendation Systems in Software Engineering. (P. Návrat)
- *Šoltés, F.:* Improving Security of a Web System using Biology Inspired Methods. (L. Hudec)
- *Šustek, M.:* Utilization of Large Volume Data Processing in Domain of Paid Internet Content. (P. Lacko)
- *Švarc, J.:* Automatic Test Generation for Combinational Circuits. (E. Gramatová)
- *Tamáši, R.:* Delay Faults Diagnostics Methods for Digital Systems. (E. Gramatová)
- *Trybulová, N.:* Providing Services to Customers by Means of Funtoro System. (P. Pištek)
- *Valiček, M.:* Design and Implementation of Data Acquisition System. (T. Krajčovič)
- *Vranec, P.:* Security in Mobile Ad hoc Networks. (L. Hudec)
- *Zemaník, L.:* System of Connecting Mobile Devices with Funtoro Devices. (P. Pištek)

V. Doctoral (Phd.) Theses

In 2016 following dissertations were defended:

- ***Eduard Kuric:*** Automatic Estimation of Software Developer´s Expertise (Information Systems, supervisor: M. Bieliková)

Abstract: Software developer's expertise can be defined as a degree of his or her familiarity with source code artifacts of a software system, respective to other developers of the system. Existing approaches to estimate developer's expertise are usually based on evaluating a degree of developer's source code authorship. In addition to the authorship, developer's development productivity should be considered. The contributions of this work can be split into three parts. First, we propose a developer's model overlaying domain model and a method for its automatic acquisition. The model provides software project-related information at different levels of abstraction (e.g., at level of software concerns). It is based on metadata and relationships between them derived from corresponding resources. Second, we propose a method for estimation of developer's expertise in the subject software system at level of software concerns. The method considers both developer's development productivity and his or her familiarity with a concern. Finally, we propose a method to recommend an expert developer for a newly created development task at level of concerns. We evaluate the proposed approach by applying it to the expert recommendation for development tasks.

- ***Karol Rástočný:*** Metadata Management for Large Information Spaces (Information Systems, M. Bieliková)

Abstract: Semantics over large information spaces is crucial for information systems, e.g. for effective information exploration. But current coverage of information spaces by semantics is insufficient, so information systems create various metadata for simplification of intelligent data processing. Crucial problem of metadata lies in dynamicity of information spaces. The content is continually modified, what can lead to an invalidation of metadata. In this work we propose novel metadata representation via information tags that describe properties of resources and users' activity provided with resources without any modification of described resources. This feature of information tags allows to perform independent and effective management and maintenance of metadata represented in the form of information tags. We propose information tags model based on standardized the Open Annotation Model and repository with sufficient performance for information

tags management. To manage and maintain information tags, we propose robust location descriptor and its interpreting algorithm with respect to special requirements and features of source code, and we proposed the method of information tags maintenance which queries linked stream data of events and executes maintaining actions.

- ***Ivan Srba:*** Promoting Sustainability and Transferability of Community Question Answering (Information Systems, M. Bieliková) *Rector's Award.*

Abstract: Community Question Answering (CQA) provides people with a possibility to ask various questions and, at the same time, provide answers on questions of other users (e.g. Yahoo! Answers). This thesis concerns with two open problems closely related to the CQA concept: (1) a long-term sustainability of CQA ecosystems, and (2) their transferability to educational and organizational environments. At first, we conducted a case study on emerging problems related to increasing amount of low-quality content created by undesired groups of users on Stack Overflow. Consequently, we suggested to preserve a long-term sustainability of CQA communities by means of robust reputation mechanisms and answerer-oriented adaptive support methods that in addition involve the whole community. We put these suggestions into practice by means of two novel methods: (1) for reputation calculation focused on quality of users' contributions, and (2) for recommendation of new questions to potential answerers with utilization of non-QA data. Our main contribution to the second open problem lies in introduction of a novel organization-wide educational CQA system Askalot, which takes educational as well as organizational specifics into consideration.

- ***Ján Balažia:*** Seamless Handover in Networks Based on IEEE 802.11 Standard (Applied Informatics, I. Kotuliak)

Abstract: In recent years we have seen tremendous growth in the use of various multimedia services, either in terms of high-res video, targeting realtime broadcasting or voice services that use IP protocol based networks. At the same time, small portable computers and tablets entered the market in big fashion and mobile phones became a fully-fledged replacement of computers on the road. With the rising number of mobile devices sold, the demand for these kind of services keeping the mobility of client grows enormously. This is the fundamental issue of IEEE 802.11 networks that are already part of every mobile device sold: the time needed to reassociate with access points is 50 milliseconds at best. Multimedia services using voice, however, for their smooth transmission have a maximum margin of tolerance at 40 to 50 milliseconds, which makes networks based on the IEEE 802.11 standard hardly usable. The aim of this work was to propose an architecture and protocol support necessary to achieve the before-mentioned transition in negligible time in order to eliminate problems connected to transmission of multimedia services and at the same time make it unnecessary in any way to interfere with the software and hardware of existing mobile stations. The proposal was verified on existing hardware in laboratory environment and test results confirmed the correctness of the architecture design proposal.

- ***Pavol Helebrandt:*** Architecture for Core Networks Utilizing Software Defined Networking (Applied Informatics, I. Kotuliak)

Abstract: New and popular approach to computer network architecture - Software Defined Networking aims to programmatically and centrally control the whole network providing many advantages. However, deployment of SDN in large scale networks of telco operators and service providers is limited due to lack of standardized communication between SDN controllers and use of routing algorithms of traditional networks. In this dissertation we provide analysis of SDN principles, existing solutions and methods to scale their performance for large scale networks. Based on the analysis we formulate problem of SDN domain interconnection for east-west communication. To solve this problem, we propose a new architecture for interconnection of controllers in various SDN domains called INT Architecture. INT Architecture is formally verified by modelling in Petri Nets and practical tests of INT Architecture prototype using virtual machines. INT Architecture is beneficial enhancement of SDN enabling greater cooperation of SDN controllers and applications in large scale multi-domain networks.

