

DEPARTMENT OF CYBERNETICS AND ARTIFICIAL INTELLIGENCE

<http://www.tuke.sk/kkui/>
Tel./Fax: ++421 95 625 3574

Head of Department
prof. Ing. Ján Sarnovský, CSc.
E-mail: Jan.Sarnovsky@tuke.sk



1 DEPARTMENT'S PROFILE

The Department is responsible for education in two specializations - Control Engineering and Automation and Artificial Intelligence. Students are prepared for creative application of basic control to practical applications.

The main research topics at the Department are methods and algorithms of control and decision processes for large-scale systems, speech recognition systems, knowledge-based systems, and the use of fuzzy and neural net techniques in speech and image recognition. The Department is also involved in continuing education.

The actual title: The predecessor of the Department was founded in 1964. Department of Cybernetics and Artificial Intelligence was adapted in 1989. Currently it has 22 staff members, 17 internal and 13 external Ph.D. students. There are 3 sections within the department: Control Systems, Artificial Intelligence, and



Automation Systems. The Department is involved in a number of research and educational projects. The following types of projects were under way in 2000: 4 research grants, 3 thematic networks, 1 grant for organization of symposia and 1 individual research grant from European Commission, 1 bilateral Slovak-Austrian and 1 bilateral Slovak-Czech research grant, 6 grants awarded by the Slovak Grant Agencies and Ministry of Education and 1 faculty grant.

2 STAFF

Professors: prof. Ing. Ján Sarnovský, CSc.
prof. Ing. Ladislav Madarász, CSc.
prof. Ing. Dušan Krokavec, CSc.
prof. Ing. Peter Sinčák, CSc.

Associate Professors: doc. Ing. Július Csontó, CSc.
doc. Ing. Anna Filasová, CSc.
doc. Ing. Ján Jadlovský, CSc.
doc. Ing. Marián Mach, CSc.
doc. RNDr. Eva Ocelíková, CSc.
doc. Ing. Tomáš Sabol, CSc.
doc. Ing. Iveta Zolotová, CSc.

Assistant Professors: Ing. Marián Bučko, CSc. Ing. Juraj Galko
Ing. Anna Jadlovská, PhD. Ing. Ján Paralič, PhD.
Ing. Kristína Machová, CSc.

Senior Scientists: Dr. Ing. Vratislav Hladký Dr. Ing. Ján Vaščák
Ing. Ján Liguš, PhD.

Technical Staff: Imrich Balogh Tatiana Baňasová
Mária Feješová

PhD. Students: Ing. Peter Benko Ing. Ján Kašprišin
Ing. Marek Bundzel Ing. Róbert Kende
Ing. Peter Engler Ing. Peter Kostelník
Ing. Jana Horanská Ing. Daniel Novotný
Ing. Ján Hreňo Ing. Peter Macej
Ing. Marcel Hric Ing. Vratislav Kováč
Ing. Stanislav Hudák Ing. Zdeno Orinčák
Ing. Miroslav Hudec Mgr. Eva Schwardyová
Ing. Jozef Chvál Ing. Marek Šamulka
Ing. Stanislav Kaleta Ing. Marek Štofko
Ing. Martin Palko Ing. Maroš Timko

3 EQUIPMENT

3.1. Teaching and Research Laboratories

- CENTER FOR INTELLIGENT TECHNOLOGIES (joint research unit between Department of Cybernetic and Artificial Intelligence, and Institute of Computer Science, Slovak Academy of Science) focussed on promotion of Intelligent technologies

- Laboratory of Information Systems (L-535)
- Laboratory of Distributed Control Systems - ROCKWELL AUTOMATION LABORATORY (L-536)
- Laboratory of Complex Systems Control (L-513)
- Laboratory of One-Chip-Computers (L-509)
- Artificial Intelligence Laboratory (LUI)
- Laboratory of Speech and Pattern Recognition (V-147)
- Knowledge Technologies Laboratory (V-101a)
- Signal Processors Laboratory (V-101b)

