

**Faculty of Informatics
and Information Technologies**

www.fiit.stuba.sk

ANNUAL REPORT 2017

© 2018, Mária Bieliková, Pavel Čičák, Daniela Chudá, Ladislav Hudec,
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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 the places where the best IT specialists rise. We are proud of this. Even though the shortness of IT specialists originated a big discrepancy also in academic staff, we as one of the best IT faculties in Slovakia work on our continual improvement. This results in attracting the best secondary school students to become FIIT students and the best IT specialists to become FIIT part of the academic staff: teachers and researchers.

One of the most important results of the year 2017 was successful international accreditation by the Institution of Engineering and Technology (IET) for all bachelor and master study programmes for next five years. The IET and Engineering Council UK databases were updated to reflect the accreditation status of all FIIT study programmes. The decision on accreditation was preceded by preparing all required documentation, hours of discussion on the processes and the accreditation panel visit, which took place in September 2017. The Panel highlighted a number of commendable aspects in the programmes,

in particular the high level of industrial collaboration, the annual student research conference, communication with students including the Askalot online question answering system.

Our research was continually influenced by rapid changes in the world. Last years we strengthened our activities in the fields of artificial intelligence and security and safety along with software engineering, computer engineering, computer science and information systems. We reflected this advancement also in education. In 2017 we have prepared several new study courses specialized to information security and artificial intelligence. Moreover, we have started new master study programme Intelligent Software Systems in Software Engineering (major) and Artificial Intelligence (minor) fields.

In 2017 we submitted 17 project proposals (APVV, VEGA, KEGA, H2020, COST, Eurostars). 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.

As we well remember, the year 2016 was a year when important changes in the faculty organizational structure were provided including establishing the Center for Industrial Research. Research supported by industry primarily executes in research labs (e.g., ESET lab, Siemens lab, Molpir lab, User Experience and Interaction Lab, Embedded Systems Lab or Computer Networks Lab). In year 2017 we continued in developing and applying the new strategy for collaboration academia and industry established in 2016. This endeavor resulted into further increase of FIIT and industry collaboration. We have now industry partners on various levels of intensity including two platinum (AT&T, Eset), five gold (Accenture, Asseco, ČSOB, Softec, Unicorn) and four silver partnerships (Continental, Exponea, QBSW, Tempest) and several more supporters. Ethic codex of academia industry collaboration was stated. We continued in 2017 with CISCO Academy, which is part of the Center for Further Education.

In year 2017 we continued also our efforts in improvements of our environment, and our building in particular. Our building now serves along its primary educational purpose also for the community meeting purposes including various workshops serving for developing new skills in changing technologies. In 2017 we covered 51 external events primarily specialized to informatics and information technologies, among them well known events such as Night of Chances, Y-Games, Pycon, Junior Internet, Softecon, Dev Days – MS Fest, Openslava or ReactiveConf.

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. This is exponentiated by still increasing number of young leaving Slovakia for study abroad, especially in Czech Republic where they can study in similar culture and in home language (Slovak). We devote a lot of effort to present our university and faculty as quality institution and also to help applicants to make right 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 and quality of applicants. 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

Juraj Petrík

Secretary of the Academic Senate

Viera Danišová

Members

Anna Bou Ezzeddine, PhD. (since October 2017)

Vanda Benešová, PhD. (till October 2017)

Peter Kapec, PhD.

Alena Martonová, PhD. (till October 2017)

Ivan Kotuliak, Assoc. Professor (since October 2017)

Peter Lacko, PhD.

Jakub Šimko, PhD.

Peter Trúchly, PhD.

Jozef Tvarožek, PhD.

Valentino Vranić, Assoc. Professor

Members of the student section

Peter Bakonyi (since September 2017)

Lukáš Csóka (till September 2017)

Marek Galinski

Gabriela Hózová (since December 2017)

Juraj Petrík (till December 2017)

Ľubomír Fischer

Activities of the Academic Senate

The Academic Senate of the Faculty of Informatics and Information Technologies in 2017

- 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 Pišteň, PhD.



Pavol Návrät, Professor



Viera Rozinajová, Assoc. Professor



Marián Šimko, PhD.

Dean and Vice-Deans

Dean

Mária Bieliková, Professor

Vice-Deans

Human Resources and International Cooperation

Pavol Návrät, 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 Pišteň, 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 Návrät, 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 Návrät, Professor

Miloš Oravec, Professor

Gregor Rozinaj, Assoc. Professor

Viera Rozinajová, Assoc. Professor

Valentino Vranič, 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 Tvrđík, 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 2017:

- 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 2017/18 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 (till June 2017)

Veronika Žatková – bachelor degree programme

Martin Janík – master degree programme (till January 2017)

Marko Ondruš – master degree programme (from January 2017)

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 they concentrate mostly on the following domains: computer architecture, distributed systems and computer networks, digital and embedded systems design, cyber security, 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 Návrát, Professor

e-mail: pavol.navrat@stuba.sk

Deputy Director:

Peter Lacko, PhD.

e-mail: peter.lacko@stuba.sk

Alena Martonová (Kovářová), PhD.

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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 Information Technologies in the range of its competencies, in areas bounded by and related to informatics, information systems and software engineering. Among the related areas, it is oriented especially to artificial intelligence in research of knowledge approaches in solving problems of informatics, information systems and software engineering, and to information systems respecting their close relation to typical problem domains in software engineering.

Within the mission, the institute especially

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

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

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

- 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 Intelligence 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 Information Technologies provides the following services for educational and research purposes at FIIT STU:

- functioning of the faculty central servers and services,
- functioning of the faculty system and network infrastructure,
- functioning of the 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 faculty audio and video systems,
- functioning of the camera security system,
- functioning of the access and attendance system,
- functioning of the IP telephony system.

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 Internet through the SANET (Slovak Academic Network) 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 facilities consists of approximately 230 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 has been 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 as well 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 Technolo-

gies 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
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. Several research labs operate within the Center of Industrial Research:

- Eset Lab
- Siemens Lab
- Molpir Lab
- UXI Research Center

STUDY

I. UNDERGRADUATE STUDY (Bc)

In the academic year 2016/17 three 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.

Information security

The study programme leads to a complete undergraduate level university education in Informatics/Computer Science with a narrower specialization in information security in an engineering profession oriented chiefly to information and software systems. The graduate will acquire deep knowledge from theoretical foundations of Computer Science and information security, security of information technologies and their management, analysis and design of software systems and their management, and architecture and organization of computer systems and networks and web technologies. The graduate is able from the topic of information security view 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 and secure information technologies designer, programmer or maintenance specialist of secure 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 Engineering. 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 2017 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*: Michal Hucko, Branislav Pecher
- *"Magna cum laude"*: Michal Hucko, Michal Kováčik, Branislav Pecher
- *"Cum laude"*: Michal Dolnák, Martin Fukas, Martin Gulis, Nikolas Janec, Jakub Janeček, Jakub Kazimír, Vladimír Kuchár, Karol Marso, Ondrej Selecký, Elena Štefancová, Peter Tibenský, Andrej Vitek
- *Dean's Award for Excellent Bachelor Thesis*: Martin Gulis, Michal Kováčik, Karol Marso
- *Dean's Commendatory Letter for Bachelor Thesis*: Peter Babinec, Peter Berta, Martin Fukas, Martin Hauskrecht, Martin Hoang, Jakub Hučko, Jakub Janeček, Kristián Koník, Tomáš Koreň, Jaroslav Lišiak, Jozef Mláka, Daniel Nechala, Marko Ondruš, Mária

Paulíčková, Ondrej Selecký, Michal Staškovan, Adam Strásky, Michal Škuta, Elena Štefancová, Peter Tibenský

II. MASTER STUDY (Ing)

In the academic year 2016/2017, FIIT STU offered two accredited study programmes with regular length two or three years¹:

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, 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 to 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 2017.

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

- *Rector's Award*: Tomáš Chovaňák, Tomáš Farkaš
- *"Magna cum laude"*: Tomáš Chovaňák, Tomáš Farkaš
- *"Cum laude"*: Martin Baňas, Mário Csaplár, Róbert Cuprik, Peter Dubec, Michal Farkaš, Adrián Huňa, Filip Jurčacko, Jakub Mačina, Lukáš Samuel Marták, Aleš Mäsiar, Lukáš Miškovský, Pavel Sluka, Peter Vrana, Jakub Benjamín Vrba
- *Dean's Award for Excellent Master Thesis*: Róbert Cuprik, Peter Dubec, Michal Farkaš
- *Dean's Commendatory Letter for Master Thesis*: Róbert Birkus, Mário Csaplár, Lukáš Doubravský, Tomáš Hermánek, Lukáš Hudec, Adrián Huňa, Samuel Pecár, Pavel Sluka, Monika Sanyová, Katarína Szakszová

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 2017 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

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

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.

Intelligent Information Systems

Doctoral studies in Intelligent Information Systems lead towards highest university education in the area of Computing and Information Tech-

nologies particularly in the field of Intelligent Information Systems, dealing with analysing, designing, developing and maintaining large software systems. The study programme Intelligent 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 students (B* – bachelor programmes, I* – master programmes, PhD – doctoral students).

	2013/14	2014/15	2015/16	2016/17	2017/18
B-IB3	-	-	-	22	37
B-IB4	-	-	-	16	20
B-INFO3	577	607	620	560	462
B-INFO4	145	208	199	195	154
B-IT3 (B-PKSS3)	179	164	124	99	71
B-IT4 (B-PKSS4)	61	32	51	46	23
I-IS2	95	143	156	156	89
I-IS3	3	4	1	2	
I-IIS2	-	-	-	-	143
I-ISS3	-	-	-	-	-
I-IT2	72	73	51	-	50
I-IT3	2	1	1	-	-
I-SI2	115	74	117	141	66
I-SI3	-	1	1	4	-
PhD	49	52	47	46	39
Sum	1298	1359	1368	1287	1154

Numbers of students in all studies.

	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
Bachelor study	962	1011	994	938	767
Master study	287	296	327	303	348
Doctoral study	57	52	47	46	39
Sum	1306	1359	1368	1287	1154

IV. STUDENT CONFERENCES AND COMPETITIONS

The Faculty organised and supported in 2017 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 2017

- 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

- Jakub Mačina – 2nd place with diploma project Recommendation of New Questions in Online Student Communities. (supervised by I. Srba)

TP Cup

- Best Team of the year 2017 winners: Matej Červenka, Mária Dragúňová, Ondrej Kudláč, Matúš Salát, Martin Šidlo, Lukáš Šimek: SmartStore (supervisor P. Krátky)

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 towards 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 experiments in the domain of energy and with datasets generated in bioinformatics research. In 2017, we started to work on common research project with Technical University Košice "Knowledge-based Approach to Intelligent Big Data Analysis" (APVV-16-0213).

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] ROZINAJOVÁ, Viera - MACKO, Peter. Using Natural Language to Search Linked Data. In *Semantic Keyword-Based Search on Structured Data Sources, COST Action IC1302 Second International KEYSTONE Conference, IKC 2016*, Cluj-Napoca, Romania, September 8–9, 2016, Revised Selected Papers, proceedings. 1. vyd. Cham : Springer, 2017, pp. 179-189.
- [2] VRABLECOVÁ, Petra - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna. Incremental Adaptive Time Series Prediction for Power Demand Forecasting. In *DMBD 2017. Data Mining and Big Data Second International Conference, DMBD 2017*, Fukuoka, Japan, July 27 – August 1, 2017, Proceedings. 1. vyd. Cham : Springer, 2017, pp. 83-92.
- [3] LOEBL, Jaroslav - POSCH, Helmut - ROZINAJOVÁ, Viera. Multi-objective Optimization for Power Load Recommendation Considering User's Comfort. In *DARE 2017, 5th ECML PKDD Workshop, DARE 2017*, Skopje, Macedonia, September 22, 2017, Revised Selected Papers. 1. vyd. Cham : Springer, 2017, pp. 26-32.
- [4] BLŠTÁK, Miroslav - ROZINAJOVÁ, Viera. Machine Learning Approach to the Process of Question Generation. In *TSD 2017, 20th International Conference, Text, Speech and Dialogue 2017*, Springer, 2017, pp. 102-110.
- [5] 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.
- [6] 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.
- [7] 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.
- [8] 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.
- [9] 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.
- [10] 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.
- [11] 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.
- [12] SRBA, Ivan - BIELIKOVÁ, Mária. Why is Stack Overflow Failing? Preserving Sustainability in Community Question Answering. In *IEEE Software*. Vol. 33, no. 4 (2016), pp. 80-89.
- [13] ŠEVCECH, Jakub - BIELIKOVÁ, Mária. Repeating Patterns as Symbols for Long Time Series Representation. In *Journal of Systems and Software*. Vol. 127, (2017), pp. 179-194.