- ***Štefan Dlugolinský:*** Combining Named Entity Recognition Methods for Concept Extraction (Applied Informatics, M. Laclavík)

Abstract: n the current work, we present our research related to Named Entity Recognition (NER). We focus on gazetteers, as a base-building

block of many NER systems as well as on combining different NER methods. Regarding gazetteers, we focus on problems, related to when it comes to complete gazetteer lists with entities from big data sources such as Freebase or Wikipedia, yet with the ability of linear complexity matching of the entities in the input text. Regarding the combination of different NER methods, we propose a method for NER in micro-posts, which is designed to combine annotations yielded by existing NER tools, in order to produce more precise results than input tools alone. We combine NE recognizing utilizing machine learning techniques, namely decision tree and random forest using the C4.5 algorithm. The main advantage of the current proposed method is the possibility to combine arbitrary NER methods and in its application on short, informal texts.

- ***Ján Mojžiš:*** Visualization, Navigation and Relationship Discovery in Graphs (Applied Informatics, M. Laclavík)

Abstract: In scope of my work, I focus on graph data structures, data extraction, distributed computing and graph visualization. I design, implement and evaluate a single machine system for data extraction and information retrieval, capable of using advanced graph visualization and filtering techniques. I propose a new visualization concept of pen patterns and colors. Next I define new universal graph visualization and filtering method, usable for filtering and relationship discovery. We propose a new distributed algorithm PCMARS, intended to be used in a Pregel computing cluster for the graph relationship discovery tasks. We implement our proposal in a client, stand alone program AGECRT (Advanced Graph and Clutter Removal Tool) and distributed algorithm PCMARS. A solution is dedicated as a single architecture.

- ***Štefan Sabo:*** Social Insect Inspired Algorithm to Detect and Track Topics in Dynamic Documents (Information Systems, P. Návrat)

Abstract: In our work we present a novel approach to identification and tracking of news stories on the web. We utilize a set of social insect inspired agents to acquire news articles and subsequently analyse relationships between articles based on story words. Story words represent our concept for modelling terms relevant to news stories as a whole, instead of using keywords relevant only to a single document. We leverage behavioural patterns inspired by honey bees when foraging for food in order to design a self adjusting and self prioritizing mechanism that allows for dynamic response to changing news story landscape. Due to the independent nature of agents, the resulting system offers flexibility, scalability and distributivity while maintaining high level of cooperation during identification and tracking of currently unfolding news stories.

- ***Martin Vojtek:*** Formal Description of an Embedded Operating Systems (Applied Informatics, T. Krajčovič)

Abstract: In the report you can find a summary of the characteristics and classification of embedded operating systems. The problem of embedded operating systems adaptation is analyzed in parallel with hardware-software co-design techniques. Energy optimization techniques are also part of the analysis. The core of this work is design of the operating system adaptation process. This process allows optimizing of adaptation of embedded operating systems to different processor architectures. In the first step of the process a formal description of the processor is created. The formal description allows the creation of a processor description readable for a computer. In the second step the formal description is processed by the code generator. The generator creates a platform-dependent code of an operating system. In the third step a formal description of operating system modules is presented. This description uses generated code to produce modules. Those modules manage existing devices in a processor. The report contains the description of the process how to design a tool capable of supporting the adaptation process. The proposed design of the single steps of the adaptation process is supported by a case study.

- ***Jakub Ševcech:*** Towards Symbolic Representation of Potentially Infinite Time Series (Information Systems, M. Bieliková)

Abstract: Wen processing very long time series, especially when they are processed in form of data streams, we have to deal with several open problems. The most eminent are the high dimensionality of the data, problems related to comparison of very long time series and processing of the data under constraints faced when processing potentially infinite streams of data. From these problems, several opportunities arise in the field of data representation, dimensionality reduction and employment of methods from text processing in time series data analysis. In our

work, we address these problems and exploit these opportunities by proposing a symbolic representation of potentially infinite time series data and associated similarity measure. We explore applicability of proposed representation in various data analysis tasks such as classification or forecasting, with various types of short and long time series. We pay special interest to processing of the data under constraints imposed by requirements for stream data processing systems and we propose our approaches in accordance with these requirements.

VI.IIT.SRC

Full papers

- *Adam, J. - Filipčiková, M. - Švec, A. - Vozár, F.:* Automated detection of Inappropriate Comments in Online Discussions. (J. Šimko)
- *Balážová, V.:* Usability Testing of Navigation on a Bank Website. (R. Móro)
- *Belai, P.:* Discovering Senses of Social-media Posts. (M. Barla)
- *Belan, R.:* Transformation from the Heavy Desktop Client to the Lightweight Web Application. (I. Polášek)
- *Bencel, R.:* The Seamless Wi-Fi Handover in SDN Architecture. (M. Kotočová)
- *Berger, P.:* Processing EEG Signal for P300 Detection. (R. Móro)
- *Blanárik, F.:* Methods of Lossless Compression of DNA Sequences. (M. Lucká)
- *Blanárik, M.:* Named Entity Recognition and Merging Inflected Forms of Named Entities. (M. Laclavík)
- *Blšták M.:* Sentence Simplification for Automatic Question Generation Task. (V. Rozinajová)
- *Bobotová, Z.:* Method of Brain Tumor Segmentation. (V. Benešová)
- *Brisuda, R.:* Construction of Succinct de Bruijn Graph for DNA Assembly. (P. Lacko)
- *Brocková, B.:* Task Assignment Prediction in Software Project Management. (M. Lekavý)
- *Burda, K.:* Authenticating Users Based on How They Pick up Smartphones. (D. Chudá)
- *Bystrický, M.:* Evaluation of Approaches Preserving Use Cases in Code. (V. Vranić)
- *Csóka, B.:* Modelling Experts Based on Software Related Tasks and Latent Topics. (E. Kuric)
- *Csóka, L.:* Parallel Genetic Algorithm on Model-Based Gauss Cluster Analysis. (P. Laurinec)
- *Demčák, V.:* News Recommendation using Implicit Feedback. (P. Návrat)
- *Dragúňová, M.:* Considering Human Visual Search Abilities in Eye Tracking User Studies. (M. Bieliková)
- *Filípek, P.:* Indoor Localization Using Particle Filter and Signal Strength. (A. Kovárová)
- *Frkáň, M.:* Improving Text Categorization with Semantically Enriched Convolutional Neural Network. (M. Šajgalík)
- *Frťala, T.:* Transforming Organizational Patterns. (V. Vranić)
- *Fülöp, P.:* Process Memory Access Tracking. D. Bernát)
- *Gajdoš, M.:* Utilization of a Multi-agent Approach for the Management of Agricultural Machinery. (M. Lekavý)
- *Gašpar, P.:* Linking Multimedia to Microblogs for Metadata Extraction. (J. Šimko)
- *Gondová, V.:* Personalized Rooms as a Mean for Increasing Student's Activity. (M. Bieliková)
- *Grežo, R.:* Network Traffic Engineering in Software-Defined Networks. (M. Nagy)
- *Hlaváč, P.:* Impact of Characteristics of Individuals on Evaluating the Quantitative Studies. (M. Bieliková)
- *Hunka, M.:* Analysis of User Activities in Web Browser. (M. Labaj)
- *Hurajt, M.:* Gaze-tracking Programmers' Activities in Web Browser: Revisitation and More. (M. Labaj)
- *Ilavský, M.:* Testing Datasets for Security Technologies. (L. Hudec)
- *Juhaniak, T.:* Robust Detection of User's Cognitive Load Using Personalized Pupillary Response Model. (M. Bieliková)
- *Kaššák, O.:* User Model Specialized for Session Exit Intent Prediction Task. (M. Bieliková)
- *Kiš, P.:* Learning by Playing: Generated Programming Exercises to Teach Programming the Innovative Way. (J. Tvarožek)
- *Kloska, M.:* Support for Domain Model Authoring. (M. Šimko)
- *Konôpka, M. - Rástočný, K.:* On the Tracks of Software Development. (P. Návrat, M. Bieliková)
- *Kostova, S.:* Aspect-Oriented Change Realization in Mobile Applications: Preliminary Study Results. (V. Vranić)
- *Krátky, P.:* Deduplication and Splitting Website Visitors: Improving Traffic Statistics. (D. Chudá)