3.2. Special Measuring Instruments and Computers

2 x RISC stations IBM RS-6000, server DEC ALPHA 1000/200, about 30 PCs, programmable logic automates of various types (PLC-5/20E, SLC 5/4, SLC-5/03, TSX-47/40, TSX-17, SIMATIC S5-90U, SIMATIC S5-95U), far connectors, industrial visualization terminals and intelligent measurement elements, block of far I/O based on modules SLC, industrial terminal Panel-View-550, 3 x analogue computers MEDA-50, three-phase drive Rockwell-Automation, model for measurement and regulation of hot water supply, asynchronous drive, resources for recognition of black and white images: black and white camera MINILUX SUPER CCTV CAMERA and CCD CAMERA CCD-4230A, program resources based on AI elements, framegrabber SHARK 22n SHT G22.N1 with PHILIPS SAA 7110 WP videoprocessor; resources for infrared images recognition: AGA TERMOVISION SYSTEM 608, camera, remote control, black and white and color monitor, PC-LabCard 812, 2 x computers SUN SPARC station 20, , 8 x single-chip-computer configurations based on I-80552, 10 x set TEMS-51 LAB based on I-8031, three application on-chip-computer configurations 196 LAB based on I-80196, 3 x 3-channel oscilloscope, 3 x generator of signals, 3 x variable voltage supply, Lego mindstorm system, 4 x kit based on ADSP - 2100 signal processor; 4 x kits based on ADSP - 2181 signal processor.

4 TEACHING

4.1. Undergraduate Study (Bc.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Identification and Modeling	5 th	2/3	Filasová
Foundations of automatic control	5 th	2/2	Filasová
Artificial Intelligence	5 th	2/2	Csontó
Linear Systems Control Theory	5 th	3/2	Madarász
Simulation Programming Tools Seminar	5 th	0/2	
Object and Component Systems	5 th	1/3	Zolotová
Cybernetics and Management	5 th	2/2	Sarnovský
Non-linear Systems Control Theory	6 th	2/2	Madarász
Stochastic Processes in Dynamic Systems	6 th	2/2	Krokavec, D.

Single-chip Microcomputers in Control	6 th	2/3	Jadlovský
Elements of Control Systems	6 th	2/2	Hladký
Signal Processors Applications Seminar	6 th	0/2	
Applied Programming Seminar	6 th	0/2	
Protocols and Interfaces	6 th	2/2	Jadlovský
Computer Vision	6 th	2/2	Zolotová, Tomori
Scheduling and Logistics	6 th	2/2	Paralič, J.

4.2. Graduate Study (Ing.)

Subject	Semester	Lectures/exercises (hours per week)	Name of lecturer
Computer Tools for Technological Systems Control	7 th	2/3	Jadlovský
Theoretical Foundations of Artificial Intelligence	7 th	2/3	Sabol
Neural Networks	7 th	3/2	Sinčák
Discrete-time System Theory	7 th	3/2	Krokavec, D.
Database Management System Applications	7 th	3/2	Ocelíková
Expert Systems	7 th	3/2	Mach
AI Programming Languages Seminar	7 th	0/2	
Control System Design Seminar	7 th	0/2	
Fuzzy Systems in Control	7 th	2/2	Vaščák
Robot Control Systems	7 th	2/2	Kováč
Optimal and Adaptive Control Theory	8 th	3/2	Sarnovský
Multicriterial Decision Making	8 th	3/2	Ocelíková
Evolutionary Algorithms	8 th	3/2	Mach
Expert Systems	8 th	3/2	Machová
Intelligent Sensor Systems	8 th	3/2	Krokavec, D.
Control and Visualization of Processes	8 th	2/2	Zolotová
Control and Artificial Intelligence	8 th	2/2	Jadlovská
Knowledge Management	8 th	2/2	Mach, Paralič, J.
Planning and Problem Solving	8 th	2/2	Sabol
Machine Learning	8 th	2/2	Mach
Online Identification	8 th	2/2	Krokavec, D., Filasová
System Analysis and Synthesis	8 th	2/2	Madarász
Robust Control	8 th	2/2	Filasová
Information Transmission	8 th	2/2	Krokavec, D.
Biocybernetics	9 th	3/1	Csontó
Complex Systems Control	9 th	3/2	Sarnovský
Complexity and Decision Making	9 th	2/2	Madarász
Distributed Control Systems	9 th	2/3	Jadlovský