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)

- 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] DRAGÚŇOVÁ, Mária - MÓRO, Róbert - BIELIKOVÁ, Mária. Measuring Visual Search Ability on the Web. In *ACM IUI 2017*, Companion Proceedings of IUI '17 Companion the 22nd International Conference on Intelligent User Interfaces. New York: ACM, 2017, pp. 97-100.
- [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] GAŠPAR, Peter. User Preferences Analysis Using Visual Stimuli. In *RecSys 2017*, Proceedings of the Eleventh ACM Conference on Recommender Systems, New York: ACM, 2017, pp. 436-440.
- [4] GONDOVÁ, Veronika - LABAJ, Martin - BIELIKOVÁ, Mária. Personalized Rooms Based Recommendation as a Mean for Increasing Students' Activity. In *Adaptive and Adaptable Learning. EC-TEL 2016*, Lecture Notes in Computer Science, Vol. 9891, Springer, 2016, pp. 591-594.

- [5] [5] HLAVÁČ, Patrik - ŠIMKO, Marián. Detecting Genuinely Read Parts of Web Documents. In *SMAP 2017*. Proceedings 12th international workshop on semantic and social media adaptation and personalization, July 9-10, 2017 IEEE, 2017, pp. 6-11.
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- [7] JUHANIÁK, 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.
- [8] 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.
- [9] 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.
- [10] 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.
- [11] 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 Companion. ACM, 2016, pp. 61-62.
- [12] 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.
- [13] KRCHŇAVÝ, Rastislav - ŠIMKO, Marián. Sentiment Analysis of Social Network Posts in Slovak Language. In *SMAP 2017*. Proceedings 12th international workshop on semantic and social media adaptation and personalization, IEEE, 2017, pp. 20-25.
- [14] MAČINA, Jakub - SRBA, Ivan - WILLIAMS, Joseph Jay - BIELIKOVÁ, Mária. Educational Question Routing in Online Student Communities. In *RecSys 2017*. Proceedings of the Eleventh ACM Conference on Recommender Systems, New York: ACM, 2017, pp. 47-55.
- [15] BERGER, Patrik - BIELIKOVÁ, Mária. Towards Adaptive Brain-computer Interfaces: Improving Accuracy of Detection of Event-related Potentials. In *SMAP 2017*. Proceedings 12th international workshop on semantic and social media adaptation and personalization, IEEE, 2017, pp. 34-39.
- [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] ŠAJGALÍK, Márius - BARLA, Michal - BIELIKOVÁ, Mária. Searching for Discriminative Words in Multidimensional Continuous Feature Space. *Computer Speech and Language*. (October 2017, accepted for publication). <https://doi.org/10.1016/j.csl.2017.10.002>
- [18] TRIGLIANOS, Vasilejos - LABAJ, Martin - MÓRO, Róbert - ŠIMKO, Jakub - HUCKO, Michal - TVAROŽEK, Jozef - PAUTASSO, Cesare - BIELIKOVÁ, Mária. Experiences Using an Interactive Presentation Platform in a Functional and Logic Programming Course. In *UMAP 2017: Adjunct Publication of the 25th Conference on User Modeling, Adaptation and Personalization*. New York: ACM, 2017, pp. 311-316.
- [19] 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.
- [20] 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.
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- [22] 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.

Martonová (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*. Proc. of the 17th International Conference on Computer Systems and Technologies 2016, ACM, 2016, pp. 269-276.
- [2] KRÁTKY, Peter - REPISKÝ, Tomáš - CHUDÁ, Daniela. Is the Visitor Reading or Navigating? In

CompSysTech'17. Proceedings of the 18th International Conference on Computer Systems and Technologies, University of Ruse, Bulgaria. 1. vyd. New York : ACM, 2017, pp. 80-87.

- [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.
- [7] KRÁTKY, Peter - CHUDÁ, Daniela. Recognition of web users with the aid of biometric user model. *J Intelligent Information Systems* (accepted for publication). <https://doi.org/10.1007/s10844-018-0500-0>.

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, Poland

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] BLŠTÁK, Miroslav - ROZINAJOVÁ, Viera. Machine Learning Approach to the Process of Question Generation. In TSD 2017, 20th International Conference, Text, Speech and Dialogue 2017, Springer, 2017, S. 102-110.
- [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] 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.
- [4] HALAŠ, Peter - LÓDERER, Marek - ROZINAJOVÁ, Viera. Prediction of Electricity Consumption using Biologically Inspired Algorithms. In *INFORMATICS 2017. Proceedings of IEEE 14th International Scientific Conference on Informatics*, IEEE, 2017, pp. 98-103.
- [5] JARÁBEK, Tomáš - LAURINEC, Peter - LUCKÁ, Mária. Energy Load Forecast Using S2S Deep Neural Networks with k-Shape Clustering. In *INFORMATICS 2017. Proceedings of IEEE 14th International Scientific Conference on Informatics*, IEEE, 2017, pp. 140-145.
- [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, DC, 2016, Proceedings. 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] LACKO, Peter. From perceptrons to deep neural networks. In *SAMI 2017: IEEE 15th International Symposium on Applied Machine Intelligence and Informatics*, IEEE, 2017, pp. 169-172.
- [10] 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.
- [11] 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.
- [12] ŠAJGALÍK, Mária - BARLA, Michal - BIELIKOVÁ, Mária. Searching for Discriminative Words in Multidimensional Continuous Feature Space. *Computer Speech and Language*. (October 2017, accepted for publication). <https://doi.org/10.1016/j.csl.2017.10.002>
- [13] 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.
- [14] VRABLECOVÁ, Petra - ROZINAJOVÁ, Viera - BOU EZZEDDINE, Anna. Incremental Time Series Prediction Using Error-Driven Informed Adaptation. In *Proceedings 16th IEEE Int. Conference on Data Mining Workshops (ICDMW 2016)*, Barcelona, Catalonia, Spain. IEEE, 2016, pp. 414-421.

- [15] 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.

Návrát, 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] VINCÚR, Juraj - KONÔPKA, Martin - TVAROŽEK, Jozef - HOANG, Martin - NÁVRÁT, Pavol. Cubely: Virtual Reality Block-Based Programming Environment. In *Proceedings of ACM Symposium on Virtual Reality Software and Technology*, Gothenburg, Sweden, ACM, 2017. To appear.
- [2] VINCÚR, Juraj - POLÁŠEK, Ivan - NÁVRÁT, Pavol. VR City: Software Analysis in Virtual Reality Environment. In *2017 IEEE International Conference on Software Quality, Reliability and Security Companion, QRS-C 2017*. Prague, Czech Republic, IEEE, 2017.
- [3] VINCÚR, Juraj - POLÁŠEK, Ivan - NÁVRÁT, Pavol. Searching and Exploring Software Repositories in Virtual Reality. In *Proceedings of 23rd ACM Symposium on Virtual Reality Software and Technology*, Gothenburg, Sweden, ACM, 2017.
- [4] FERENC, Matej - POLÁŠEK, Ivan - VINCÚR, Juraj. Collaborative Modeling and Visualisation of Software Systems Using Multidimensional UML. In *Proceedings of 2017 IEEE Working Conference on Software Visualization, VISSOFT 2017*. Shanghai, China, IEEE, 2017.
- [5] SULAIMAN KHAIL, Waheedullah - VRANIĆ, Valentino. Treating Pattern Sublanguages as Patterns with an Application to Organizational Patterns. In *Proceedings of 22nd European Conference on Pattern Languages of Programs, EuroPLoP 2017*. Kloster Irsee in Bavaria, Germany, ACM, 2017.
- [6] BYSTRICKÝ, Michal - VRANIĆ, Valentino. Preserving Use Case Flows in Source Code: Approach, Context, and Challenges. In *Computer Science and Information Systems*. Vol. 14, no. 2 (2017), pp. 423-445. ISSN 1820-0214.
- [7] LACKO, Peter - KAJSÁ, Peter - NÁVRÁT, Pavol. Design Pattern Instances within Model Driven Development Based on Abstraction, Concretization and Variability. In *Computing and Informatics*. Vol. 36, no. 1 (2017), pp. 55-85. ISSN 1335-9150.
- [8] 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.
- [9] 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.

- [10] 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 Śmiełek), 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.

Kapac, 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. Use Case Driven Modularization as a Basis for Test Driven Modularization. In *Proceedings of 6th Workshop on Advances in Programming Languages, WAPL'17*, 2017 Federated Conference on Computer Science and Information Systems, FedCSIS 2017, September 2017, Prague, Czech Republic, IEEE Computer Society, 2017.
- [2] BERTA, Peter - KREMPASKÝ, Michal - BYSTRICKÝ, Michal - VRANIĆ, Valentino. Employing Issues and Commits for In-Code Sentence Based Use Case Identification and Remodularization. In *Proceedings of 5th European Conference on the Engineering of Computer Based Systems*, ECBS 2017, Larnaca, Cyprus, ACM, 2017.
- [3] ONDÍK, Jakub - OLEJÁR, Martin - RÁSTOČNÝ, Karol - BIELIKOVÁ, Mária. Activity-based Model Synchronization and Defects Detection for Small Teams. In *Proceedings of IEEE International Conference on Software Quality, Reliability and Security, QRS 2017*, Prague, IEEE, 2017.
- [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] BYSTRICKÝ, Michal - VRANIĆ, Valentino. Development Environment for Literal Inter-Language Use Case Driven Modularization. In *MODULARITY Companion 2016*, Companion Proceedings of the 15th International Conference on Modularity, Modularity 2016, Modularity 2016 Demos & Posters, Málaga, Spain, ACM.

- [6] BYSTRICKÝ, Michal - VRANIČ, Valentino. Literal Inter-Language Use Case Driven Modularization. In *MODULARITY Companion 2016*, Companion Proceedings of the 15th International Conference on Modularity, Modularity 2016, LaMOD'16: Language Modularity A La Mode, workshop, Málaga, Spain, ACM, 2016.
- [7] 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.
- [8] 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.
- [1] VRANIČ, 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.

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 Infnit.

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 Śmiątek), 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] KOVÁČIK, Tomáš - BENČEL, Rastislav - MAŤO, Ján - BRONIŠ, Roman - TRÚCHLY, Peter - KOTULIAK, Ivan. Enhanced Hybrid TV Platform with Multiscreen, Advanced EPG and Recommendation Enablers. In *Journal of Electrical Engineering*. Vol. 68, no. 3 (2017), pp. 224-234. ISSN 1335-3632.
- [2] 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.

- [3] VARGIC, Radoslav - KOTULIAK, Ivan - VRÁBEL, Andrej - HUSÁK, Filip. Provisioning of VoIP Services for Mobile Subscribers using WiFi Access Network. In *Telecommunication Systems*. Vol. 52, No. 3 (2013), pp.1705-1711. ISSN 1018-4864.

Selected research projects

- Methods and algorithms for improving efficiency and multimedia content delivery in IP networks (VEGA 1/0836/16) (I. Kotuliak), Duration: 2016 - 2018
- Cloud Based Human Robot Interaction (APVV-15-0731) (I. Kotuliak), Duration: 2016 - 2020

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] 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. ISBN 978-1-4503-4182-0.
- [2] 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.
- [3] 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.

Selected research projects

- Security in distributed computer systems and mobile computer networks. Grant Agency VEGA 1/0722/12
- Methods and algorithms for improving efficiency and multimedia content delivery in IP networks. Grant Agency VEGA 1/0836/16
- Secure communication in car using TCP/IP. Grant STU for young researchers, 2016

Industry collaboration

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

Academy collaboration

- Martin Danko, Faculty of Law, Comenius university in Bratislava
- Ondrej Rysavy, FIT VUT Brno, Czech republic

EMBEDDED SYSTEMS

Due to the increasing number of IoT devices and its future estimations, 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] PEREŠÍNI, Ondrej - KRAJČOVIČ, Tibor. More Efficient IoT Communication through LoRa Network with LoRa@Fiit and STIOT Protocols. In *AICT 2017*. 11th IEEE International Conference Application of Information and Communication Technologies 2017, Moscow, Russia. Conference proceedings. 1. vyd. Piscataway: IEEE, 2017, pp. 32-37.
- [2] VOJTKO, Martin – KRAJČOVIČ, Tibor. Semi-automated Process of Adaptation of Platform Dependent Parts of Embedded Operating Systems. In *Journal of Electrical Engineering*. Vol. 68 (2017), No.2, pp. 87-98. ISSN 1335-3632.
- [3] MACKO, Dominik - JELEMENSKÁ, Katarína - ČIČÁK, Pavel. Verification of Power-Management Specification at Early Stages of Power-Constrained Systems Design. In *Journal of Circuits Systems and Computers*. Vol. 26, iss. 8 (2017), [23 p.]. ISSN 0218-1266.

