

**Laboratories/Research groups taking part in the TEAM project at Eötvös Loránd University (ELTE)**

Thematic field	Laboratory/ research groups and subjects	More details	Website	Contact person	Contact email
Analysis of online social and transactional networks including Twitter, BitCoin, etc.	Communication Networks Laboratory	In the past ten years online social networks have gained outstanding popularity, having millions of active users. Using these new multi-terabyte data sources, previous research showed the possibility to gain valuable new insights into the structure and dynamics of society, gaining the possibility to address questions whose study was previously limited by the scarcity of available data. In addition, the possibility to simultaneously analyse both the network topology of connections between users and the corpus of textual data posted by them opens up new possibilities in the fields of social, network and computer sciences. A valuable aspect of some online social networks is the inclusion of spatial data. This research focuses on the data management problem of large social network data and the development of new methodologies to reveal hidden correlations between various aspects to better understand human behaviour and visualize large-scale networks with millions of data points. This project is partially funded by National Research Grants.	<a href="http://scholar.google.com/citations?user=GOxjaBsAAAAJ&amp;hl=en">http://scholar.google.com/citations?user=GOxjaBsAAAAJ&amp;hl=en</a>	prof. Gábor Vattay	<a href="mailto:vattay@elte.hu">vattay@elte.hu</a>
Cyber Physical Systems for Smart Factories	Neural Information Processing Group	Recent developments in robotics, reinforcement learning and deep networks enable end-to-end learning for goal-oriented systems, including computer vision, information fusion, smart tools all the way up to workflow	<a href="http://nippg.inf.elte.hu/">http://nippg.inf.elte.hu/</a>	Dr. András Lorincz	<a href="mailto:lorincz@inf.elte.hu">lorincz@inf.elte.hu</a>

		<p>management. A successful candidate will work in an international team with German collaborators. The focus of the work is ontology driven workflow management for manipulation. The task of manipulation requires the monitoring and tracking of facial expressions, gaze direction, head pose, and limb in addition to 3D camera based monitoring of hand pose. Challenges include occlusion, the modeling of 3D objects and information fusion of sensory information plus the models of the hands and the objects. Human robot joint work is aimed at. Experiments can be conducted with robots, including the da Vinci system at Obuda University, and, or at a research factory in Germany. The project will run parallel with health and well-being projects for independent living and augmentative and alternative communication.</p>			
Modeling of Information Systems	Department of Information Systems	<p>1. Investigation of formal models for documents and the opportunities to be integrated into the formal, mathematical models of Information Systems. 2. Integration, reconciliation and alignment of Business Process models and document models exploiting the formal and semi-formal methods: BPMN 2.0; Process algebra; Petri-net; Story algebra; Description Logic. 3. Methods and structures of mathematics and computer science that can be exploited for modeling and operationalizing of Information Systems. 4. The impact and influence of Web technologies on modeling and designing Information Systems. 5. Cloud computing. 6. Contemporary research issues on the field of Enterprise Resource Systems (ERP). 7. Problems of alignment between ERPs on-site and in cloud. 8. The analysis of trends in development of most modern ERP systems by Big Data analytics and other data mining and statistical methods.</p>	<a href="http://www.doktori.hu/index.php?menuid=192&amp;lang=EN&amp;sz_ID=9807">http://www.doktori.hu/index.php?menuid=192&amp;lang=EN&amp;sz_ID=9807</a>	Dr. Bálint Molnár	<a href="mailto:molnarba@inf.elte.hu">molnarba@inf.elte.hu</a>