Dynamic Systems Diagnostics	9 th	3/2	Krokavec, D.
Speech Recognition	9 th	2/2	Krokavec, D.
Neuro-fuzzy Systems	9 th	2/2	Sinčák
Project Management	9 th	2/2	Sabol
Agent Systems	9 th	2/2	Sabol
Electronic Commerce	10 th	3/2	Sabol, Kováč

4.3. Undergraduate and Graduate Study for Foreign Students (in English Language)

All subjects listed in previous two subsections are offered also in English language for foreign students.

5 RESEARCH PROJECTS

- Web Technologies Supporting Direct Participation in Democratic Processes (WEBOCRACY)*, European Commission within the IST Program (5th Framework Program), IST-1999-20364, collaboration: Faculty of Electrical Engineering and Informatics, TU Kosice, SK, The School of Computing & Information Technology, University of Wolverhampton, UK, Department of Information Systems, University of Essen, D, JUVIER s.r.o. - SK, Citec Information, Citec Engineering Oy Ab, Vaasa, FIN, City ward Tahanovce, SK, City ward Dargovskych hrdinov, SK, Wolverhampton Council, UK, duration: 2000 – 2003, web page: <http://esprit.ekf.tuke.sk/webocracy/>, members: Tomáš Sabol (co-ordinator), Marián Mach, Ján Paralič, Róbert Kende, Ján Hreňo, Peter Macej, activity: Project aims to empower citizens with innovative communication, access and voting systems supporting increased participation in democratic processes. This organizational objective is achieved through scientific objectives, which are of technical and methodological nature. Technical objectives involve design and development of a Web-based system Webocrat. Webocrat will support: communication and discussion, publication of documents (incl. notices for competitive tendering), browsing and navigation, voting, intelligent retrieval (access to requested documents), calculation of summaries/statistics. All functions will be supported by knowledge model module. The methodological objectives are focused on development of a methodological framework and organizational practices for development and management of systems providing on-line support to public administration (PA) services.
- Web in Support of Knowledge Management in Company (Know-Web)*, ESPRIT Project 29065 supported by European Commission, collaboration: Luton Business School, University of Luton, UK - co-ordinator, Marketing Assessments Limited, Ltd. - UK, Oy Botnia Retail Data Ab, Finland, Faculty of Electrical Engineering and Informatics, TU Kosice, SK, University of Vaasa, Finland, IFBL Slovakia Ltd. - SK, duration: 1998 – 2001, web page: <http://www.tuke.sk/kkui/projects/nowweb/NowWeb.html>, members: Tomáš Sabol, Marián Mach, Ján Paralič, Róbert Kende, activity: Development of tools which help to capture, maintain, share and retrieve knowledge and foster communication within the company. The Know-Web is based on Web technologies (intelligent agent technologies, dynamic Web, etc.), knowledge modeling and sharing techniques (ontologies), case-based reasoning, and others.