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] POLATSEK, Patrik - WALDNER, Manuela - VIOLA, Ivan - KAPEC, Peter - BENEŠOVÁ, Wanda. Exploring Visual Attention and Saliency Modeling for Task-based Visual Analysis. In *Computers & Graphics*, Vol. 72, 2018, pp. 26-38, ISSN 0097-8493.
<https://doi.org/10.1016/j.cag.2018.01.010>.
- [2] 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.
- [3] POLATSEK, Patrik - BENEŠOVÁ, Vanda - PALETTA, Lucas - PERKO, R. Novelty-based Spatiotemporal Saliency Detection for Prediction of Gaze in Ego-centric Video. In *IEEE Signal Processing Letters*. Vol. 23, iss. 3 (2016), pp. 394-398. ISSN 1070-9908.

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,
- ADVANSO – 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 2017, FIIT STU organised or co-organised several events aimed at exhibition of students' research

work. Above all, the most important event was the 13th Informatics and Information Technologies Students Research Conference – IIT.SRC 2017, which was held on April 27, 2017.

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 Cesare Pautasso (Faculty of Informatics, University of Lugano, Switzerland) titled: "Liquid web apps".

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

- **category of doctoral students** – Matúš Pikuliak (Transfer Learning between Languages for Sentiment Analysis, supervisor: M. Bieliková)
- **category of master students** – Tomáš Farkaš (Novel DNA Alignment-free Comparison Methods Based on Signal Processing Approaches, supervisor: M. Lucká)
- **category of bachelor students** – Veronika Búčiová (A New Scheduling Algorithm for Real-time Networks, supervisor: Lukáš Kohútka)

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

- Karol Marso (A New Parking-Space Detection System, supervisor D. Macko)
- Jakub Mačina (Recommendation of New Questions in Online Student Communities, supervisor: I. Srba)
- Adrián Huňa (Automatic Answering of Students' Questions by Using an Archive of Questions, supervisor: I. Srba)
- Lukáš Marták (Modelling Music Structure using Artificial Neural Networks, supervisor: M. Šajgalík)
- Lukáš Hudec (Automatic Segmentation and Semantic Indoor Scenes Description Using RGB-D Data, supervisor: V. Benešová)

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

- **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.

- **FiitaPixel** – photo contest best pictures exhibition,
- **JUNIOR IIT.SRC 2017**.

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 2017 Finals were organized in December 2017 in Prague. The finalists' projects were selected by the judges from the best thesis submitted by Czech and Slovak universities based on successfully defended master thesis in 2016/17.

The project

- Recommendation of New Questions in Online Student Communities by Jakub Mačina (supervisor I. Srba) won the 2nd prize

In September 2017 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 also proud of our FIIT STU student teams, which realized interesting projects. Several of them were presented in media:

- KillBills – Jakub Šimko
- Automatic Analysis of Medical Data - Martin Tamajka
- Stratospheric Sonde – Michal Valiček

III. PUBLICATIONS

Results of our research were published in 83 publications. 64 scientific contributions were published

in conference proceedings, 39 out of which were published in reviewed proceedings of international conferences. 13 scientific contributions were published in scientific journals (3 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 2017 – 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 national grant agencies (the Scientific Grant Agency of the Ministry of Education and the Slovak Academy of Sciences (VEGA) and Slovak Research and Development Agency (APVV) formed an essential form of research organisation and scientific projects funding at the FIIT STU. We have succeeded to receive also international projects in grant schemes Scopes and Cost. Our endeavour is to be successful in European research grants H2020, however, at present we just cooperate on solving H2020 project "Newton" with Faculty of Electrical Engineering and Information Technology STU.

Number of publications	UISI²	UPAI	FIIT
Books and parts of books published by international/national publisher	-/1	-/-	-/1
Scientific works published in international/ national scientific journals	2/4	2/5	4/9
Scientific works published in international conference proceedings	30	9	39
Scientific works published in national or local conference proceedings	22	3	25
Conference proceedings editors	5	0	5

Number of projects funded	UISI	UPAI
VEGA ³	3	2
KEGA	1	1
APVV	3	2
International projects	4	-
Others /Tatra banka, grants for young scientific researchers	10	4
FIIT STU	20	10

Overview of funds (in Eur)	UISI	UPAI	SUM
VEGA	33 943	15 454	49 397
KEGA	14 720	4 732	19 452
APVV	49 745	22 783	72 528
International projects	18 471	-	18 471
Others	11 530	5 000	16 530
FIIT STU	128 409	47 969	176 378

The projects are realized in our research laboratories (description can be found in the parts devoted to individual institutes). In 2017 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)
- Networks Technology Laboratory I and II (P. Trúchly)

- Laboratory of Computer Graphics, Vision and Interaction (University scientific park) (V. Benešová)
- Siemens Research Laboratory (V. Benešová)
- User Experience and Interaction Research Center (M. Bielíková)
 - 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

² UISI – Institute of Informatics, Information Systems and Software Engineering
UPAI – Institute of Computer Engineering and Applied Informatics

³ VEGA – Scientific Grant Agency of the Ministry of Education of Slovak Republic 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

I. THESES

Bachelor (Bc.) Theses

Study Programme Informatics

- *Abelovský, G.:* Processing and Prediction Tool for Network Flows. (J. Lúčanský)
- *Adamov, M.:* Animating organizational patterns. (T. Frťala)
- *Anda, T.:* Merging Duplicated Visitor Records using Biometrics. (P. Krátky)
- *Andrejkovič, I.:* Analysis of Fault Distribution Impact on RAM Repair Rate. (Š. Krištofík)
- *Babinec, P.:* Automatic Tag Recommendation in CQA Systems. (I. Srba)
- *Babula, L.:* User Modeling via Hand Gestures for User Identification. (K. Burda)
- *Bachárová, Z.:* Prediction of User's Readmission. (M. Kompan)
- *Bako, T.:* User Behavior Similarity Identification for the Task of Prediction the Session Exit. (O. Kaššák)
- *Bakonyi, P.:* Executable Data Analysis Guides. (J. Ševcech)
- *Bakoš, P.:* Household Electric Consumption Measurement. (V. Rozinajová)
- *Baláž, M.:* Test Dataset for Security Technology. (L. Hudec)
- *Baláž, M.:* Improving of a Simulated Robotic Soccer Player. (I. Kapustík)
- *Balco, K.:* Visualisation of Routing Protocols Activity in MANET Networks. (L. Hudec)
- *Bañas, M.:* Multiplayer Game Based on Eye Tracking. (J. Tvarožek)
- *Bedejová, K.:* File System for Accessing Remote Content via HTTP Protocol. (D. Bernát)
- *Beka, P.:* Determination of the Eye-catching Parts in Graphical Interfaces. (M. Šajgalík)
- *Belaj, L.:* Application for Website Usability Testing. (E. Kuric)
- *Beňo, D.:* Memory Management in Real-time Systems. (L. Kohútka)
- *Bernád, M.:* Gamification in Libraries. (N. Andrejčíková)
- *Berta, P.:* Identification of Use Cases in Source Code. (M. Bystrický)
- *Božík, T.:* Biologically Inspired Algorithms. (A. Bou Ezzeddine)
- *Brandajský, M.:* Semantic Data Processing using Machine Learning Methods. (M. Šurek)
- *Brandýs, M.:* The Security of Account, on the Basis of Control Devices. (P. Krátky)
- *Brezáni, M.:* Biologically Inspired Algorithms. (A. Bou Ezzeddine)
- *Buzássy, M.:* Opinion Diffusion on the Web. (P. Návrat)
- *Csöllei, G.:* Online Interactive Desktop. (J. Tvarožek)
- *Csupka, J.:* Improvement of Golie for Simulated Robotic Football. (I. Kapustík)
- *Cuper, M.:* Optimizing Configuration Parameters of Prediction Methods. (M. Lóderer)
- *Czaudt, D.:* Semantic Data Processing Using Methods of Machine Learning. (M. Šurek)
- *Čegiň, J.:* Advanced Testing During Software Development. (K. Rástočný)
- *Čičman, M.:* Interactive Visualisation of Graphs. (P. Kapec)
- *Čuláková, N.:* Web Site Users' Behavioral Trends Analysis. (O. Kaššák)
- *Demeter, R.:* Eye Tracking Data Visualization. (J. Šimko)
- *Dieška, M.:* Energy Consumption in Households. (N. Andrejčíková)
- *Dlhá, M.:* Mining Data from Repositories of Software Projects. (K. Rástočný)
- *Dolnák, M.:* Processing of Data from Intelligent Meters. (V. Rozinajová)
- *Dzik, M.:* Reconstruction of Text for Slovak Language. (M. Šimko)
- *Fábry, T.:* Time Series Prediction. (P. Lacko)
- *Fabušová, J.:* Visualization of Similarity. (J. Petřík)
- *Fukas, M.:* Time Series Forecasting. (P. Vrablecová)
- *Furucz, M.:* Development Environment and Virtual Reality. (J. Vincúr)
- *Gábrš, T.:* Question Generation from Educational Text. (M. Blšták)
- *Gašpar, M.:* Simulator of Formal Models of Computation. (D. Chudá)
- *Gburík, M.:* Opinion Flow on the Web. (P. Návrat)
- *Gembec, M.:* Management and Simulation of Movement of Automated Guided Vehicles in Production Halls. (Š. Krištofík)
- *Grivalský, Š.:* Natural Language Processing using Neural Networks. (M. Šajgalík)
- *Grotkovský, D.:* Web Services Publishing for the Usage in Geographic Information Systems. (M. Uhrík)

- *Gulis, M.:* Simulator of Counter Machines. (D. Chudá)
- *Halajová, M.:* Virtual Graffiti using Smartphone. (K. Burda)
- *Harvan, Š.:* Gamification in Libraries. (N. Andrejčíková)
- *Hauskrecht, M.:* Enhancement of Presentation System Features. (D. Bernát)
- *Hoang, M.:* Development Environment and Virtual Reality. (J. Vincúr)
- *Hózová, G.:* Preparation of Samples for Comparing Similarities. (J. Petřík)
- *Hrutka, M.:* Quality Prediction of Short Texts from an Interactive Web Application. (M. Barla)
- *Hucko, M.:* Analysis of Students Answers to Questions. (M. Bieliková)
- *Hučko, J.:* Analyzing Solutions of Programming Tasks. (M. Konôpka)
- *Chodorčuk, E.:* Support for Moderation of User Study. (P. Hlaváč)
- *Jakubík, M.:* Using Machine Learning for Predicting User Behaviour. (M. Kompan)
- *Janeček, J.:* Executable Documents on Data Analysis. (J. Ševcech)
- *Jasaň, J.:* Software Knowledge Linking. (V. Vranić)
- *Juhásová, N.:* Functional SBST System Testing on Chip. (J. Hudec)
- *Kačmár, D.:* Application to Support Energy Saving in Households. (V. Rozinajová)
- *Karas, M.:* Interactive Visualization of Data in Augmented Reality. (P. Kapec)
- *Kaščák, O.:* User Experience and Emotions. (R. Móro)
- *Kazimír, J.:* Time Series Prediction. (P. Lacko)
- *Kleň, J.:* Software Tool for Acquiring Forensic Evidence in the Digital Environment. (P. Pišteck)
- *Klostermann, K.:* Interactive Graph Visualization. (P. Drahoš)
- *Knapík, M.:* Automated Distribution and Testing of Software Packages. (P. Drahoš)
- *Koník, K.:* Readability Attributes of Program Code. (J. Lang)
- *Kotuláč, L.:* Enhancement of a Player of Simulated Robotic Soccer. (I. Kapustík)
- *Kováč, M.:* A Goalkeeper for Simulated Robotic Soccer. (I. Kapustík)
- *Kováčik, M.:* Innovative Application within an International Competition. (J. Šimko)
- *Krempaský, M.:* Identification of Use Cases in Source Code. (M. Bystrický)
- *Krupa, P.:* Graphic Knowledge Based Editor. (M. Holub)
- *Krupa, T.:* Visualization of Transport DVB Streams. (P. Trúchly)
- *Kubík, S.:* Web Application as a Tool for Mastering SQL Language. (M. Barla)
- *Kuchár, V.:* Application of Web 3.0 Technologies in Commercial Sphere. (M. Líška)
- *Lach, T.:* Indoor People Tracking. (A. Martonová)
- *Lam, Tuan Anh:* Support Tool for Development of Digital Electronics. (L. Kohútka)
- *Liebe, Ch.:* Search Engine Keyword Prediction based on User Needs Derived from Eye-tracking. (E. Kuric)
- *Ligárt, B.:* Attention Management. (J. Lang)
- *Loureiro, E.:* Application Supporting Usability Testing in Web Pages. (E. Kuric)
- *Lukáč, D.:* Simulator of a Technological System. (T. Krajčovič)
- *Macko, O.:* Interactive Graph Visualization. (P. Drahoš)
- *Madzik, L.:* Impact of Stress on the Model of the Biometric Characteristics of the User. (D. Chudá)
- *Machajdík, D.:* Online Support of Essay Writing. (J. Tvarožek)
- *Manduch, L.:* Active Fight against Spam. (J. Ševcech)
- *Marušin, P.:* Automated Distribution and Testing of Software Packages. (P. Drahoš)
- *Matula, M.:* Reconstruction of Text for Slovak Language. (M. Šimko)
- *Mazúr, S.:* Parallel Methods of Searching for Patterns in Large Data Files. (M. Lucká)
- *Melicherčík, J.:* Support for Moderation of User Study. (P. Hlaváč)
- *Melúch, M.:* Gaze Visualization. (R. Móro)
- *Meňhart, L.:* Visualization of User Activity in an Interactive Application. (M. Bieliková)
- *Mičo, J.:* Parallel Methods of Pattern Recognition in Big Data. (M. Lucká)
- *Mišík, D.:* Transformations of Dynamic UML Models. (I. Polášek)
- *Mláka, J.:* Innovative Application within an International Competition. (J. Šimko)
- *Mňačko, T.:* Automatic Post Stamp Recognition using Computer Vision Methods. (V. Benešová)
- *Moravčík, M.:* Spread of Opinions on Web. (A. Martonová)
- *Motko, Š.:* Visualization and Manipulation of Multiple-dimensional UML Diagrams. (I. Polášek)