- *Kren, M.:* Assignment of Educational Badges in CQA System Askalot. (I. Srba)
- *Krchňavý, R.:* Sentiment Analysis of Social Network Posts in Slovak. (M. Šimko)
- *Kudlačák, F.:* Artificial Neural Network for Adaptive PID Controller. (T. Krajčovič)
- *Laštinec, J.:* Performance Evaluation of TCP/IP Security Protocols for Automotive Domain. (L. Hudec)
- *Lieskovský, A.:* Scalable Personalized Recommender System. (M. Kompan)
- *Lipovský, M., Švarc J.:* A New Interface for Test Pattern Generation for Digital Circuits. (E. Gramatová)
- *Liskovec, M.:* Beacon Based Localization Refined by Outputs from Mobile Sensors. (A. Kovárová)
- *Lóderer, M.:* Adaptive Heterogeneous Ensemble Learning based on Biologically Inspired Algorithms for Time Series Predictions. (V. Rozinajová)
- *Loebl, J.:* Automatic Text Processing – Syntactic Analysis of a Sentence. (M. Šimko)
- *Lovasová, V.:* Recommendation of Solved Questions from Archives in CQA Systems. (I. Srba)
- *Macko, P.:* Using Natural Language to Search Linked Data. (V. Rozinajová)
- *Markovič, M.:* Towards Rule Based Refactoring. (I. Polášek)
- *Marták, L.:* Simulating Communication in Unreliable Networks. (D. Bernát)
- *Martinkovič, T.:* Discrete Bat Algorithm for Assembling DNA Sequences. (G. Grmanová)
- *Matlovič, T.:* Emotion Detection using EPOC EEG Device. (R. Móro)
- *Mazán, F.:* Indoor Localization Using Bluetooth LE and Artificial Neural Networks. (A. Kovárová)
- *Mocko, M.:* Frequent Item Mining Comparison on Data Streams. (J. Ševcech)
- *Mokrý, M.:* Sound Classification Based on Feature Extraction. (J. Ševcech)
- *Morvay, T.:* Home Network Security. (L. Hudec)
- *Mura, M.:* Keyword Extraction with Recurrent Neural Network. (M. Šajgalík)
- *Ogurčák, V.:* Electricity Load Forecasting. (G. Grmanová)
- *Olejár, M.:* Software Model Synchronization for Small Teams. (K. Rástočný)
- *Olešová, V.:* Generating a Saliency Map using Depth Information. (V. Benešová)
- *Ondik, J.:* Detecting Defects in Software Models of Small Teams. (K. Rástočný)
- *Pavlíková, B.:* Identification of Important Places in Source Code by Eye Tracking Programmers. (M. Konôpka)
- *Perešíni, O.:* Topology Effective Routing in the Capillary Networks. (T. Krajčovič)
- *Pernecký, P.:* Reduction of Binary Decision Diagrams. (P. Pištek)
- *Petrík, J.:* PerfectPlaggie: Source Code Plagiarising Tool. (D. Chudá)
- *Pikuliak, M.:* Relationship Extraction from Text Using Word Embeddings. (M. Šimko)
- *Podlucká, J.:* Adaptation of Prediction Methods for Big Data Processing. (P. Vrablecová)
- *Polko, M.:* Animation of Subdivision Surfaces with Displacement Maps. (P. Drahoš)
- *Rabčan, J.:* Empirical Evaluation of Short-Term Load Forecasting Model Based on Different Regression Algorithms. (P. Návrat)
- *Rafajdus, A.:* Improving Text Categorization with Semantically Enriched LSTM. (M. Šajgalík)
- *Roštár, M.:* Similarities in Source Codes. (M. Kompan)
- *Rybár, M.:* Automated Detection of User Deception in Online Questionnaires. (M. Bieliková)
- *Salát, M.:* Personal Computer Assistant for Supporting University Study. (J. Tvarožek)
- *Siro, M.:* Synthesis of Hardware Systems Power Management. (D. Macko)
- *Spurný, M.:* Configurable Spare Database Reduction for RAMs. (Š. Krištofík)
- *Svrček, M.:* Hybrid Personalized Explanation of Recommendations. (M. Kompan)
- *Šafárik, Š.:* Recommendation of Software Developers for Bug Fixing. (P. Návrat)
- *Šárik, S.:* Data Stream Processing. (A. Bou Ezzeddine)
- *Ševcech, J.:* Alphabet Size Reduction for Symbolic Time Series Representation. (M. Bieliková)
- *Šidlo, M.:* User Localization and User's Movement Model. (A. Kovárová)
- *Šimek, J.:* DNA Short Reads Assembly. (G. Grmanová)
- *Šmihla, Š.:* The Usage of Levenshtein Distance in Intrusion Detection on Web Server. (L. Hudec)
- *Šoltés, F.:* Use of a Dendritic Cell Algorithm in Web System Anomaly Detection. (L. Hudec)