- *Geographic Information On-Line Analysis (GIS - Data Warehouse Integration) (GOAL)*, INCO-COPERNICUS Project No. 977091, collaboration: Technical University Vienna (AUT) – co-ordinator; Czech Technical University Prague (CZ); Lumare GIS, Ltd. (CZ); Technical University of Kosice (SK); University (Gesamthochschule) Essen (D); VEGA, Ltd. (CZ), duration: 1998 – 2001, web page: <http://krizik.felk.cvut.cz/goal/>, members: Ján Paralič (leader), Július Csontó, Marek Hubal', Peter Bednár, Martin Pecuch, activity: The research project GOAL aims to find the way to integrate data warehouses (DWH) with geographical information systems (GIS) to support top executives in their decision-making by providing them with the information stored in the geographical information system. Our department is responsible for the knowledge discovery package integrated within the GIS-DWH prototype.
- *Providing Innovative Service Models and Assessment (PRISMA)*, European Commission within the IST Program (5th Framework Program), IST-1999-29088 coordinator: Danish Technological Institute, Copopenhagen, Denmark, web page: <http://www.prisma-eu.net/>
- *Euro-International Symposium on Computational Intelligence, 5th Framework Program* No. HPCF-CT-1999-00200, duration: 1999-2002, activity: The goal of the project is organize the Euro symposiums on the topic of Computational Intelligence. The first event had happened in August 2000 in Košice and the second is prepared for June 2002 (see the WEB page <http://www.e-isci.sk>). Both events are supporting Interactions between leading persons in the field and young research persons in the field of Computational Intelligence. The list of invited persons includes professors from Japan, USA, New Zealand, Germany and other countries. International Neural Network Society and many other leading scientific society including IEEE and AAAI support this event.
- *European Network of Intelligent Technologies*. Thematic Network, European Commission within the IST Program (5th Framework Program) IST-2000-29207, coordinator: Free University Amsterdam, Netherlands, web page: Computational Intelligence Group (CIG) is active node in this international project. Prof. Sinčák is a member of Technology Transfer EUNITE committee and is in charge of competition activities within the EUNITE. The CIG has organized the world-wide competition about electricity load forecast. The full information about this competition including the results can be found on Web page – <http://neuron-ai.tuke.sk/competition>. It was an interesting contribution to the problem of prediction using intelligent technologies. There are number of activities in EUNITE and their Web page is <http://www.eunite.org>.
- *European Knowledge Management Forum*. Thematic Network, European Commission within the IST Program (5th Framework Program) IST-2000-26393, coordinator: BIBA (Bremer Institut für Betriebstechnik und angewandte Arbeitswissenschaft an der Universität Bremen), Germany, web page: <http://www.knowledgeboard.com/>
- *Ontology-based information exchange for knowledge management and electronic commerce (OntoWeb)*. Thematic Network, European Commission within the IST Program (5th Framework Program) IST-2000-29243, coordinator: Free University Amsterdam, Netherlands, web page: <http://www.ontoweb.org/>
- *Computational Intelligence in Real World Problems - Individual Maria – Currie Fellowship (5th Framework Program)* 5RP HP-2000-1744, duration: November

- 1, 2001 – May 31, 2002, activity: Project is devoted to support relation between Academia and Industry and is devoted for Prof. Peter Sinčák to stay 7 months in Siemens Vienna with ECANSE Group. The main role of this project is to create conditions for possible future collaboration between academia and industry in the field of computational intelligence. Prof. Sinčák as hosting professor is responsible for advisory work in application potential of intelligent technologies tools in Siemens projects. Also some supportive material for teaching should be produce during his stay in Siemens AG Vienna with the Ecanse Group. For ECANSE information look at Web site <http://www.siemens.at/PSE/ecanse>.
- *TEXAS (TEXT Analysis)*, bilateral Slovak-Austrian research project, duration: 2001 – 2002, members: Ján Paralič and Andreas Rauber (Vienna Univ. of Technology), activity: Main goal of this project is to find out a way to automatically organize documents by their content into topical hierarchies similar to manual organization. Documents are carefully organized by topic into the various topical sections. This type of organization greatly supports the user in finding his or her orientation within a document collection, guiding the search process and supporting efficient browsing. To obtain this type of organization we propose the utilization of an unsupervised neural network model, namely the self-organizing map (SOM), which has proven to be capable of organizing documents by their subject. This model shall be extended to provide detailed hierarchical representation of topical clusters. Furthermore, ontologies shall support statistical measures to provide high-quality description of the various topical clusters identified.
 - *Multiagent Hybrid Control in Large-Scale Systems Using Methods of Artificial Intelligence*, S.G.A. project No. 1/5236/1999, duration: 1999 – 2001, members: Ján Sarnovský (project leader), Ladislav Madarász, Anna Filasová, Ján Vaščák, Vratislav Hladký, Ján Liguš, Marián Bučko, Anna Jadlovská, Ján Jadlovský, Rudolf Jakša, Peter Benko, Maroš Timko, activity: The goal of the project is the research and design of algorithms and methods of control and decision of automatic control systems, namely using modern paradigm of multiagent approach to control large-scale systems using the principles and methods of artificial intelligence.
 - *Pattern Recognition on the Basis of Intelligent and Information Technologies*, S.G.A. project No. 1/6061/99, duration: 1999 – 2001, members: Eva Ocelíková (project leader), Ladislav Madarász, Ivetta Zolotová, Nguyen Hong Thai, Ján Krištof, Jozef Marcin, Andrea Julényová, Juraj Galko, Marek Štofko, activity: Resolving problems of image acquisition as primary input information in the recognition process, analysis of their nature and followed pre-processing, design and implementation of programming modules for suitable informative feature extraction and dimension reduction of feature space, development of classification methods and hybrid classifiers with combination of classical statistical methods and neural technologies. The data are used from control of large-scale technological process (situational control, surface inspection of materials), from ecology (remotely sensed data) and from medicine (cardiovascular illnesses data, bio-medical images).
 - *Robust Diagnosis of Dynamic Systems*, S.G.A. project No. 1/6270/99, duration: 1999 – 2001, members: Dušan Krokavec (project leader), Anna Filasová, Juraj Galko, Róbert Németh, Peter Engler, Ján Kašpříš, activity: Investigation of test signals which reflects inconsistencies between the fault-free and fault system as well as neural network classifier training and discriminative hidden Markov