- *Mrocek, F.*: Postage Stamps Recognition Application. (V. Benešová)
- *Murín, M.*: Optimization of Information System's Interface for Researchers. (A. Martonová)
- *Nagy, A.*: Application for Support Websites Usability Testing. (E. Kuric)
- *Nagy, A.*: Automatic Segmentation of Web Site Users. (M. Barla)
- *Nagy, I.*: Automatic Segmentation of Website Users. (M. Barla)
- *Nagy, M.*: Automatic Documentation Generation from Source Codes. (P. Kapec)
- *Nagy, T.*: Analysis and Method of Solving Educational Tasks. (J. Tvarožek)
- *Nechala, D.*: The Impact of Color on Visual Attention. (P. Polatsek)
- *Nemec, L.*: Energy Consumption in Households. (N. Andrejčíková)
- *Novák, D.*: Virtual Laboratory as a Form of Modern Education. (G. Rozinaj)
- *Oláh, M.*: Modeling User Behaviour in Educational CQA Systems. (I. Srba)
- *Ondrejka, P.*: Innovative Application within an International Competition. (J. Šimko)
- *Papšo, P.*: Fighting Robots. (P. Kubán)
- *Pastierovič, D.*: Generating of VHLD Model from AST Tree. (K. Jelemenská)
- *Paulen, V.*: Attention Management. (J. Lang)
- *Paulíčková, M.*: Simulator of Technological Equipment. (T. Krajčovič)
- *Pavlenko, D.*: Support of Three Dimensional Modeling in CASE Tool. (J. Lang)
- *Pazúrik, J.*: Object Recognition Using Kinect V.2. (M. Jakab)
- *Pecher, B.*: Innovative Application within an International Competition. (J. Šimko)
- *Pham, Van Nghia*: Application of Technologies of Web 3.0 in Commercial Sphere. (M. Líška)
- *Pindeš, P.*: Application Integration through Enterprise Service Bus (ESB). (M. Galajda)
- *Písecký, P.*: Battle of Robots. (P. Kubán)
- *Pitoňák, O.*: Advanced Search and Visualisation. (M. Kompan)
- *Pizner, M.*: Task Scheduling in Real-time Operating Systems. (L. Kohútka)
- *Polák, M.*: Time Series Prediction. (P. Lacko)
- *Psota, P.*: Data Analysis and Anomaly Detection. (A. Bou Ezzeddine)
- *Púčať, S.*: Goalkeeper for Simulation Robot Soccer. (I. Kapustík)
- *Puškáš, M.*: Advanced Search and Visualization. (M. Kompan)
- *Rešutík, L.*: Measuring Cognitive Load. (M. Bieliková)
- *Roba, D.*: Simulator of a Technological System. (T. Krajčovič)
- *Sabatula, S.*: Generating Source Code and XMI Files from UML 2.4 Diagrams. (I. Polášek)
- *Samotný, L.*: Creating Animations of Organizational Patterns. (T. Frála)
- *Sčensný, P.*: Interactive Visualization of Data in Augmented Reality. (P. Kapec)
- *Selecký, O.*: Medical Image Processing using Magnetic Resonance Data. (V. Benešová)
- *Selický, M.*: Cluster Analysis of Data Streams in Energetics. (P. Laurinec)
- *Schnürer, M.*: Natural Language Processing using Neural Network. (M. Šajgalík)
- *Schwarz, P.*: Generating Documentation from Source Code. (P. Drahoš)
- *Slížik, M.*: Support of Active Conceptual Modeling in Case Tool. (J. Lang)
- *Smetana, M.*: Turing Machine Simulator. (P. Kubán)
- *Staškovan, M.*: Application Supporting Energy Saving in the Household. (V. Rozinajová)
- *Súkeník, F.*: Visual Detection of Cars for Parking Areas. (V. Benešová)
- *Svítek, J.*: Question Type Classification in Educational CQA Systems. (I. Srba)
- *Ševčík, M.*: Eye Blink Detection using Webcam. (A. Fogelton)
- *Škodáček, M.*: Smart Meter Data Processing. (V. Rozinajová)
- *Škriečka, M.*: User Interface of Web Pages Automatic Testing. (P. Kianička)
- *Šlesariková, T.*: Similarity Visualisation. (J. Petřík)
- *Špuro, J. J.*: Task Management in Real-time Operating Systems. (L. Kohútka)
- *Štefanková, E.*: User Experience and Emotions. (R. Móro)
- *Štefanková, E.*: Evaluation System based on Key Performance Indicators. (J. Hudec)
- *Štefunko, L.*: Visualization of Identity Management System Configuration. (P. Mederly)
- *Števuliak, M.*: Visual Object Segmentation Utilizing Kinect V2. (M. Jakab)
- *Števuliak, M.*: Cluster Analysis of Data Streams in Energetics. (P. Laurinec)
- *Štofaňák, P.*: Localization Social Network in Mobile. (A. Martonová)
- *Tibenská, V.*: Creating Animations of Organizational Patterns. (T. Frála)
- *Tibenský, P.*: Visual Detection of Cars for Parking Lots. (V. Benešová)

- *Tomcsányiová, J.:* Learning Tool for Security Technology Network IDS. (L. Hudec)
 - *Ungerová, B.:* Graphic Knowledge based Editor. (M. Holub)
 - *Valčíčák, M.:* Support Exploring Online Conversation using Visualization. (P. Návrat)
 - *Valko, P.:* Proposal of Selected Parts of the System for Intelligent Monitoring of Bearings and Components. (L. Majer)
 - *Války, M.:* What Can Eye Tracking Reveal about a Filled Electronic Questionnaire? (A. Martonová)
 - *Vašek, P.:* Cluster Analysis in Large Data Sets. (P. Laurinec)
 - *Vereš, I.:* Effects of External Environment on Energy Consumption. (N. Andrejčíková)
 - *Višvarda, M.:* Linking Data of Software Development. (M. Konôpka)
 - *Vítek, A.:* Online Support Solution for Educational Exercises. (J. Tvarožek)
 - *Vlha, M.:* Automated Assessment of VHDL Models. (K. Jelemenská)
 - *Vnenčák, S.:* Similarity in Source Codes. (D. Chudá)
 - *Volko, J.:* Weather Station – Device of Internet of Things. (P. Lacko)
 - *Vrba, L.:* Extension of Thin GIS Client. (T. Kovár)
 - *Williger, R.:* Assessing UML Models. (K. Rástočný)
 - *Záhumenská, Z.:* Analysis of Trends in User Behavior on the Web Site. (O. Kaššák)
 - *Zigo, J. M.:* Virtual Laboratory as a Modern Form of Education. (G. Rozinaj)
- Study Programme Internet Technologies**
- *Balashov, P.:* Experimental System for Odor Samples Analyzing. (T. Krajčovič)
 - *Belluš, M.:* Optimization of Wifi Network. (R. Bencel)
 - *Broniš, T.:* Object Search using Drones. (V. Šulák)
 - *Cagáň, K.:* Lora Based Network Server Design. (O. Perešíni)
 - *Čelesová, B.:* Advanced Networks Monitoring. (I. Hucková)
 - *Dian, F.:* Authentication with NFC. (D. Bernát)
 - *Ďurech, J.:* Deployment of Network Security Technology IDS. (L. Hudec)
 - *Gottstein, M.:* Parking in Smart Cities. (T. Kováčik)
 - *Hampel, M.:* Authentication with NFC. (D. Bernát)
 - *Hesek, M.:* Special Functions of Network Adapter. (J. Hudec)
 - *Hrobák, M.:* Optimal Memory-testing Layout for Testing in the System on a Chip. (J. Šubín)
 - *Husár, P.:* Stopwatch for Parallel Race. (T. Krajčovič)
 - *Janec, N.:* Authentication with NFC. (D. Bernát)
 - *Kaňuch, P.:* Processing of Typical Security Vulnerabilities. (D. Bernát)
 - *Koreň, T.:* Built in Self-test of ROM Memories. (J. Šubín)
 - *Kuntová, H.:* Emulation and Processing of GPS in Transport. (P. Pištek)
 - *Lišiak, J.:* Low Energy Devices of the Smart Cities Communicating via Lora Technology. (O. Perešíni)
 - *Marso, K.:* Embedded-systems Communication using Bluetooth Low Energy. (D. Macko)
 - *Mauer, M.:* Processing Model Transport Grid. (D. Bernát)
 - *Moravčík, M.:* Telemetry for Electric Monopost. (F. Kudlačák)
 - *Ofčarovič, T.:* Advanced Monitoring Networks. (I. Hucková)
 - *Ondruš, M.:* Modeling Of Network Traffic. (J. Lúčanský)
 - *Pecha, M.:* Optimizing Interconnection of Content Delivery Networks. (R. Roštecký)
 - *Pešek, R.:* Experimental Musical Instrument. (T. Krajčovič)
 - *Procházka, M.:* Generation of Diagnostic Communication in IP Networks. (D. Macko)
 - *Pullmann, J.:* Generation of Diagnostic Communication in IP Networks. (D. Macko)
 - *Sabol, M.:* Telemetry for Electric Monopost. (F. Kudlačák)
 - *Sosňak, M.:* Security in Ubiquitous „Internet of Things“. (R. Bencel)
 - *Strásky, A.:* Avoid Potholes - Automatic Recording of the Potholes on the Roads. (T. Kováčik)
 - *Škuta, M.:* Wireless Access Point for Devices Communicating via Lora Technology. (O. Perešíni)
 - *Štefunko, S.:* Software Library for Devices Communicating via Lora Technology. (O. Perešíni)
 - *Uhlik, M.:* How to Speed up Load Times of Web Sites? (T. Kováčik)
 - *Válka, P.:* Protocol TCP in Wireless Systems. (P. Trúchly)
 - *Valko, J.:* Optimization of Wi-Fi Networks. (R. Bencel)

- *Žabka, P.:* Network IDS Deployment. (L. Hudec)