Research on parallel query algorithms for distributed relational database management systems.	Communication Networks Laboratory	Scale-out scenarios of data warehouses require efficient parallel, distributed processing of long-running massive query workloads. This functionality is usually implemented on top of existing, monolithic RDBMS. Our search focuses on the application of distributed query processing for petascale scientific databases.	<a href="http://scholar.google.com/citations?user=kllQz-YAAAAJ&amp;hl=en&amp;oi=ao">http://scholar.google.com/citations?user=kllQz-YAAAAJ&amp;hl=en&amp;oi=ao</a>	Dr. László Dobos and prof. István Csabai	<a href="mailto:dobos@complex.elte.hu">dobos@complex.elte.hu</a> <a href="mailto:csabai@complex.elte.hu">csabai@complex.elte.hu</a>
IT security	Department of Information Systems	The research is targeting at observing practical security problems and their popular solutions in order to develop better, efficient algorithms based on theory and practice, architecture designing, intrusion detection and prevention systems, firewalls, cloud security, database security, anonymity, benchmarks.	<a href="http://scholar.google.com/citations?user=06CX4UAAAAJ&amp;hl=en">http://scholar.google.com/citations?user=06CX4UAAAAJ&amp;hl=en</a>	prof. Attila Kiss	<a href="mailto:kissattiladr@gmail.com">kissattiladr@gmail.com</a>
Static program analysis & transformation, language processing (e.g. refactoring) tools	Software Laboratory	Construct static source code analysis techniques and tools for a wide variety of languages (C++, Erlang, Java, Scala etc.) to facilitate software development and maintenance. Design and implement high level and domain specific languages to (re)engineer software for multicore and distributed systems. Develop methods supporting code comprehension, semantics preserving code transformations, and automatic detection of components that can be refactored semi-automatically for parallel and distributed execution.	<a href="http://people.inf.elte.hu/hz/index_eng.html">http://people.inf.elte.hu/hz/index_eng.html</a>	prof. Zoltán Horváth	<a href="mailto:hz@inf.elte.hu">hz@inf.elte.hu</a>
Programmable abstract data plane project based on P4	Communication Networks Laboratory	This research is based on the P4 language (p4.org) by Stanford that is considered as the next generation OpenFlow. With respect to that we are developing a softswitch for Intel DPDK platform that could be used in experimentation systems, enabling the full programmability of data plane. The first release is expected by the end of this year. In addition, the research is also focus on how P4 could be used as an abstract language to describe/implement NFVs, with special focus	<a href="http://lakis.web.elte.hu">http://lakis.web.elte.hu</a>	Dr. Sándor Laki	<a href="mailto:lakis@elte.hu">lakis@elte.hu</a>

		on network monitoring and anomaly detection functions. P4 is a good tool for rapid prototyping in the ICN area, and it is anticipated that it will enable radically novel applications in networking. Research is done in close collaboration with Ericsson Research.			
Statistical Machine Learning - Uncertain Dynamical Systems	ELTE-MTA SZTAKI	There are many fields of computer science (from image- and voice recognition, robotics and cyber security to medical-, economical- and industrial applications) in which stochastic models (for example, Markov decision processes or Box-Jenkins models) should be applied due to significant uncertainties, typically coming from measurement errors, hidden processes, imprecise models and changing environments. The main (interconnected) challenges of such models are: (i) how to learn them from experimental data; (ii) how to make predictions with them; and (iii) how to build efficient control policies using these models. For practical reasons we favor distribution-free and non-asymptotic approaches, i.e., ones which do not make too strong statistical assumptions and come with finite sample guarantees. The research focuses on statistical machine learning methods for uncertain dynamical systems, possible choices include reinforcement learning-, active learning-, Monte Carlo-, and bootstrap algorithms. This research is done in cooperation with the Institute for Computer Science and Control (SZTAKI) of the Hungarian Academy of Sciences (MTA).	<a href="http://www.sztaki.mta.hu/~csaji/">http://www.sztaki.mta.hu/~csaji/</a>	Dr. Balázs Csanád Csáji	balazs.csaji@sztaki.mta.hu
ICT – Open applicaton	Communication Networks Laboratory	Open application in the Communication Networks Laboratory that is a joint laboratory of ELTE and Ericsson Research. This kind of application is based on individual partner search. Any kind of topic in ICT is possible, but the applicant should contact us in advance. If you are interested, please send us a mail and we will help you to find a host professor.	<a href="http://cni.elte.hu/">http://cni.elte.hu/</a>	Dr. Sándor Laki	<a href="mailto:lakis@elte.hu">lakis@elte.hu</a>