models learning for system fault classes, testing of procedures for fault function decomposition and fault isolation, robustification of fault tolerant control for uncertain dynamic systems.

- *Computational Intelligence in Decision-like Procedures*, S.G.A. project No. 1/6087/99, duration: 1999 – 2001, members: Peter Sinčák (project leader), Ján Vaščák, Rudolf Jakša, Stanislav Kaleta, Miroslav Hudec, Peter Kostelník, Marek Šamulka, Gyongy Gebeová, Daniel Novotný, Martin Kropuch and some other colleagues from different Universities, activity: Computational Intelligence represents a part of Artificial Intelligence and mainly integrating 3 different technologies concerning artificial neural networks, fuzzy systems and evolutionary systems. Integration of these systems results in so called hybrid intelligent systems. The project covers and focuses on basic-and-fundamental research issues and also application domain in the following directions: intelligent control, intelligent prediction systems and intelligent image processing systems. In all application problems we focus on decision-like procedures and utilization of obtained knowledge base in these processes. The level of decision procedures is the crucial point of the technology level. If we will be able to make intelligent decisions (decisions with high level reliability) we can improve many technological processes in general. The machine IQ seems to be an attempt to measure the level of intelligence of human-made systems and to evaluate decision procedures in technology.
- *Artificial life simulators and their application*, Scientific Grant Agency project (S.G.A.) No. 1/8135/01, duration: 2001 – 2003, members: Július Csontó (project leader), Marián Mach, Jozef Chvál, Martin Palko, Marek Polák, Dalibor Schon, Zuzana Tkáčová, Peter Zvirinský; activity: The project is directed towards A-life simulation methods and their application. The aim is to create specialized simulators of different initial bases (Swarm system, Lindenmayer systems, evolutionary algorithms) which take into consideration the requirements of particular application fields. The core of the project will be the utilization of these simulation tools in solving a relatively wide scale of practical tasks: monitoring the global ecosystem behavior, utilization of algae in eliminating heavy metals from water, monitoring the effect of signal spread in plants on their morphogenesis, data mining, prediction tasks and constraint problem solving.
- *Knowledge Technologies for Information Acquisition and Retrieval*, Scientific Grant Agency project (S.G.A.) No. 1/8131/01, duration: 2001 – 2003, members: Marian Mach (project leader), Július Csontó, Tomáš Sabol, Ján Paralič, Róbert Kende, Ján Hreňo, Milan Schmotzer, Peter Macej, Kristína Machová, activity: The project is focused on using knowledge modelling methods for solving information acquisition and information retrieval tasks. It is based on creating domain models in the form of conceptual models of different application areas. Elements of these models enable to represent a context of textual and non-textual documents in an explicit way. Within this framework the focus of the project activities is on: building of domain models, manual and automatic annotation of documents based on a particular domain model, indexing of knowledge stored in databases, retrieval of relevant documents and/or relevant parts of these documents, categorisation and clustering of textual documents, and automatic generation of document abstracts.
- *SCADA/HMI Systems as Decision Support Systems in Industry Automatization*, Institutional project of FEI TU Košice No. 1/6087/99, duration: 1999 – 2002, members: Iveta Zolotová (project leader), Eva Ocelíková, Marek Štofko,