Master (Ing.) Theses

Study Programme Information Systems

- *Antl, O.:* Content-aware Eye Movement Analysis in Online Programming. (J. Tvarožek)
- *Bacho, A.:* Usability of Information Visualizations. (R. Móro)
- *Beňovic, I.:* Presentation of Personalized Recommendations. (M. Kompan)
- *Beťák, P.:* Modeling Users and Learning in Online Education. (J. Tvarožek)
- *Birkus, R.:* Segmentation of Anatomical Organs in Medical Data. (V. Benešová)
- *Borák, M.:* Detection of Anti-social Behavior in Online Communities. (I. Srba)
- *Čagáň, T.:* Big Data Prediction with the Use of Biologically Inspired Algorithms. (A. Bou Ezzeddine)
- *Cimerman, M.:* Stream Analysis of Incoming Events using Different Data Analysis Methods. (J. Ševcech)
- *Cuprik, R.:* Motif Finding in DNA Sequences. (P. Návrat)
- *Čerman, O.:* Personalized Recommendation of TV Program. (M. Bielíková)
- *Ďaďo, J.:* Knowledge Harvesting from Slovak Web. (M. Holub)
- *Donko, T.:* Results Analysis in the Presentation of Personalized Recommendations. (M. Kompan)
- *Dubec, P.:* Towards Quantitative Eye Tracking User Studies of Mobile Applications. (M. Bielíková)
- *Dzurňak, E.:* Discovering Patterns in Computer Pointing Device Data. (P. Krátky)
- *Gallay, L.:* Automatic Computation of Textual Similarity. (M. Šimko)
- *Gaššo, T.:* Evaluation of Adaptive Prediction Methods. (P. Vrabecová)
- *Gazdík, J.:* Group-based Problem Solving in Online Programming. (J. Tvarožek)
- *Gedera, J.:* Recognizing the Meaning of Emoticons in Text. (M. Šimko)
- *Halaš, P.:* Prediction of Electricity Consumption using Biologically Inspired Algorithms. (M. Lóderer)
- *Hnilicová, E.:* Unique Identification of Entities. (N. Andrejčíková)
- *Hudec, L.:* Automatic Segmentation and Semantic Scene Description from RGB-D Data. (V. Benešová)
- *Huňa, A.:* Supporting Question Answering in Online Student Communities by Utilizing Archives of Solved Questions. (I. Srba)
- *Chovaňák, T.:* Recognition of Website Users' Behavioral Patterns. (O. Kaššák)
- *Illés, D.:* Software Visualization in 3D Space. (P. Kapec)
- *Janečková, K.:* Recognition of Advertising Sequences in the Video Record. (V. Benešová)
- *Jurík, M.:* Text Editor with Support for Graphical Visualization of Structures. (P. Drahoš)
- *Karásek, R.:* Improving the Security of Web Systems with Nature Inspired Method. (L. Hudec)
- *Korbeľ, M.:* Streamlining the Web Browsing based on User Task Identification. (M. Labaj)
- *Kucharíková, Z.:* Terrain Data Capture through Mobile Application: Visual Smog Monitoring. (J. Šimko)
- *Kutlíková, L.:* Automatic Evaluating Usability of Applications with Eye-tracking Technique. (J. Šimko)
- *Kysel, M.:* Usability Improvement of Browser in Parallel Web Browsing. (M. Labaj)
- *Löffler, M.:* Improvement of Intrusion Detection using Multiple Classifier Model. (L. Hudec)
- *Lošák, M.:* Disclosure of Hidden Relationships in the Energy Data. (N. Andrejčíková)
- *Macejková, S.:* Personified Recommendations of Short Messages. (P. Návrat)
- *Mačina, J.:* Recommendation of New Questions in Online Student Communities. (I. Srba)
- *Marák, J.:* Data Visualization and Interaction in Augmented Reality. (P. Kapec)
- *Marták, L.:* Modelling Music Structure using Artificial Neural Networks. (M. Šajgalík)
- *Mäsiar, A.:* Human-based Computation with the Use of Gaze Tracking. (J. Šimko)
- *Mészáros, D.:* Learning Text Representation for Generating Descriptions. (M. Šajgalík)
- *Miškovský, L.:* Identification of Coreference Links in Text. (M. Blšták)
- *Mrocek, J.:* Detection of Incomprehensible Parts of Text using an Eye Tracker. (R. Móro)
- *Ostrovský, A.:* Use of Linked Data for Automatic Question Answering. (M. Holub)
- *Osvald, V.:* Using Stream Data Processing Methods to Create an Adaptive Prediction Model for Power Consumption. (M. Lucká)
- *Pecár, S.:* Automatic Taxonomy Extraction. (M. Šimko)

- *Pikna, R.*: Optimization of Indoor Navigation for Visually Impaired. (A. Martonová)
 - *Posch, H.*: Modelling Ecosystem in Energetics. (V. Rozinajová)
 - *Sanyová, M.*: HCI Literacy Estimation using Eye Tracking. (E. Kuric)
 - *Smoleňák, M.*: Parallel Methods for Identification of Identical and Similar Figures in DNA using Graphics Processors. (P. Kubán)
 - *Susko, M.*: User Model in Parallel Browsing Behavior. (M. Labaj)
 - *Štrbák, M.*: Analysis of Reading Difficulty in Web Environment. (M. Šimko)
 - *Tomašových, F.*: Multifactor Authentication of a User on a Smartphone Platform. (D. Chudá)
 - *Trizna, J.*: Entity Disambiguation in Automatic Indexation of Unstructured Text. (N. Andrejčíková)
 - *Turay, D.*: Beacon Network Reconstruction from their Signals. (A. Martonová)
 - *Uhrin, J.*: Segmentation of Multiple Sclerosis Lesions in Radiological Images using Methods of Computer Vision. (V. Benešová)
 - *Wolf, M.*: User's Model for Identification of his Emotional State. (D. Chudá)
 - *Zigo, J.*: Obtaining and Deduplication of Bibliographic Data. (N. Andrejčíková)
 - *Žalondek, M.*: Use of Data Analytics in Solving Problems of Regulation of Electric Energy Generation and Consumption. (V. Rozinajová)
 - *Žuffa, T.*: Knowledge Discovery from Long Tail Queries in E-commerce. (T. Kramár)
- Study Programme Software Engineering**
- *Báňai, D.*: Simulation of Secure Communication in Vehicular Networks. (J. Laštinec)
 - *Baňas, M.*: Effective Communication in Wireless Multi-client System of Public Transport. (P. Pištek)
 - *Baranovičová, H.*: Symmetric Aspect-oriented Programming in Established Programming Languages. (V. Vranič)
 - *Belan, R.*: Advanced Methods of Analysis and Design using Multidimensional UML. (I. Polášek)
 - *Csaplár, M.*: Negation Detection in Documents using Syntactic Dependencies. (I. Polášek)
 - *Csóka, L.*: Parallel Clustering of Big Data. (M. Lucká)
 - *Cút, J.*: Load Balancing between NFV Domains. (I. Kotuliak)
 - *Čarnoký, M.*: Virtual Currency Replacing Meal Vouchers. (T. Kováčik)
 - *Dekan, M.*: User Experience Testing on Mobile Device. (M. Čerňanský)
 - *Demko, M.*: Interaction of Physically Disabled Patients with a Computer Game based Rehabilitation System. (M. Nagy)
 - *Dikant, P.*: Application for Integrated Multimedia Platform. (P. Trúchly)
 - *Dobai, M.*: Firmware of Control System for Fail-safe Technological Equipment. (T. Krajčovič)
 - *Doubravský, L.*: Securing Wireless Networks in Smart Homes against Cybernetic Attacks. (L. Majer)
 - *Dubovský, M.*: High Speed Network Impact and Optimisation of HbbTV Application. (R. Broniš)
 - *Erdelyi, J.*: Estimation of Power-management Effect on Dynamic Power Consumption. (D. Macko)
 - *Farkaš, M.*: Prediction of Energy Load using Deep Neural Networks. (P. Lacko)
 - *Farkaš, T.*: Deep Analysis and Clustering of Big Data Files. (M. Lucká)
 - *Ferenc, M.*: Method for Collaborative Modelling and Visualisation of Software Systems using Multidimensional UML. (I. Polášek)
 - *Gáborík, J.*: Negation Detection in Text with Machine Learning. (I. Polášek)
 - *Gono, O.*: Internet of Things Communication Model for Higher Layers of Heterogenous Networks. (O. Perešíni)
 - *Grman, E.*: Training System for Robotic Soccer Player. (I. Kapustík)
 - *Grznár, M.*: Enhancement of SDN Platform. (I. Kotuliak)
 - *Hermánek, T.*: Internet of Things Communication Model for Lower Layers of Heterogenous Networks. (O. Perešíni)
 - *Hudec, M.*: Communication Management in Multi-client System using SMS Gateway. (P. Pištek)
 - *Jenis, M.*: Automatization of Power-management Specification of System Model in Time. (D. Macko)
 - *Jurčácko, F.*: Processing Large Volumes of Binary Files. (P. Lacko)
 - *Kaplán, L.*: Effective and Secure Virtual Private Network Deployment and Management in Cloud Environment. (T. Halagan)
 - *Kleščinec, L.*: Automation of Virtual Machines Deployment. (T. Halagan)

- *Kolek, P.*: Increase of Electronic Payment Security by using Hardware Cryptography. (L. Majer)
- *Kopřo, R.*: Security Based Clustering and Analysis of Big Log Files. (M. Lucká)
- *Košťál, K.*: Invisible Wifi Roaming in Software Defined Networks. (R. Bencel)
- *Kováč, M.*: Context-aware Recommender System for Software Refactoring. (P. Návrat)
- *Kovačín, A.*: System for BIST Architecture Generation for Serial Memory Testing. (J. Šubín)
- *Krajča, P.*: Automation of Power-management Specification in System Model. (D. Macko)
- *Kristel, P.*: Network Traffic Optimization in Anonymous Networks. (I. Kotuliak)
- *Krkoš, T.*: System for BIST Architecture Generation for Parallel Memory Testing. (J. Šubín)
- *Kulíšek, A.*: Recommending Web Content with the Usage of a Hybrid Recommender System. (P. Lacko)
- *Kuric, D.*: Effective Entity Linking using Metadata in the Domain of Multimedia. (J. Šimko)
- *Lenčucha, A.*: Innovative User Interfaces for Business Applications. (R. Sládek)
- *Macho, P.*: Processor Functional Test Generation. (J. Hudec)
- *Matuš, J.*: Real Time Human Motion Tracking in Image Stream. (P. Malík)
- *Mikuška, T.*: Interconnection of Multiple Cloud Computing Topologies. (T. Halagan)
- *Mlynčár, A.*: Automated Source Code and Sequence Diagram Synchronization. (K. Rástočný)
- *Mtier, R.*: Searching for Identical and Similar Genes. (P. Kubán)
- *Novotný, M.*: Presence Awareness in Agile and Lean Software Development with Distributed Teams. (V. Vranič)
- *Palatinus, M.*: Application of SDN in Wireless IoT Networks. (P. Trúchly)
- *Paška, P.*: Variance in Organizational Patterns of Agile and Lean Software Development. (T. Frála)
- *Pernecký, P.*: Optimization of Binary Decision Diagrams. (P. Pištek)
- *Radványi, P.*: Communication Module of Control System in Internet of Things. (T. Krajčovič)
- *Rychvalský, T.*: Estimation of Power-management Effect on Static Power Consumption. (D. Macko)
- *Sluka, P.*: Specifics of Transformation Properties between Selected Conceptual Models. (J. Lang)
- *Spišák, D.*: Behavior Model as an Orientation Catalyst within a Source Code. (J. Lang)
- *Szakszová, K.*: Secure Data Transmission via Channel Speaker - Microphone in the Mobile World. (T. Kováčik)
- *Štefánik, M.*: Visual Representation of Program in Innovative IDE. (P. Kapec)
- *Takács, G.*: Synchronization Methods for IT in Domain of Transport. (P. Pištek)
- *Valíček, Š.*: Parallel Methods of Mapping DNA Sequences. (M. Lucká)
- *Valocký, D.*: Automatic Human Detection and Tracking their Movements in Video Stream. (P. Malík)
- *Vrana, P.*: Empirical Software Metrics for Detection of Code Smells. (K. Rástočný)
- *Vrba, J. B.*: Automatic Segmentation of a Screen Recording for Scene Identification. (J. Šimko)
- *Závacký, M.*: Transaction Service for Television Devices. (T. Kováčik)
- *Žalman, B.*: Methods for Automatic Porting of Platform Dependent Code of Operating System. (T. Krajčovič)
- *Žigo, T.*: Program Representation with Use of Graph Structures. (P. Kapec)

Doctoral (Phd.) Theses

In 2017 following dissertations were defended:

- **Ján Laštinec**: Security Extension of Automatic Communication Protocols Using Ethernet/IP (Applied Informatics, L. Hudec)

Abstract: This thesis deals with the design of a novel approach to secure In-vehicle Systems by taking advantage of Ethernet/IP technology and proven security mechanisms from TCP/IP model. The work is focused mainly on the widespread Controller Area Network (CAN). The main goal is to design an efficient solution that meets requirements for latency without requiring high amounts of processing power and provides secure exchange of control signals. The presented solution is based on encapsulation of CAN traffic into UDP datagrams with added authenticity, integrity, and (if required) confidentiality of communication using IPsec protocol in transport

mode which creates a “secure tunnel” across backbone Ethernet network in a vehicle. Next part of the thesis presents extensive tests both on hardware and in simulation in order to evaluate the characteristics of the designed security extension. The results indicate that using IPsec is a viable solution for securing in-vehicle communications.