- *Šubín, J.:* A New Automatic MBIST Generation System for Embedded Memories in SoCs. (E. Gramatová)
- *Šustek. M.:* Utilization of Large Volume Data Processing in Domain of Paid Internet Content. (P. Lacko)
- *Tamajka, M.:* Segmentation of Anatomical Organs in Medical Data Using Supervoxels and Classification. (V. Benešová)
- *Tamáši, R.:* An Improved Method for Path Criticality Calculation. (E. Gramatová)
- *Truchan, P.:* Prediction of User Behavior in a Web Application of the Bank. (M. Bieliková)
- *Trybulová, N.:* Providing Services to Customers by Means of Funtoro System. (P. Pištek)
- *Vincúr, J.:* Cluster-based Approach to Aspect Mining. (P. Návrat)
- *Viskup, M.:* Face Recognition Using Depth Information. (V. Benešová)
- *Vnenk, Ľ.:* Classifying Human Work Activity on the Web Space. (M. Bieliková)
- *Volovár, M.:* Rendering High Detail Models from Displacement Maps. (P. Drahoš)

Extended abstracts

- *Buhaj, D.:* Embedded System for Protection against Impact. (F. Kudlačák)
- *Hošková, D.:* Information System for the Funtoro Platform. (P. Pištek)
- *Matejov, E.:* Mobile Device Identification via Sensors Fusion Fingerprint. (T. Kováčik)
- *Mikle, F.:* How to Efficiently Incorporate E-learning Tasks into Gaming Environment. (J. Tvarožek)
- *Nemče, M.:* Interactive System for Creation of Notes. (M. Blšták)

VII. TP CUP Competition

- *Baňas, M., Erdelyi, J., Farkaš, T., Gedera, J., Gono, O., Hudec, M., Tomašových, F.:* CAN Bus – Application for the Funtoro Platform. (P. Pištek)
- *Kopšo, R., Krajča, P., Košťál, K., Pernecký, P., Čápka, V., Turay, D., Radványi, P.:* Invisible Wi-Fi Roaming in SDN Networks. (R. Bencel)
- *Birkus, R., Hudec, L., Janečková, K., Jurík, M., Karásek, R., Korbeľ, M., Löffler, M.:* Reconstruction of 3D Scene from 3D Data. (V. Benešová)
- *Csóka, L., Dekan, M., Farkaš, M., Macejková, S., Pikna, R., Sluka, P.:* A New Approach to Aid in-Class Activity and Examinations of Students. (B. Steinmüller)
- *Bendík, J., Borák, M., Bystričan, J., Heršel, M., Kyseľ, M., Štefánik, M., Štrbák, M.:* Chamelleon –Aggregator and Viewer of Media Portals. (L. Turský)
- *Cuprík, R. - Dubec, P. - Gajdošík, P. - Roba, R. - Sanyová, M. - Vrba, J. - Žigo, T.:* sUXess - Towards Online Usability Testing with the Use of Eye-tracking. (R. Móro)
- *Černák, M. - Gallay, L. - Hnilicová, E. - Huňa, A. - Jandura, F. - Žuffa, T.:* Askalot Meets Online Courses on edX. (I. Srba)
- *Posch, H. - Žalondek, M. - Chovaňák, T. - Belan, R. - Daabousová, R. - Gajdoš, M. - Palatinus. M.:* OpenScience: Web Portal with Open Data for Research Support. (P. Lacko)
- *Hajdu, D. - Marták, L. - Mäsiar, A. - Miškovský, L. - Moravčíková, Z. - Šandor, F.:* Experimental Evaluation of Hypothesized Relationship between Trust and Entrainment in Speech. (E. Kuric)
- *Takács, G. - Takács, M. - Demko, M. - Pecár, S. - Marák, J. - Černan, O.:* Semiautomatic Floor Maps Editor with Automatic Beacons Net Generator. (A. Kovárová-Martonová)
- *Ďaďo, J. - Dzurňak, E. - Gaššo, T. - Vantúch, M. - Spišák, D. - Slezák, D. - Paška, P.:* VisitorTrack: Accurate Data for Website Visits Analytics. (P. Krátky)
- *Adamko, M. - Bednár, D. - Cagáň, T. - Galbavý, M. - Kucharíková, Z. - Trizna, J. - Uhrin, J.:* Linked Research. (N. Andrejčíková)

VIII. RESEARCH PROJECTS

Methods and algorithms for improving efficiency and multimedia content delivery in IP networks (VEGA 1/0836/16) (I. Kotuliak), Duration: 2016 - 2018

Multimedia applications and multimedia provisioning OTT (as Store from Apple) became the moving force of the ICT industry. Telecommunication companies are investigating of novel systems into their core networks ti improve flexibility and expenses optimisation. One of the most promising technology belongs SDN. The objectives of this project follow up on 7RP HBB-Next project and on SDN having in mind the proposals for Future Generation Internet in three areas:

i) to complement architecture proposed within 7FP project HBB-Next with distribution channel based on IP and its verification and evaluation,

ii) to improve architecture of SDN with controllers interconnection and its verification in SDN to NFV controller

Methods for the design and verification of digital systems with low power consumption using formal spefification languages (VEGA 1/0616/14) (P. Čičák), Duration: 2014 - 2016

The project is focused on the basic research in the field of modeling, design and verification of digital systems with low power consumption using high-level formal specification languages. At present, digital systems modeling and verification at a higher level of abstraction is still one of the important objects of basic research because of the complexity and difficulty of the design at the structural level. The project aims at developing new methods and algorithms for modeling, design and verification of digital systems at the system level based on specification language (e.g. HSSL), or other means of modeling, taking into account the requirement of low power system. Expected outputs are new approaches, methods and algorithms for digital systems design and verification at higher abstraction levels supporting reductions in system consumption and supplemented by design transformation procedures to established lower-level design platforms (VHDL, Verilog, SystemVerilog etc.).