Vratislav Hladký, Ján Jadlovský, Ján Liguš, Jana Horanská, Anna Jadlovská, activity: The goal of the project is the creation of the whole methodics for software projects of SCADA/HMI systems (Supervisory Control and Data Acquisition/Human Machine Interface) with the attention to the newest technology and emergence trends of automation and informatics. It deals about methods of integration, distribution, evt. design of software (COM, ActiveX) components and whole systems with the functions: human-machine interface - HMI (classical and remote), OPC servers, alarms and messages, statistical process control, communication with databases, decision support e.g. trend prediction with the using of methods of artificial intelligence. Science-technical and education goal is application of these methods in the laboratory technical evt. simulate models with the technological nets (e.g. DH+, DH485), the protocols (DHTML, TCP/IP) and internet/intranet technology.

6 CO-OPERATION

1.1. Co-operation in Slovakia

- Department of Biophysics IEP Slovak Academy of Science - DB IEP SAS
- Department of Automatic Control Systems Bratislava – DACS
- Slovak University of Technology, Bratislava
- Institute of Control Theory and Robotics Slovak Academy of Science in Bratislava
- University of P.J. Šafárik, Košice
- Economic University, Faculty of Business Economics, Kosice
- The City of Košice
- Local Authority Košice – City ward Staré mesto
- Local Authority Košice – City ward Juh
- Local Authority Košice – City ward Západ
- Local Authority Košice – City ward Ťahanovce
- Local Authority Košice – City ward Dargovských hrdinov
- Tatrabanka, a.s.

1.1.1. Visitors to the Department

- prof. Imre Rudas – Polytechnic Budapest, Hungary
- prof. Vladimír Kvasnicka, DrSc. – STU Bratislava
- Dr. Dana Klimešová, PhD. – UTIA Czech Academy of Sciences, Prague
- Dr. Dipl.-Ing. Andreas Rauber – Vienna University of Technology, Austria
- Ph.D. Tomori, Z. – DB IEP Slovak Academy of Sciences
- Dr. Peter Burden – University of Wolverhampton, UK
- Dipl.-Ing. Fredj Dridi – University of Essen, Germany

1.2. International Co-operation

- University of Wolverhampton, United Kingdom
- The Open University, Knowledge Media Institute, United Kingdom
- University of Vaasa, Finland
- Helsinki University of Technology, Dipoli, Finland
- Vienna University of Technology, Austria
- University of Essen, Germany

- Botnia Oy Ab, Finland
- CITEC, Finland
- Wolverhampton City Council
- Boston University, USA
- University of Dortmund, Germany
- Tokyo Institute of Technology, Japan
- Kuyshu Institute of Technology, Japan
- Department of Informatics, Technical University, Ostrava, Czech Republic
- Department of Control Systems and Instrumentation, Faculty of Mechanical Engineering Technical University of Ostrava, Czech Republic
- Department of Software Engineering, Vienna University of Technology, Austria
- Department of Cybernetics, Czech Technical University Prague, Czech Republic
- Department of Control Engineering, Czech Technical University, Prague, Czech Republic
- Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, Prague, Czech Republic
- Faculty of Mechanical Engineering, Department of Automation, Institute of Information, University of Miskolc, Hungary
- Budapest Polytechnic, Hungary
- Budapest University of Technology and Economics, Hungary
- California Institute of Technology, Jet Propulsion Laboratory (Dr. Antal, K. Bejczy), USA, California
- Hungarian Academy of Sciences, Computer and Automation Research Institute, Hungary (prof. Gyorgy Kovács)
- Bay Zoltán Foundation for Applied Research (prof. László Cser)