- **Máriuš Šajgalík:** Modelling Text Semantics (Information Systems, M. Bielíková)

Abstract: In the dissertation, we focus on modelling text semantics. We identify two sub-goals, which aims at modelling abstract text semantics. While the first sub-goal is oriented on modelling the general text semantics, the second sub-goal is focused on the discriminative semantics, which can possibly be of more information value. Besides proposing new methods to fulfil these sub-goals, we also examine a practical application of our proposed method of discriminative keyword extraction. Our contribution can be split into three parts. First, we propose a method to model abstract text semantics via key-concepts and show how it improves over standard keyword extraction methods. As a second contribution, we propose a method to model discriminate abstract text semantics, which is based on categorised text documents. We show how better representation of text semantics can improve over state-of-the-art methods in text categorisation even with traditional keywords. Finally, we propose an approach to modelling user interests using our method of discriminative keyword extraction, which is evaluated on real-world noisy data in diverse domains.

- **Róbert Móro:** Navigation Leads for Exploratory Search and Navigation in Digital Libraries (Information Systems, M. Bielíková)

Abstract: Exploratory search has exploration, learning, and investigation as its goal; it is characterized by ill-defined information needs of the users and requires use of various search strategies. We proposed a general model of exploratory search and navigation unifying different existing models and views. Although it is applicable to any domain, we focused in this thesis on the digital libraries of research articles, namely on the scenario of a researcher novice whose task is to explore a new domain. Our main focus was on support for query formulation and refining, the lack of which we identified as an open research problem. We proposed an approach of

exploratory search and navigation using navigation leads, with which we augment the search results. We found out that using citation and co-citation analysis improves the precision of the keywords extracted in the process of identification of navigation lead candidates. Our main contribution is in examining the different aspects of selecting the suitable leads. We found out that considering navigation history of users as well as the corpus relevance of terms in the process of navigation leads selection helps identify more relevant leads and improves the total coverage of (relevant) documents during the search.

- **Peter Krátky:** Biometric User Model for Recognition on the Web (Information Systems, D. Chudá)

Abstract: Nowadays, the Internet serves to huge masses browsing anonymously and many users have even multiple identities, not necessarily on purpose. Methods aimed at recognition work with machines, but fail to distinguish real persons behind the computers. Authors present a concept of biometric component as a part of user model for recognition on the web including a framework for assessing quality of features based on input devices. Mouse-based features are compared from different aspects in a case study from e-shop environment. Further, the authors propose a method for recognition individuals based on comparing features distributions, which is evaluated from different points of view. As an application, the paper describes usage of the method for deduplication of visitors records on the web based on mouse usage. In addition to this, a method for estimation of user characteristics based on input devices usage is proposed. Its evaluation shows modeling of age and gender of users in e-shop environment from mouse usage data.

- **Andrej Binder:** Content Delivery Network Interconnect (Applied Informatics, I. Kotuliak)

Abstract: Content Delivery Networks have been the driving force of globally scalable services on the Internet for almost two decades. They have always been developed and implemented as overlay networks run by companies independent from the network providers. In the recent years there has been a significant pressure to make it possible for content providers and telecom operators to be able to enter the content delivery market. This move is a sensible one because they have access to information about their network

topologies that puts them into an unique position to distribute and deliver content more efficiently than the over the top players. The only problem is that these Telco companies usually only have a local coverage. This means that a protocol has to be developed to make it possible for multiple local CDN's to interconnect into a single CDN Federation with much broader coverage. The design of such a protocol and related research are the goals of this thesis.

- **Tomáš Halagan:** Architecture for delivery of virtualized network functions (Applied Informatics, I. Kotuliak)

Abstract: A state of the art in this dissertation thesis is mainly focused on the emerging technologies in the area of computer networks, specifically the Software-Defined Networks (SDN) and Network Functions Virtualization (NFV). The aim of this work is to clearly identify the benefits deriving not only from these two technologies, but also from their synergies. The work focuses further on the interconnection of several autonomous systems / domains that already contain the implemented SDN and NFV technologies and further investigates their possible interconnection and the benefits of this interconnection. The result of the research is the new architecture design that will unify these interconnections of multiple types of different implementations SDN / NFV domains as well as a general solution to create a unified universal system. The verification of the proposed architecture was done using Coloured Petri networks.

- **Ondrej Kaššák:** Modelling Changes in User Short-term Behaviour on a Website (Information Systems, M. Bieliková)

Abstract: User modelling within a website represents a process of capturing chosen characteristics based on observation of user behaviour, his personal traits or preferences. It is also a process of transformation user behaviour (on the level of actions) into aggregated form revealing complex relations, which are not visible directly from captured actions. Its aim is to create an abstraction of real user behaviour - a user model. The user models are typically used as an input for chosen task enabling personalization, prediction, recommendation or in general an improvement of interaction quality between the user and the website. Nowadays, the Web represents an information space, in which the content is dynamically changed. In several domains such as news, multimedia or e-commerce, the items arise

quickly and remain actual only for a while. Additionally, a high number of occasional and one-timer users with unknown preferences and previous behaviour occur often in these domains. For this reason, modelling of user short term behaviour become increasingly important, as it allows capturing of actual behaviour. In this thesis, we focus on the process of user modelling complexly, from identification of suitable data sources, through sessions creation from individual user actions. Consequently, we continue by the model fulfilling and by capturing chosen user characteristics. Equally important task is an application of created user model into a task, which employs the model. The main contribution of this thesis is proposal of domain and language independent method for modelling changes in user short-term behaviour on the level of individual actions in user session. The model captures the user behaviour from different time periods as well as in comparison to behaviour of other users. We evaluated the model through a task of user's session end intent prediction. This task represents a modification of customer loss task transformed into the short-term context, where we, in online time, predict if the user will leave actual webpage or if he will continue the visit.

II. IIT.SRC

Full papers

- *Beka, P.:* Determination of the Eye-catching Parts in Graphical Interfaces. (M. Šajgalík)
- *Beňo, D.:* Testing Platform for Memory Management in Real-time Systems. (L. Kohútka)
- *Berta, P, Komarová, L., Krempaský, M.:* Automatic Use Case Based Remodularization. (M. Bystrický)
- *Birkus, R.:* Methods of Automatic Brain Tumor Segmentation in 3-Dimensional MRI Data. (V. Benešová)
- *Borák, M.:* Detection of Antisocial Behavior in Online Communities. (I. Srba)
- *Búcsiová, V.:* A New Scheduling Algorithm for Real-time Networks. (L. Kohútka)
- *Cagáň, K., Lišiak, J., Škuta, M., Štefunko, S.:* LoRa@FIIT Specification. (O.j Perešíni)
- *Cagáň, K., Lišiak, J., Škuta, M., Štefunko, S.:* Proposal of STIOT Protocol. (O.j Perešíni)
- *Cimerman, M.:* Stream Analysis of Incoming Events Using Various Data Analysis Methods. (J. Ševcech)
- *Csóka, L.:* Parallel Multi-Densities Based Clustering of Large Datasets. (P. Laurinec)

- *Cuprik, R.:* Motif Finding In DNA Sequences. (P. Návrat)
- *Čegiň, J.:* Visual Analysis of Unit Tests and their Results. (K. Rástočný)
- *Čuláková, N.:* Web Site Users' Behavioral Trends Analysis. (O. Kaššák)
- *Ďaďo, J.:* Knowledge Harvesting from Slovak Web. (M. Holub)
- *Dubec, P.:* Towards Quantitative Eye-tracking User Studies of Mobile Applications. (M. Bieliková)
- *Dzurňak, E.:* Discovering Patterns in Computer Pointing Device Data. (P. Krátky)
- *Erdelyi, J.:* Estimation of Power-management Effect on Dynamic Power Consumption. (D. Macko)
- *Farkaš, T.:* Novel DNA Alignment-free Comparison Methods Based on Signal Processing Approaches. (M. Lucká)
- *Filipek, J.:* Advances in Distributed Security for Mobile Ad Hoc Networks. (L. Hudec)
- *Galinski, M.:* Load balancing Unsplittable SIP Single Port Data Flows in MPLS Networks. (I. Kotuliak)
- *Gašpar, P.:* Image-based User Preferences Analysis: Towards Advanced User Modelling. (M. Bieliková)
- *Gaššo, T.:* Evaluation of Adaptive Prediction Methods. (P. Vrabecová)
- *Grežo, R.:* Network Security in the Internet of Things. (L. Hudec)
- *Halaš, P.:* Prediction of Electricity Consumption using Biologically Inspired Algorithms. (M. Lóderer)
- *Hlaváč, P.:* Towards Automatic Web Literacy Detection. (M. Bieliková)
- *Hrutka, M.:* Classification of Short Texts from an Interactive Web Application. (M. Barla)
- *Hucko, M.:* Clustering and Classification of Student's Answers to Questions. (M. Bieliková)
- *Hudec, L.:* Automatic Segmentation and Semantic Indoor Scenes Description Using RGB-D Data. (V. Benešová)
- *Huňa, A.:* Automatic Answering of Students' Questions by Using an Archive of Questions. (I. Srba)
- *Chodorčuk, E., Melicherčík, J.:* Effects of Instructions on User Studies. (P. Hlaváč)
- *Chovaňák, T.:* Web User Behavioral Patterns Recognition in Online Time for Personalized Recommendation. (O. Kaššák)
- *Jurčacko, F.:* Processing Large Volumes of Binary Files. (P. Lacko)
- *Kazimír, J.:* Weather Prediction using LSTM. (P. Lacko)
- *Kopšo, R.:* Security Based Clustering and Analysis of Network Stream Data. (M. Lucká)
- *Kuchariková, Z.:* Terrain Data Capture through Mobile Application: Visual Pollution Monitoring. (J. Šimko)
- *Kulišek, A.:* Recommending Web Content Using a Small-world Implicit Trust Network. (P. Lacko)
- *Kunštár, V.:* Proximity Based Access Control System with Encryption. (T. Krajčovič)
- *Kutlíková, L.:* Did They Read Instructions? (J. Šimko)
- *Laurinec, P., Kaššák, O.:* Similar Consumer Clustering Based on Smart Meter Data: Suggestion of Electricity Consumption Settings. (M. Lucká, M. Bieliková)
- *Lúčanský, J.:* Residual Variable in Kronecker Functional Decision Diagram. (P. Pistek)
- *Macejková, S.:* Love Recommender: Personalised Life Partner Recommendations Using Human Odor. (P. Návrat)
- *Mačina, J.:* Recommendation of New Questions in Online Student Communities. (I. Srba)
- *Marso, K.:* A New Parking-Space Detection System. (D. Macko)
- *Marták, L.:* Modelling Music Structure using Artificial Neural Networks. (M. Šajgalík)
- *Matuš, J.:* Real Time Human Motion Tracking in Image Stream. (P. Malík)
- *Meňhart, L.:* Visualization of Student Activity in an Interactive Web-based Application. (M. Bieliková)
- *Mészáros, D.:* Generating Headlines with Text Summarization. (M. Šajgalík)
- *Miškovský, L.:* Coreference Resolution in Text. (M. Blšták)
- *Mlynčár, A.:* Automated Source Code and Sequence Diagram Synchronization. (K. Rástočný)
- *Pecár, S.:* Automatic Taxonomy Extraction. (M. Šimko)
- *Pernecký, P.:* Optimization of Binary Decision Diagrams. (P. Pistek)
- *Petrík, J.:* Source Code Stylometry - Footprint in Your Source Code. (D. Chudá)
- *Pikuliak, M.:* Transfer Learning between Languages for Sentiment Analysis. (M. Bieliková)
- *Procházka, M.:* Generation of Diagnostic Communication in IP Networks. (D. Macko)
- *Sanyová, M.:* Estimation of User's Web HCI Literacy. (E. Kuric)