Visual Object Class Recognition in Video Sequences Using a Linkage of Information Derived by a Semantic Local Segmentation and a Global Segmentation of Visual Saliency (VEGA 1/0625/14) (V. Benešová), Duration: 2014 - 2016

Visual class objects recognition is one of the biggest challenges of current research in the field of computer vision. This project aims to explore new methods of recognizing classes of objects in video sequences. In the center of research focus will be the research of new methods of semantic segmentation at the local level approach and segmentation of the visual saliency at the global level. An integrating part of the project proposal will be research of intelligent methods of transfer of information, which will be obtained by the local and global approach using the principle of cooperative agents.

Atmospheric probe measuring physical quantities (2015et10) (P. Pištek), Duration: 2016

The project is aimed at creating a system that will use commonly available hardware (sensors, smartphones and others) to measure environmental changes for as long as they can be used to improve current modules, but also to promote science and technology.

The project aims to:

- analysis of atmospheric probe development area,
- project system based on analysis and consultation with experts for this area,
- implementing the system with regard to affordability and stability, by testing
- publishing the whole process of creating similar systems for the general public.

The probe climbed to a height of 27,756 m, gained 32GB of data and sent photos on facebook to a height of 6100 m

Applied research on measurement of physiologic parameters of stress and smart wireless biomonitoring using on-chip technologies (APVV-15-0789) (K. Jelemenská), Duration: 2016 - 2019

The main focus of the project is applied research for identification human stress using vital function monitoring of the human body by employed modern methods, as well as the progressive alternative methods that would allow final wide use of the application outputs in health care (in acute, outpatient, home care and systems AALAmbient Assisted Living), in biomedicine, psychology and other areas of social life such as relaxation physiotherapy or active sports, recreational activities, but also in completely different industries like in criminalistics, in the banking sector and so on. Targeted research on a long-term continuous monitoring of essential and alternative physiological processes of human in terms of his cognitive and emotional functions by measuring selected properties of the skin (measurement of human stress) is necessary step towards improving the quality of health care, and thus the quality of life at home and abroad. Continuous monitoring of selected characteristics providing sufficient information for professionals involved in the identification of stressful situations, as well as its impact on other serious diseases. Non-invasive continual measurement of these parameters directly on the body and target vertical integration of several SW/HW layers requires a specific research for sensor structure design, the development of methodologies for measuring and processing of data and other scientific and research work necessary for a successful project finalization.

Cloud Based Human Robot Interaction (APVV-15-0731) (I. Kotuliak), Duration: 2016 - 2020

Project deals with multimodal Human Robot Interaction. Cloud Computing Technologies inspired a new domain called Cloud Robotics. Development of integrated programming environment for robotic systems in distributed approach give occasions for agent environment with learning abilities, incremental knowledge acquisition sharing for group of robots. The goal of basic research is study of artificial intelligent tools for intelligent robotics, basic research in the area of natural language processing and also the study of innovative software tools for distributive software systems in could environment. The focus will be given also to image processing, virtual reality and speech processing in intelligent robotics.

Human Information Behavior in the Digital Space (APVV-15-0508) (M. Bieliková), Duration: 2016 –2020

Project is aimed at the basic research of models and methods of acquisition and processing of information, which are primarily used for predicting of behaviour of human in digital space, which are consequently used for improving the work with information. The processed information are especially the implicit feedback signals -- footprints that the human leaves us during his interaction with digital space. In the project, we will work with signals that are nowadays only starting to be considered and researched, for example gaze tracking or tracking of physiological characteristics. In the context of information processing, these signals were (until now) only utilized in static applications. This is due to the difficult technical realization of the signal measurements, which itself imposes challenges like processing of big data. The goal of the project is to acquire remarkable new knowledge about how the human is behaving in the environment of digital information a how does he/she react on information he/she is receiving within, all this from the perspective of interconnected research areas of computer science, social science and behavioural science. This knowledge would enable design and evaluation of models that would uncover connections between individual feedback signals. This will subsequently enable design of new methods of personalization of information, either from the perspective of visualization or navigation in digital space.

Intelligent Analysis of Big Data by Semantic-oriented and Bio-inspired Methods in a Parallel Environment (VEGA, 1/0752/14) (P. Návrat), Duration: 2014 –2017

The currently used methods of data analysis, extraction, data mining and automated support for domain modeling can no longer effectively support the processing of nowadays commonly available datasets, which arise in every field of human activity. One of the advantages of the work with large datasets is the potential to acquire often better or even completely new results of the data processing, e.g. finding new patterns, obtaining more accurate results or achieving greater statisti-cal significance. In this project we will focus on intelligent analysis of large bodies of medical data as well as modeling of big data available on the Internet. We will focus on the area of DNA sequencing and pattern extraction from medical imaging. Another source of data will be the actual content of the Web, user access logs and records of user preferences. To support the processing of such large datasets we will study the potential of parallel and distributed computing models and new approaches to software design.

Adaptation of Access to Information and Knowledge Artifacts Based on Interaction and Collaboration within Web (VEGA, 1/0646/15) (M. Bieliková), Duration: 2015 – 2018

During common use of Web (searching, learning and task solving), users are confronted with problems of information overload, loss in information space and insufficient collaboration support. These problems are not novel and were addressed in various specific domains with varying degrees of success. However, new challenges and possible solutions are opening in the form of new types of approaches for interaction of users, new means for gathering feedback and new methods to work with big data and data streams. Based on the results of our research team in this field, in this project we focus on using these means for introducing new methods for adaptation of content, navigation and form of the information space, with the goal of improving orientation and collaboration of users in the information space. We will also research options for supporting information space analysis (metadata acquisition, text analysis) and user's behaviour analysis concerning interaction with information spaces.

Virtual Learning Software Lab for Collaborative Task Solving (KEGA, 009STU-4/2014)
(M. Bieliková), Duration: 2014 – 2016

Interaction and collaboration between students and teacher and among students themselves are important elements of the learning process. Presently, the support for collaboration in learning is limited to standard communication tools such as discussion and to only some environments. The goal of the project is to extend an existing software platform for learning support with features for interaction and collaboration at the level of learning materials, task solving or question answering. The platform will not only support enhancements of learning process such as social dimension, interaction and collaboration with active features attached to learning materials (annotation of learning materials, question creation, search and evaluation of external resources suitable for learning), but will also enable working with selected features on portable devices. We evaluate the platform using existing learning materials in the domain of programming, which we will extend by new materials from software engineering domain.