1.2.1. Visits of Staff Members to Foreign Institutions

- Hric, M.: International conference on Intelligent Technology in Economics, Neapol, Italy
- Hric, M.: International Conference in Intelligent Technologies Bangkok, Thailand
- Kende, R. – Paralič, J. – Sabol, T.: University of Essen, Essen, Germany
- Kopčo, N.: Long term stay at CNS Boston University, USA
- Kostelník, P. – Šamulka, M.: International Conference on Neural and Adaptive Systems Boston, CNS Department
- Macej, P. – Sabol, T.: FAO, Rome, Italy
- Novotný, D. – Sinčák, P.: EUNITE International Conference, Spain
- Novotný, D. – Sinčák, P.: 10th European Conference on neural networks, Vienna, Austria
- Ocelíková, E.: Institut of Information Technology, University of Miskolc, Miskolc, Hungary
- Paralič, J.: Technical University of Munich, Germany
- Paralič, J.: Vienna University of Technology, Vienna, Austria
- Sabol, T.: University of Wolverhampton, United Kingdom
- Sabol, T.: Danish Technological Institute, Copenhagen, Denmark
- Sabol, T.: University of Athens, Athens, Greece
- Sabol, T.: Helsinki University of Technology, DIPOLI, Helsinki, Finland
- Sabol, T.: University of Mining and Metallurgy, Krakow, Poland
- Sabol, T.: University of Calabria, Rende, Italy
- Sarnovský, J. – Sinčák, P.: Kent State University, Ohio, University of

Binghamton, New York International joint Conference on Neural Networks
Washington D.C., USA

- Sinčák, P.: Hongkong at China University, China
- Sinčák, P.: Tokyo Institute of Technology, Japan
- Sinčák, P.: International conference on Intelligent Engineering Techniques, Helsinki – Invited talk
- Sinčák, P.: European Symposium on Intelligent technologies, Spain
- Vaščák, J.: Tokyo Institute of Technology, Yokohama, Japan

1.3. Membership in International Organizations and Societies

- Ocelíková, E. – Sinčák, P. – Zolotová, I.: Czech Society for Cybernetics and Informatics
- Ocelíková, E. - Sinčák, P. - Zolotová, I.: CPRS - Czech Pattern Recognition Society
- Ocelíková, E. - Zolotová, I.: CSSS - Czech and Slovak Society for Simulation
- Paralič Ján: ACM – Association of Computer Machinery
- Paralič Ján: AAAI – American Association for Artificial Intelligence
- Sabol Tomáš: Information Society Technologies Program Committee (IST PC), 5th Framework Program, Brussels
- Sarnovský Ján: INES - International Network of Engineers and Scientists for Global Responsibility
- Sarnovský Ján: Principia Cybernetica Web PRNCYB-L
- Sarnovský Ján: SWIIS - Supplementary Ways for Improving International Stability

1.4. Membership in Slovak Organizations and Societies

- Krokavec Dušan: Slovak Elelectrical Engineering Society:
- Ocelíková, E. - Zolotová, I.: Slovak Society of Applied Cybernetics and Informatics
- Sabol Tomáš: Board of the Open Society Fund, Bratislava
- Sinčák, P. – Kende, R. – Vaščák, J. – Hric, M. – Sarnovský, J. – Andrassyová, E. – Kaleta, S. - Madarász, L. – Hudec, M. – Schmotzer, M. – Timko, M. – Kostelník, P. – Šamulka, M.: SAIS - Slovak Artificial Intelligence Society