- *Sluka, P.*: Requirements Modeling and Transformations Using Mind Mapping. (J. Lang)
- *Spišák, D.*: Support Readability and Understandability of the Source Code by Explicit Binding to the Activity Diagrams. (J. Lang)
- *Sulaiman Khail, W.*: Treating Pattern Sublanguages as Patterns with an Application to Organizational Patterns. (V. Vranić)
- *Svrček, M.*: A First Step Toward Detection of Usability Smells Using Eye-tracking. (M. Bieleková)
- *Štefancová, E.*: Detection of Usability Mistakes by Measuring Emotions with EEG and Facial Expressions. (R. Móro)
- *Šubín, J.*: An Efficient Automatic Generation of Address Schemes for Memory Testing. (E. Gramatová)
- *Šulák, V.*: Search using a Swarm of Unmanned Aerial Vehicles. (I. Kotuliak)
- *Tamajka, M.*: Supervoxels and Superpixels for Use in Medical Image Processing. (V. Benešová)
- *Uhrin, J.*: Segmentation of Multiple Sclerosis Lesions in Radiological Images Using Methods of Computer Vision. (V. Benešová)
- *Valocký, D.*: Automatic Human Detection and Tracking their Movements in Video Stream. (P. Malík)
- *Vrba, J.*: Automatic Segmentation of a Screen Recording for Scene Identification. (J. Šimko)

Extended abstracts

- *Čarnoký, M.*: Virtual Money Replacing Meal Vouchers. (T. Kováčik)
- *Gábrš, T.*: Question Generation from Educational Text. (M. Blšták)
- *Halajová, M.*: Virtual Graffiti Using Smartphone. (K. Burda)
- *Kováčik, M., Mláka, J., Ondrejka, P., Pecher, B.*: OCR and Analysis of Receipts at the Level of Individual Items. (J. Šimko)
- *Lach, T.*: Indoor Free Time Places Availability. (A. Martonová)
- *Melúch, M.*: Application for Evaluation of Common Scanpath Algorithms. (R. Móro)
- *Strásky, A.*: Automatic Detection and Notification of Bumps on Roads to Drivers. (T. Kováčik)
- *Szakszová, K.*: Data Transmission via Audio Channel in the Mobile World. (T. Kováčik)
- *Tibenská, V.*: Creating Animations of Organizational Patterns. (T. Frtála)

III. TP CUP COMPETITION

- *Bobotová, Z., Černák, D., Gondová, V., Matlovič, T., Pavlovič, T., Šmihla, J.*: eMotion: Emotion Management and Mood Recognition Framework. (P. Gašpar, F. Lehocki)
- *Brechtl, J., Juhaniak, T., Kalužník, M., Krchňavý, R., Kren, M., Lacek, M., Vaculčíak, A.*: WebX: A System for Automated Web Extraction. (I. Srba)
- *Ondík, J., Neupauer, A., Januška, P., Olejár, M., Hamara, O., Hurajt, M.*: StoryTeller: Software Requirements Gathering and Evaluation. (K. Rástočný)
- *Blaško, A., Cvičela, M., Gulis, I., Liščák, T., Makan, B., Matula, M.*: EduSim – Multi-domain Educational Simulations. (M. Lóderer)
- *Pánis, J., Findura, J., Frkáň, M., Urban, T., Oravský, M., Písarovič, D.*: Advanced Repeatable Service Module for High-altitude Balloon. (M. Valiček)
- *Danišík, N., Gurán, M., Jurika, M., Kadlic, Š., Lang, R., Poliak, M., Puk, M.*: SECMON - Security Events Collerator Done Right! (J. Laštinec)
- *Augustín, P., Balážová, V., Bruchatý, M., Flamík, J., Kípila, O., Kostova, S., Žlnka, A.*: BeaCode: Indoor Navigation Providing Position Related Information. (A. Martonová)
- *Salát, M., Dragúňová, M., Červenka, M., Šidlo, M., Kudláš, O., Šimek, L.*: SmartStore - Automated Optimization of Warehouse. (P. Krátky)
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V. 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 to 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

Modeling of human visual attention using automatic scene recognition and object recognition (VEGA 1/0874/17) (V. Benešová),
Duration: 2017 - 2019

The tasks of modeling of the human visual attention and creating of saliency maps have a lot of application areas as for example in computer graphics, compression of a video signal, in the visualization of information, but also in an automatic interpretation of the scene captured by the optical sensors. The aim of this project is a research of modeling the human visual attention. Models for modeling the human visual attention are usually developed as models of "bottom-up" and "top-down" or a combination of them. Both approaches will be researched in this project. An important part of the research will be focused on the methods of visual object recognition and automatic scene description with a respect of their possible integration into the proposed model of the human visual attention. Another part of the project will deal with a design of elements for the visualization of information systems with a goal to propose elements with such visual expressiveness which can properly attract the attention of observers.

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 statistical 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.

Teachers' personality and professional vision related to the dealing with challenging situations in the classroom during the transition into service (VEGA, 1/0409/17) (E. Kuric, P. Hlaváč), Duration: 2017 – 2019

Challenging interpersonal situations and inappropriate behaviour of children at school are the main sources of teachers' stress and concerns of novice teachers entering the profession. A quick and relevant evaluation of the cues to individual behaviour and the dynamics of the class is the basis of competent classroom management and effective dealing with challenging school situations. The term "professional vision" therefore is understood as a teacher's ability to perceive and interpret events in the classroom; it involves selective attention and knowledge-based reasoning. This project aims to research formation and development of professional vision among student teachers related to the perception of and dealing with difficult situations in the classroom, concerning their personality profiles and the ef-

fect of pre-gradual training. Besides the personality inventories and narration analysis, video analysis and eye-tracking methods will be used. This project aims to research the formation of professional vision among student teachers related to the perception of and dealing with challenging situations in the classroom

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 AA-LAmbient 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 cloud 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.

Knowledge-based Approaches for Intelligent Analysis of Big Data (APVV-16-0213) (V. Rožnájová), Duration: 2017-2021

Processing and analysis of big data represent one of the biggest challenges faced by professionals in the field of ICT for several last years. It is becoming important not only the content and volume of such data, but also the context in which

this data is generated and used. The proposed project is focused just on research and development of intelligent methods enabling the processing and analysis of big data in the broader knowledge context, which describes and characterizes such an environment. We focus not only on big data with static character, such as DNA/RNA/protein sequences, but also on dynamically changing data streams, which can be represented by the operation data from the different types of critical network infrastructure, data from social networks or networks of different sensors and smart devices. The main objective of the project is to design and verify new adaptive methods for analyzing big data in a dynamic environment, able to extract new knowledge and to integrate them with the knowledge model of the environment.

Tumor Heterogeneity in Multiple Myeloma: Evolution and Clinical Significance (APVV-16-0484) (M. Lucká), Duration: 2017-2021

Tumor heterogeneity is likely, from a Darwinian-selection perspective, to be the essential feature of clonal evolution, disease progression and relapse. The existence of intra-clonal heterogeneity resulting from clonal selection has been recently reported in multiple myeloma (MM). Multiple myeloma (MM) is a B cell malignancy characterized by clonal proliferation of plasma cells in the bone marrow (BM). It remains incurable despite improved survival after development of novel therapies. The overall objective of this proposal is to better understand clonal architecture of primary patient-derived BM samples during the development of MM and therapy induced intra-clonal dynamics during progression of MM. A central component of these studies is evolution of BM patient samples from premalignant stages to malignant stages by combining genetic, molecular and phenotypic approaches. We also will evaluate the impact of chemotherapy and immunotherapy on the dynamic nature of the clonal composition together with the role of the tumor microenvironment on clonal selection in MM. To reveal insights into inter- and intra-clonal heterogeneity in MM, the study will provide the framework for development of more personalized diagnostic criteria and novel therapeutic strategies against coexisting persistent subclones resulting in a more individualized targeted therapy to either maintain long-term remission or completely eradicate MM disease.

Innovative methods of teaching informatics in large groups with support for online education (KEGA, 028STU-4/2017)

(M. Bieliková), Duration: 2017 – 2019

The ability to collaborate is one of the most important skills for today's person and it is crucial to cultivate it during school years. Collaboration in school however is difficult to support with standard tools, which often do not meet the requirements of the educational context, so they can be used only sparingly. The current web communication and social applications work mainly thanks to the community of users who are actively using these applications and thus either explicitly or implicitly share their knowledge and improve learning. The proposed project aims to extend the existing tools and create new tools for supporting collaboration and knowledge sharing in large communities of students and teachers, and to integrate the tools into a common platform to enable students to develop communication and collaboration skills, helping to make education in large groups more efficient. It is the large groups of students in individual courses that create the potential for the use of collective intelligence. The platform will provide tools and features for enabling the power of crowd of students in order to facilitate teaching, and for data collection and data mining in order to better adapt and personalize the tools for the students. We will build web tools for supporting explicit collaboration such as peer grading assignments, peer tutoring and peer feedback during solving of programming-related problems, and common solutions for study-related questions. We will also build tools for implicit collaboration that will enable for example the use of collective intelligence of students for identifying errors in educational materials. When designing these tools, we will build upon the existing educational systems that are being developed at our faculty and have been created with the support of KEGA. Within the project, we will create the Virtual community learning environment as a widely available software platform that integrates the created tools. An important part of the project is to open the solution for integration with tools and support systems in other institutions, while this transfer of know-how helps further strengthen the resulting effect on education in our faculty. The created tools will be adapted to portable devices, allowing for increased participation. We will evaluate the platform in computer science courses for programming,

database systems and software development principles.

Update of computer networks curricula based on needs of practice (KEGA, 011STU-4/2017)

(M. Bieliková), Duration: 2017 – 2019

The objective of this project is to update computer networks curricula at three Slovak technical Universities based on actual needs of practice. A dynamic development in the fields of network technologies and updated needs of industrial certification require a change of the content scope of lecturing and practical trainings. The secondary goal of this project is to create a cooperation platform among FIIT STU, FRI UNIZA, and FEI TUKE for exchanging content bases, knowledge, pedagogues, and students by means of common courses, summer schools, and practically oriented seminars and trainings. The achievement of this project and cooperation is a higher quality product - student with a high level of proficiency, better prepared for practice. The mutual exchanging of pedagogues and PhD students will support mutual ties and will reinforce the possibilities of the future scientific and pedagogical cooperation. This project will establish a new shared educational content for university students, implement into the education new items of multimedia content, collaborative tools and it will improve practical trainings as a precondition of better preparation of graduates for practice.

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. Bielíková), 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.

Service module for stratospheric balloon, 2016et023) (J. Valiček), Duration: 2017

The team developed special equipment enabling regular launching of balloons, whereby various experiments can be performed. It is designed to

work under specific conditions, what makes the whole project unique.

Better Utilization of Green Energy through Better Modelling (Bilateral Fund at National Level, BFN16-ENV-010) (M. Lucká), Duration: 2017-2018

Environmental concerns motivate researches to involve more renewable energy resources into smart grid considerations. Because there are very few possibilities to store produced electric power, by building balanced networks it is very important to develop models and algorithms that allow accurate prediction of electricity production and consumption. The goal of this project is to exchange existing knowledge between two mixed (teachers and students) university groups (Slovak and Norwegian) in the frame of a study stay at University of Bergen (UiB). It will focus on methods (especially ensemble learning methods) suitable for electricity prediction of photovoltaic power (PV) plants in dependence on external factors, such as weather and to test them on data sets available at UiB.

Development of the research infrastructure of STU (003STU-2-3/2016) (T. Krajčovič), Duration: 2017

The aim of the project was to improve the research infrastructure so that it is fully competitive and to create a positive stimulating environment for research and collaboration with the practice. The portable eye tracker (Tobii Pro glasses) was purchased from the project resources, along with the recording unit and the software for controlling the experiment and the software for the analysis of the glasses outputs. In addition, special computer components and active network elements were added to complement the research infrastructure of other laboratories. Within the project, selected research topics were also solved in the User Experience and Interaction Research Center, the Laboratory of Computer Graphics, Vision and Interaction, and in the Embedded Systems Laboratory.

VI. 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 monolithic microprocessors and one-chip microcomputers with RISC and CISC architectures, FPGA and CPLD development kits, logical analyzers, in-circuit and JTAG emulators, digital oscilloscopes and other development tools. 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 specification means and diagnostics and reliability to undergraduates and digital systems design, to graduates in the study programme Internet Technologies. 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, several types of FPGA boards and necessary software tools to gain practical skills in the area of digital systems design – FPGA Advantage, Vivado, and Synopsys tools.

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 Embedded, 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 Healthineers 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 Research 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 solution. 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 exercises 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.