Future Education and Training in Computing: How to Support Learning at Anytime Anywhere (539461-LLP-1-2013-1-BG-ERASMUS-ENW)
(D. Chudá), Duration: 2013 – 2016

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 reorganisation 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.

PARSing and Multi-word Expressions: Towards Linguistic Precision and Computational Efficiency in Natural Language Processing (COST Action IC 1207) (M. Šimko),
Duration: 2014 – 2017

The general aim of PARSEME is increasing and enhancing the ICT support of the European multilingual heritage. This aim is pursued via more detailed objectives: (outreach) to put multilingualism in focus of linguistic and technological studies, (networking) to establish a long-lasting cross-lingual, cross-theoretical and cross-methodological research network in natural language processing (NLP), (scientific) to bridge the gap between linguistic precision and computational efficiency in NLP applications.

Semantic Keyword-based Search on Structured Data Sources (COST Action IC 1302)
(M. Bieliková), Duration: 2014 – 2017

The main objective of the Action is complemented by the following secondary objectives: Promote the development of novel techniques for keyword-based search over structured data sources. Facilitate the transfer of knowledge and technology to the scientific community, practitioners and the enterprises. Build a critical mass of research activities and outcomes that achieve the sustainability of the research themes beyond the Action.

Innovative teaching curricula, methods and infrastructures for computer science and software engineering (SCOPES) (M. Bieliková),
Duration: 2015 – 2018

The main goal of the project is to innovate the teaching infrastructures at partner institutions based on the knowledge and experience of individual partners acquired mostly by the research activities. This goal will be achieved by transferring and integrating content, best practices, methods and existing learning support research infrastructure in the context of selected computer science and software engineering courses. In this project we aim to transfer our know-how embedded in several learning support software systems, and also build a long-term research cooperation through the integration and cross-utilization of these systems, which serve as working prototypes in research activities in domain of personalized learning. In particular, we include learning support systems that enable interactive lectures that improve focus and engagement of students as well as increase teacher awareness

of student progress; automatic assessment systems that enable thorough testing and feedback on student's solutions, and social support systems that enable increased engagement of students with teachers and more in-depth communication. We aim to innovate: teaching methods, material and content used in selected computer science and software engineering courses and transfer best practices in the software infrastructures used at each partner institution. We focus on thematically common courses for programming and software development offered at each institution: introductory programming and programming fundamentals courses, and software and/or web engineering courses.

HoloBanking (Tatrabanka Foundation, 2015et07) (J. Vincúr, M. Konôpka), Duration: 2016

The HoloBanking project explores the whole new dimension in the online banking with the latest, generally available, technologies for experiencing mixed and virtual reality. We see true potential in these devices to seamlessly integrate online banking with reality and to let us to break away from the limitations of the web which is currently used as a medium for that. Simplifying financial operations with virtual objects instead of amounts of long numbers and codes alleviates client‘s concerns about correctness and validity of the operation. Moreover, since the mixed or virtual reality is projected onto glasses which only the client wears, no other person may see what the client sees, it eliminates client’s privacy concerns when operating a bank account.

IndoorNav (Tatrabanka Foundation, 2015et09) (A. Kovárová-Martonová), Duration: 2016

The goal of the IndoorNav project was to create a prototype (with small supporting apps), which will help users to localize and navigate themselves in a building and in the same time provide many other contextual information. This may be a building of shopping centers, hospitals, offices, business centers, museums, exhibitions, Zoo, hotels, universities or any other building or space consisting of buildings. During earlier prototype development (for our building FIIT STU), we had identified key areas that needed to be resolved and which was set as priorities for this project: (i) prototype has to be easily and quickly transferred to another building (portability) (ii) localization of a user in a building has to have lower error (accuracy) (iii) prototype has to be useful not only for healthy people but also affected, such as physically or visually (for disabled) (iv) prototype has to be easily deployed (deployability).

IX. RESEARCH LABORATORIES

Networks Technology Laboratory I (P. Trúchly)
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 (P. Trúchly)
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 wire-less access points, wireless network cards are available and necessary software tools.

Embedded Systems Laboratory (T. Krajčovič)
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 softcore processors, including real-time applications. It contains specialized equipment, such as development kits based on monolitic 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. The latest specialized equipment has been obtained withing the University Scientific Park project.

Communication Technologies Laboratory (I. Kotuliak)

The research 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. The specialized laboratory equipment has been procured in the frame of the University Scientific Park project.

Digital Systems Design Laboratory (K. Jelemenská)

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.

FIIT – Molpir, Ltd. Laboratory (P. Pištek)

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.

Grid Computing Laboratory (L. Hudec)

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, frontend server with UPS, Globus Toolkit software and VMWare software. The second part is production grid equipped 40 CPUs, 1Gb network connection, frontend 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 Graphics, Vision and Interaction (V. Benešová)

Augmented reality module provides a variety of devices for the research of augmented reality: AR glasses, AR interactive holographic foil, etc. Virtual reality module includes VR glasses, multiple projection for the simulation of immersive VR. Computer vision module includes high-resolution and high-speed cameras, eye tracker glasses, colorimetric devices etc. Computer graphics module offers the possibility of powerful GPU computing. Interaction module consist of several interaction devices like 3D mouse, Leap sensor etc.

Siemens Research Laboratory (V. Benešová)

Siemens research laboratory is a centre of the research of computer vision methods in the area of medical imaging applications. The main focuses of the research in the laboratory are methods of

segmentation in the 3D visual medical data data (CT, MRI). Laboratory equipment consists mainly of powerful PCs.

ESET Research Centre (L. Hudec)
The ESET Reaseach Centre is a joint project of ESET Ltd company, Slovak University of Technology and Comenius University. Common workplace allows closer links between university and industry and brings to university interesting problems and allows to create conditions (material, technical, know-how, personnel) for problems solu-tion. Centre differs from others labs in a way that it does not offer only technical equipment, but also know-how in the form of specialized teaching modules. Alongside with lectures Eset will also provide guidance of exercices and consultations. In addition to lectures joint workplace develops other forms of cooperation - experts from ESET, STU and UK lead jointly diploma and bachelor thesis. In the ESET Research Centre Lab the 12 workstations for students, one teacher's workstation, server, and Internet connection is installed. On workstations Windows operating system with applications for carrying out a reverse engineering (machine code analysis) is installed.