1.5. Contracts, International Scientific Projects

- IST-1999-20364 "Web Technologies Supporting Direct Participation in Democratic Processes (Webocracy)", 2000-2003, Project Co-ordinator.
- Esprit Project 29065 "Web in Support of Knowledge Management in Company (KnowWeb)", 1998-2001.
- INCO-COPERNICUS Project 977091" Geographic Information On-Line Analysis (GIS - Data Warehouse Integration) (GOAL)", 1998-2001
- International Education Project TEPMUS - STAMP – European Standards for Advanced Manufacturing Technologies and Intellectual Property, 1999-2001 (Košč, P. – leader, Zolotová, I. and others – members)
- International Scientific Project: Intelligent and Information Technologies for Objects Recognition. Eva Ocelíková (project leader), Jozef Marcin, Iveta Zolotová, Nguyen Hong Thai, Ján Krištof. Funding: Slovak-Czech scientific and technological co-operation. Project No. 064/097. Collaboration with Institute of Theory and Automation, Academy of Sciences of the Czech Republic. 2000 –

2001

- Central European Exchange Programme for University Studies (CEEPUS H-021), mobility network - collaboration with: University of Miskolc, Hungary (coordinator); Czech Technical University Prague, Czech Republic; Vienna University of Technology, Austria; Duration: 1997 – 2001
- Central European Exchange Programme for University Studies (CEEPUS H-140), mobility network - collaboration with: Budapest Polytechnic, Hungary (coordinator); Budapest University of Technology and Economics, Hungary; Partium Christian University Oradea, Romania; Technical University of Cluj-Napoca, Romania; Duration: 2001 - 2002

7 THESES

1.1. Masters Theses

1. Bajus M.: Hybrid Control of inverse Pendulum (Hladký, V.)
2. Barnová, S.: Statistical Classification Methods in the Strategie of Composite Classifiers (Ocelíková, E.)
3. Bednár, P.: Data Mining of Decission Rules (Paralič, J.)
4. Bodnár, V.: Applicatino of Hammerstein Model in Modelling and Control of Non-linear Dynamic Systems (Sarnovský, J.)
5. Compeľ, P.: Extension of the Departmental Distributed Control System Model Using Allen Bradley Tools (Jadlovský, J.)
6. Ditte, S.: Hierarchical Decission-Making Based on Graph Theory (Sarnovský, J.)
7. Duľa, M.: Decentralized Control Methods Comparison (Sarnovský, J.)
8. Dzivý, P.: Non-parametric Statistical Classification Rule k -NN (Ocelíková, E.)
9. Gajdoš, J.: Realisation of Managerial Part of the Information System Using Microsoft products and its Incorporation Into Departmental Distributed Control System (Jadlovský, J.)
10. Engler, P.: Deterministic Residual Generation in Dynamic System Fault Diagnosis (Krokavec, D.)
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1.2. Doctoral Theses

1. Jadlovská A.: Modeling and Control of Nonlinear Processes Using Neural Networks (Sarnovský, J.)
2. Marcin, J.: Grayscale Image Segmentation with Methods of Pyramidal Seeded Region Growing (Ocelíková, E.)
3. Nguyen Hong Tai: Maximum Entropy Image Restoration by Neural Network (Ocelíková, E.)

8 OTHER ACTIVITIES

- Ing. Ján Paralič, PhD. has been invited in summer semester 2001 to teach a subject "VU 188.118: Advanced Artificial Intelligence 2" at the Vienna University of Technology in June 2001.
- prof. Ing. Peter Sinčák, CSc. has invited talk entitled "Computational Intelligence tools in Complex Decision Support Systems" at the China University in Hong-kong, China (Prof. Jun Wangom from Dept. of Automation invited Prof. Peter Sinčák to the stay in China) as well as at the Technical University of Tokyo, Japan (invitation of Prof. Kauru Hirota from Dept. of Computational Intelligence at the Tokyo Institute of Technology).
- Center for Intelligent Technologies is joint research unit between Department of Cybernetic and Artificial Intelligence, FEI TU Košice, Slovakia and Institute of Computer Science, Slovak Academy of Science. The main focus in general is in promotion of Intelligent technologies.

9 PUBLICATIONS

9.1. Books

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9.5. Other Publications

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