VII. 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 Experience 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)

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)

Róbert Móra

- Slovakia Chapter of the Association for Computing Machinery (member, since 2016)

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)
- Working Group on Information and Communication Technologies for RIS3 SK (member, since 2015)
- Slovak Gold committee for software products (member/chair, since 2012)

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 Vranič

- 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 Bielíková

- IEEE, Institute of Electrical and Electronic Engineers (member, since 1998; senior member since 2003)
- IEEE Computer Society (member, since 1997)
- IET, Institution of Engineering and Technology (member, since 1998)
- ECUK, Engineering Council UK (registered Chartered Engineer, since 1998)
- ACM, Association for Computing Machinery (member, since 1998; senior member since 2009)
- ACM SIGWEB, Special Interest Group on Hypertext the Web (member, since 2007)
- IFIP, International Federation for Data Processing (member of Technical Committee TC2 – Software: Theory and Practice, since 2008)
- ISWE, International Society for Web Engineering (member, since 2007)
- CaSTB, Czech and Slovak Testing Board, a member of ISTQB, International Software Testing Qualifications Board (member, since 2006)
- ADBIS, Advances in Databases and Information Systems Conference Series, standing Steering Committee (member, since 1998)
- Data and Knowledge – Annual Conference, standing Steering Committee
- SMAP – International Workshop on Semantic Media Adaptation and Personalization, standing Steering Committee (member since 2011)
- UM Inc., User Modeling (member of Directors at Large, since 2017)

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)
- 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)
- 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)
 - IEE, Institute of Electrical and Electronic Engineers (member, since 2017)
- 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)
- ACM SIGAI, ACM Special Interest Group on Artificial Intelligence (member, since 2017)
- Ján Lang*
- ECBS, European Conference on Engineering of Computer Based Systems (member, since 2011)
 - IGIP, International Society for Engineering Pedagogy (member, since 2006)
- 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 since 1993. HQ Paris: IIP – member of bureau –1996-98, chair – 1998-2001, IFAP – member of bureau – since 2001. Executive Board – member – since 2001)
 - ICETA, member of honorary committee
- Róbert Móro*
- ACM, Association for Computing Machinery (member, since 2011)
 - ACM SIGCHI, Special Interest Group on Computer-Human Interaction (member, since 2017)
- 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)

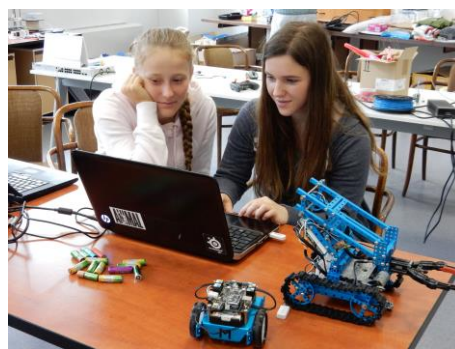
Marián Šimko

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

Valentino Vranić

- ECBS, European Conference on Engineering of Computer Based Systems – Steering Committee (member, since 2013), Program Committee (Co-Chair, 2017, 2015, 2011; member, since 2011)
- SQAMIA, Workshop on Software Quality Analysis, Monitoring, Improvement, and Applications – Program Committee (member, since 2013)
- SCLIT, Symposium on Computer Languages, Implementations and Tools – Program Committee (member, since 2011)

GALLERY





FIIT PERSONNEL

Institute of Computer Engineering and Applied Informatics

Administrative department

Šípková Tatiana

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Teachers

Benešová, Vanda, doc. Ing. PhD.

Čerňanský, Michal, doc. Ing. PhD. (part-time)

Čičák, Pavel, prof. Ing. PhD. (part-time)

Drahoš, Peter, Ing. PhD.

Drnajová, Barbara, Mgr.

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Hudec, Ladislav, doc. Ing. PhD.

Jelemenská, Katarína, Ing. PhD.

Kapec, Peter, Ing. PhD.

Kotuliak, Ivan, doc. Ing. PhD.

Krajčovič, Tibor, doc. Ing. PhD.

Krištofík, Štefan, Ing. (part-time)

Laštinec, Ján, Ing. PhD. (part-time, since February)

Macko, Dominik, Ing.

Pištek, Peter, Ing. PhD.

Solčány, Viliam, Ing. PhD. (part-time)

Trúchly, Peter, Ing. PhD.

Researchers

Bernát, Dušan, Ing.

Ries, Michal, Dr. Ing. (since September)

Collaborators

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Čechvala, Martin, Ing.

Daňko, Martin, Mgr. PhD.

Kazička, Roman, Ing. PhD.

Kováč, Martin, Ing.

Kováčik Tomáš, Ing. PhD.

Kvasnička, Vladimír, prof. Ing. DrSc.

Munka, Juraj, PaedDr.

Obetko, Jakub, Ing.

Pšeneková, Judita, Mgr.

Rybárová, Viera, Mgr. CSc.

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Šutarík, Peter, Ing.

Vaško, Jozef, Ing.

Vilhan, Peter, Ing. PhD.

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Binder, Andrej, Ing.

Boros, Tomáš, Ing.

Doubravský, Lukáš, Ing.

Erdelyi, Jaroslav, Ing.

Filipek, Jozef, Ing.

Fogelton, Andrej, Ing.

Galinski, Marek, Ing.

Grežo, Rudolf, Ing.

Halagan, Tomáš, Ing.

Hucková, Ivana, Ing.

Hudec, Lukáš, Ing.

Jakab, Marek, Ing.

Košťál, Kristián, Ing.

Kudlačák, František, Ing.

Kunštár, Vladimír, Ing.

Lampe, Georg Sven

Laštinec, Ján, Ing.

Lúčanský Ján, Ing.

Marták, Lukáš, Samuel, 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.

Valiček, Michal, Ing.

Zafarabadi, Pouria, M.Sc.

Institute of Informatics, Information Systems and Software Engineering

Administrative department

Džupinová, Eva, Mgr. PhD.

Jančaťová, Ľubica, Mgr.

Macková, Zuzana

Matfiaková, Mária, Ing. (till May)

Zakálová, Alexandra, Ing.

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.

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.
 Návrat, Pavol, prof. Ing. PhD.
 Polášek, Ivan, doc. Ing. PhD.
 Považanová, Anna, Ing. (part-time)
 Rástočný, Karol, Ing. PhD.
 Rozinajová, Viera, doc. Ing. PhD.
 Srba, Ivan, Ing. PhD.
 Šajgalík, Mária, Ing. PhD. (till January)
 Šimko, Jakub, Ing. PhD.
 Šimko, Marián, doc. Ing. PhD.
 Tvarožek, Jozef, Mgr. PhD.
 Vranič, Valentino, doc. Ing. PhD.

Researchers

Bachratý Viktor, Ing. (since September)
 Demčák, Peter, Ing.
 Ševcech, Jakub, Ing. PhD. (since December)

Collaborators

Babincová, Danka, PhDr.
 Bartošovič, Lukáš, Mgr.
 Bečka, Martin, Mgr. PhD.
 Benedigová, Michaela, Mgr. MBA
 Bieliková, Barbora, Mgr.
 Böhm, Radoslav, RNDr. PhD.
 Bobák Martin, Mgr.
 Černý, Vladimír, doc. RNDr. CSc.
 Čipková, Karla, RNDr. PhD.
 Domonkos, Tomáš, Ing.
 Frič, Pavol, Ing. PhD.
 Farkaš, Igor, Ing. PhD.
 Grisáková, Nora, Ing. PhD.
 Grošek, Otokar, prof. RNDr. PhD.
 Gyarfáš, František, Ing. PhD.
 Holas, Juraj, Mgr.
 Hošková, Dominika, Ing.
 Hruška, Matej, Mgr.
 Kloska, Matej, Ing.
 Jakubík, Jaroslav, Ing. PhD.
 Krajčovič, Dušan, RNDr. CSc.
 Královič, Rastislav, doc. RNDr. PhD.
 Krátky, Peter, Ing.
 Kramár, Tomáš, Ing. PhD.
 Krammer, Peter, Ing.
 Kučečka, Tomáš, Ing.
 Kuzma, Tomáš, Mgr.
 Lukočka, Robert, RNDr. PhD.
 Major, Marián, Ing.
 Malkin Ondik, Irina, Dr. (part-time)
 Markovič, Lukáš, Ing.
 Marsenič, Alexandra, RNDr. PhD.
 Mazák, Ján, Mgr. PhD.
 Mičková, Veronika, Ing. PhD.

Molnár, Ľudovít, prof. RNDr. DrSc. (professor emeritus)
 Nagy, Roman, RNDr.
 Nehéz, Martin, RNDr. PhD.
 Olejček, Vladimír, doc. RNDr. PhD.
 Papula, Jozef, prof. Ing. PhD.
 Pokorný, Jaroslav, prof. RNDr. CSc.
 Potočný, Marián, Mgr.
 Repka, Marek, Ing. PhD.
 Sabo, Štefan, Ing. PhD.
 Skúpa, Katarína, Mgr.
 Smetanová, Iveta, Ing. RNDr. PhD.
 Suchal, Ján, Ing.
 Šaloun, Petr, doc. RNDr. PhD.
 Šelmeci, Roman, Ing.
 Šešera, Ľubor, RNDr. PhD.
 Šoltéssová, Danica, Mgr. PhD.
 Šuráb, Marian, doc. ThDr. PhD.
 Winczer, Michal, RNDr. PhD.
 Zelenka, Ján, Ing. PhD.
 Zeman, Jakub, Mgr.
 Železnák, Andrej, Ing.

Doctoral students

Blšták, Miroslav, Ing.
 Burda, Kamil, Ing.
 Bystrický, Michal, Ing.
 Cuprik, Róbert, Ing.
 Dubec, Peter, Ing.
 Farkaš, Michal, Ing.
 Farkaš, Tomáš, Ing.
 Frtála, Tomáš, Ing.
 Gašpar, Peter, Ing.
 Hlaváč, Patrik, Ing.
 Jarábek, Tomáš, Mgr.
 Kaššák, Ondrej, Ing.
 Kloska, Matej, Ing.
 Konôpka, Martin, Ing.
 Krátky, Peter, Ing.
 Kubán, Peter, Ing.
 Labaj, Martin, Ing.
 Laurinec, Peter, Mgr.
 Loeb, Jaroslav, Ing.
 Lóderer, Marek, Ing.
 Macko, Peter, Ing.
 Magyar, Róbert, Ing.
 Mariani, Pavel, Ing.
 Pecár, Samuel, Ing.
 Petřík, Juraj, Ing.
 Pikuliak, Matúš, Ing.
 Sulaiman Khail, Waheedullah, Ing.
 Svrček, Martin, Ing.
 Šelmeci, Roman, Ing.

Vincúr, Juraj, Ing.
Vrablecová, Petra, Ing.

Center of Computing and Communication Services

Brath, Peter
Gozora, Dominik (since February)
Gnipová, Marta, RNDr.
Grell, Peter
Hauskrecht, Martin, Bc.
Husár, Patrik, Bc.
Kollár, Ivan, Ing.
Malina, Dušan, Ing.
Pešek, Radovan, Bc.
Steinmüller, Branislav, Ing.
Stovíček, Roman, Ing. PhD.
Šifra, Matej

Center of Information and Library Services

Falbová, Lucia, Mgr.
Gábrišová, Henrieta, Mgr. (since April)

Deanship

Faculty Secretary

Palatinusová, Ľubica, Ing.

Economics

Danišová, Viera, Mgr.
Habajová, Eva (till September)
Švajdlenková, Daniela (since May)
Kitanovicsová, Miriam
Lakušová, Anna
Mišíková, Zuzana
Sabová, Erika (till may)

Personal Resources

Breznenová, Soňa
Nižnanská, Erika, PhD.

Public Relations

Gubová, Jana, Mgr. (since August)
Marušincová, Zuzana
Mršková, Katarína, RNDr. PhD.
Reis, Martina, Ing.

Secretariat

Kozíková, Zuzana, Mgr.

Study Affairs

Flesarová, Adriána, Ing. (since June)
Horniaková, Zuzana, Mgr.
Husková, Ľubica
Krištofová, Jarmila, Mgr. (till May)
Tekulová, Zuzana, Mgr.

Center of Industry Research

Rošková, Barbora, Mgr.
Slezáková, Miroslava, Mgr.
Varga, Peter, MBA (part-time)

Center of Further Learning

Čičák, Pavel, prof. Ing. PhD. (part-time)

Department of Technical Operation and Management

Balšan, Viliam
Balážová, Rozália (since January)
Blažková, Katarína
Borsová, Diana
Čičátka, Aurel
Dúbravský, Jozef, Ing. PhD.
Dudák, Vladimír
Figura, Zdenko
Glaczynská, Helena
Glaczynský, Emil (till February)
Hlávková, Eva (till February)
Chrenko, Imrich (till June)
Ivaneková, Verona
Jankovich, Alojz
Kauzlaričová, Emília (since April)
Kováč, Peter, Ing. (till June)
Lešková, Lýdia (till January)
Matejka, Pavol
Mišíková, Jana
Molnár, Oto
Orlovský, František
Potančok, Milan, Ing. Mgr. PhD.
Špička, Ján, Ing.
Toman, Ladislav
Vašinová, Daniela
Warosch, František (since July)

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