Intelligent Systems Laboratory (P. Návrat)
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.

3D UML Laboratory (I. Polášek)
The laboratory is used for research in the area of UML modeling using multidimensional space to support analysis and design of the large software systems. The laboratory is equipped with new powerful computer system and various I/O devices (leap motion, 3D mouse SpaceNavigator and 3 interconnected 3D monitors). Many students in their bachelor, team and diploma projects help us create first prototypes. In the next period, research projects will make use of the facilities available in the laboratory. Collaboration with other research teams with similar laboratories is also envisaged. We shall also seek collaboration with companies from IT sector for validation and deployment our prototypes. We plan to create a working prototype of a CASE system to support the development of software products using 3D UML and offer it to the partners and IT companies.

User Experience and Interaction Research Center (M. Bieliková)
User Experience and Interaction Research Center consists of two labs:
1) Engelbarts's Laboratory of User Experience Research (nicknamed UX Lab). Named after Douglas Engelbart, the creator of a first computer mouse, the lab is primarily focused on detailed monitoring of behaviour of an individual computer user. It is ideal for qualitative user studies. The highly precise sensors, devices and software in the lab are suitable for investigation, what experience the user has, when he interacts with given applications, performs given tasks or even spends his leisure time. The sensors not only track the user's gaze, but also expression of his face, physiology and neuroelectrical activity. The lab consists of multiple rooms connected with semi-transparent glass, which enables observation of the experiment participant's behaviour without disturbances.
2) Simon's Laboratory of personalized learning (nicknamed UX Group). Named after Nobel Prize laureate Herbert A. Simon, the classroom-style lab is designed for simultaneous monitoring of behaviour of groups of users. It especially enables largerscaled quantitative user studies. It comprises twenty workstations, each equipped with an eye-tracker and a depth camera. All workstations are connected to a single information system, which is capable of real-time transfer of all necessary data to central storage, from where they can be further analysed.

X. MEMBERSHIP

Slovak Professional Organisations and Societies
The whole institute is a collective member of Slovak Artificial Intelligence Society.

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

Vanda Benešová
- SUXA- Slovak User Wxperience Association

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

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

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

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)

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

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

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

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

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

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

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

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

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

Mária Lucká
- Slovak Society for Computer Science (member, since 2012)
- Slovakia Chapter of the Association for Computing Machinery (member)
- Slovak Association of Mathematicians and Physicists (member)

Alena Martonová
- Slovakia Chapter of the Association for Computing Machinery (member)
- SUXA- Slovak User Wxperience Association

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

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

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

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

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

International Professional Organisations and Societies

Vanda Benešová
- ACM, Association for Computing Machinery (member, since 2013)
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2013
- IFIP, International Federation for Data Processing (member of Technical Committee TC13 – Human-Computer Interaction)

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)
- Data and Knowledgy – Annual Conference, standing Steering Committee
- 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 Čerňanský
- INNS, International Neural Network Society Society (member, since 2006)

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)

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

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

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

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

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

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

Michal Kompan
- ACM, Association for Computing Machinery (member)

Martin Konôpka
- ACM, Association for Computing Machinery (member)

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

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)

Mária Lucká
- IEEE, Institute of Electrical and Electronic Engineers (member, since 2008)
- ACM, Association for Computing Machinery (member)

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

Alena Martonová
- ACM, Association for Computing Machinery (member)

Ľudovít Molnár
- IEEE, Institute of Electrical and Electronic Engineers (member, since 1991)
- ACM, Association for Computing Machinery (member, since 1991)
- UNESCO (Slovak Commission: member of bureau –1993-96, chair – since 1996, Informatics section – chair since1993. HQ Paris: IIP – member of bureau –1996-98, chair – 1998-2001, IFAP – member of bureau – since 2001. Executive Board – member – since 2001)
- ICETA, member of honorary committee

Pavol Návrat
- 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)
- IFIP, International Federation for Data Processing (member of Technical Committee TC8 – Information Systems, since 2012)

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

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

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STU
SLOVAK UNIVERSITY OF
TECHNOLOGY IN BRATISLAVA

FIIT PERSONNEL

Institute of Computer Engineering and Applied Informatics

Administrative department
Šípková, Tatiana
Flochová, Jana, Ing. PhD.

Teachers
Benešová, Vanda, doc. Ing. PhD.
Čerňanský, Michal, doc. Ing. PhD. (part-time)
Čičák, Pavel, doc. Ing. PhD.
Drahoš, Peter, Ing. PhD.
Drnajová, Barbara, Mgr.
Flochová Jana, Ing. PhD. (part-time)
Gramatová, Elena, doc. RNDr. PhD. (part-time)
Hudec, Ján, Ing. PhD.
Hudec, Ladislav, doc. Ing. PhD.
Jelemenská, Katarína, Ing. PhD.
Kapec, Peter, Ing. PhD.
Kotočová, Margaréta, doc. Ing. CSc. (part-time, till August)
Kotuliak, Ivan, doc. Ing. PhD.
Kováčik, Tomáš, Ing. PhD. (till July)
Krajčovič, Tibor, doc. Ing. PhD.
Krištofík, Štefan, Ing. (part-time)
Macko, Dominik, Ing.
Pištek, Peter, Ing. PhD.
Solčány, Viliam, Ing. PhD. (part-time)
Trúchly, Peter, Ing. PhD.

Researchers
Bernát, Dušan, Ing.
Pavol Helebrandt, Ing. PhD.

Collaborators
Andraško, Jozef, Ing.
Arbet, Daniel, Ing. PhD.
Buzová, Katarína, Mgr. PhD.
Clementis, Ladislav, Ing.
Čechvala, Martin, Ing.
Daňko, Martin, Mgr. PhD.
Garaj, Michael, Ing.
Kvasnička, Vladimír, prof. Ing. DrSc.
Markošová, Mária, doc. RNDr. PhD.
Melišová, Jana, Mgr.
Munka, Juraj, PaedDr.
Obetko, Jakub, Ing.
Pšeneková, Judita, Mgr.
Rošková, Barbora, Mgr.
Rybárová, Viera, Mgr. CSc.
Stopjaková, Viera, prof. Ing. PhD.
Vilhan, Peter, Ing. PhD.

Doctoral students
Balažia, Ján, Ing.
Bencel, Rastislav, Ing.
Binder, Andrej, Ing.
Boroš, Tomáš, Ing.
Filipek, Jozef, Ing.
Galinski, Marek, Ing.
Grežo, Rudolf, Ing.
Halagan, Tomáš, Ing.
Helebrandt, Pavol, Ing.
Hucková, Ivana, Ing.
Jakab, Marek, Ing.
Kudlačák, Michal, Ing.
Kunštár, Vladimír, Ing.
Lampe, Georg Sven
Laštinec, Ján, Ing.
Lúčanský Ján, Ing.
Mohammed, Ishaque
Muhammad, Emran
Nagy, Martin, Ing.
Perešíni, Ondrej, Ing.
Polatsek, Patrik, Ing.
Roštecký, Richard, Ing.
Šubín, Juraj, Ing.
Šulák, Viktor, Ing.
Tamajka Martin, Ing.
Turský, Lukáš, Ing.
Valiček Michal, Ing.
Vojtko, Martin, Ing.
Zafarabadi Pouria, M.Sc.

Institute of Informatics, Information Systems and Software Engineering

Administrative department
Džupinová, Eva, Mgr. PhD.
Jančaťová, Ľubica, Mgr.
Macková, Zuzana

Teachers
Andrejčíková, Nadežda, Ing. PhD. (part-time)
Barla, Michal, Ing. PhD. (part-time)
Bieliková, Mária, prof. Ing. PhD.
Bou Ezzeddine, Anna, RNDr. PhD.
Grmanová, Gabriela, Mgr. PhD.
Chudá, Daniela, doc. Mgr. PhD.
Kapustík, Ivan, Ing.
Kompan, Michal, Ing. PhD.
Kuric, Eduard, Ing. PhD.
Labaj, Martin, Ing. (till June)
Lacko, Peter, Ing. PhD.
Lang, Ján, Ing. PhD.

Lekavý, Marián, Ing. PhD. (part-time)
Lucká, Mária, doc. RNDr. PhD.
Martonová, Alena, Mgr. PhD.
Móro, Róbert, Ing. PhD. (part-time)
Návrat, Pavol, prof. Ing. PhD.
Polášek, Ivan, Ing. PhD.
Považanová, Anna, Ing. (part-time)
Rástočný, Karol, Ing. PhD.
Rozinajová, Viera, doc. Ing. PhD.
Srba, Ivan, Ing. PhD. (since September)
Šajgalík, Márius, Ing. PhD.
Šimko, Jakub, Ing. PhD.
Šimko, Marián, Ing. PhD.
Tvarožek, Jozef, Mgr. PhD.
Vranić, Valentino, doc. Ing. PhD.

Researchers
Demčák, Peter, Ing.
Ševcech, Jakub, Ing. PhD. (since December)

Collaborators
Babincová, Danka, PhDr.
Bartošovič, Lukáš, Mgr.
Bečka, Martin, Mgr. PhD.
Bieliková, Barbora, Mgr.
Blahušiak, Pavol, Mgr.
Böhm, Radoslav, RNDr. PhD.
Ciglan, Marek, RNDr. PhD.
Černý, Vladimír, doc. RNDr. CSc.
Čipková, Karla, RNDr. PhD.
Erdélyiová Gancárová, Martina, Mgr.
Frič, Pavol, Ing. PhD.
Furková, Andrea, Ing. PhD.
Gergelová, Bianka, Mgr.
Grisáková, Nora, Ing. PhD.
Grošek, Otokar, prof. RNDr. PhD.
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Holub, Michal, Ing.
Hošková, Dominika, Ing.
Kloska, Matej, Ing.
Jakubík, Jaroslav, Ing. PhD.
Krajčovič, Dušan, RNDr. CSc.
Královič, Rastislav, doc. RNDr.PhD.
Kramár, Tomáš, Ing. PhD.
Krammer, Peter, Ing.
Kučečka, Tomáš, Ing.
Labaj, Martin, Ing.
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Major, Marián, Ing.
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Moravcsík, Attila, Mgr.
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Zelenka, Ján, Ing. PhD.
Žilka, Tomáš, Mgr.
Žilková, Viktória, Mgr.

Doctoral students
Blšták, Miroslav, Ing.
Burda, Kamil, Ing.
Bystrický, Michal, Ing.
Frťala, Tomáš, Ing.
Gašpar, Peter, Ing.
Hlaváč, Patrik, Ing.
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Šifra, Matej

Center of Information and Library Services
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Rendeková, Gabriela
Zemešová, Mária

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Kirová, Mariana
Kitanovicsová, Miriam
Lakušová, Anna
Mišíková, Zuzana
Sabová, Erika
Šelmeciová, Mária

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Schrammová, Oľga, Ing.
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Mršková, Katarína, RNDr. PhD.
Reis, Martina, Ing.

Secretariat
Dodrvová, Lucia, RNDr.
Kozíková, Zuzana, Mgr.

Study Affairs
Horniaková, Zuzana, Mgr.
Husková, Ľubica
Krištofová, Jarmila, Mgr.
Tekulová, Zuzana, Mgr.
Výbohová, Andrea, Ing.

Center of Industry Research
Rošková, Barbora, Mgr.
Slezáková Miroslava, Mgr.
Varga, Peter, MBA

Center of Further Learning
Čičák, Pavel, prof. Ing. PhD.
Lúčanský, Ján, Ing.

Department of Technical Operation and Management
Balšan, Viliam
Blažková, Katarína
Borsová, Diana
Dúbravský, Jozef, Ing. PhD.
Dudák, Vladimír
Figura, Zdenko
Glaczynská, Helena
Glaczynský, Emil
Hlávková, Eva
Chrenko, Imrich
Ivaneková, Verona
Jankovich, Alojz
Kováč, Peter, Ing.
Lešková, Lýdia
Matejka, Pavol
Mišíková, Jana
Molnár, Oto
Orlovský, František
Potančok, Milan, Ing. Mgr. PhD.
Špička, Ján, Ing.
Toman, Ladislav
Vašinová, Daniela

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