

DEPARTMENT OF KNOWLEDGE TECHNOLOGIES

E-8

The Department of Knowledge Technologies performs research in advanced information technologies, aimed at acquiring, storing and managing knowledge to be used in the development of knowledge-based applications. The established areas of knowledge technologies include intelligent data analysis (machine learning, data mining, knowledge discovery in databases), text and web mining, semantic web, social network analysis, language technologies and computational linguistics, decision support and knowledge management. The research areas of the department also include Web 2.0, management of virtual organizations, new media and e-science. Apart from knowledge technologies research, we also develop applications in environmental sciences and ecology, medicine and health care, biomedicine and genetics, economy and marketing.



Head:
Prof. Nada Lavrač

In 2010 we were involved in 21 EU projects, mainly the projects of the seventh framework programme (FP7). In terms of our collaboration in EU projects, we are the most successful research group in Slovenia.

In the area of **intelligent data analysis and data mining** we have developed several new methods. (a) We developed new methods for noise and outlier detection. We have also shown that outlier detection can help us in finding bridging terms in medical cross-domain knowledge discovery; this work was published in the Computer Journal. (b) Methods of semantic data mining have been upgraded to enable the use of general ontologies as background knowledge in relational data mining. (c) A new service-oriented knowledge-discovery platform Orange4WS was made publicly available to a broader community of data-mining researchers. (d) Our lemmatisation engine LemmaGen was made publicly available; this work was published in the Journal of Universal Computer Science. (e) We have developed some improved methods for predicting structured target variables (i.e., multi-target regression, hierarchical multi-label classification and predictive clustering of short time-series), e.g., methods for learning rule ensembles. (f) We have developed new methods for learning from data streams, especially for the learning of different types of regression trees (including trees for multi-target regression).

We have successfully collaborated in the FP7 project PHAGOSYS (Systems biology of phagosome formation and maturation - modulation by intracellular pathogens) in the area of systems biology. For this project we have developed new methods for the analysis of complex data and equation discovery for the modeling of dynamic systems, and have applied them to a series of practically relevant problems. Examples include gene-function prediction, modeling of gene expression response to infection, and modeling of different processes within immune response. We are partners in the FP7 project BISON (Bisociation Networks for Creative Information Discovery). The project aims at developing methods for discovering bisociative links between different contexts and domains. We have shown that outlier detection methods can be used to find hidden relationships between different medical domains. We have also developed the SegMine methodology for microarray data analysis which enables the discovery and visualization of groups of differentially expressed genes. We became partners of two new FP7 projects in the area of data mining and text mining: e-LICO (e-Laboratory for Interdisciplinary Collaborative Research in Data Mining and Data-Intensive Sciences) and FIRST (Large scale information extraction and integration infrastructure for supporting financial decision making). The goal of the e-LICO project is to build a virtual laboratory for interdisciplinary collaborative research in data mining and data-intensive sciences. A meta-miner is being developed for this purpose, to provide suggestions about the most appropriate workflows for a given data-mining task. The FIRST project is more domain oriented, it provides an information-extraction, information-integration and decision-making infrastructure for information management in the financial domain.

In the area of **decision support**, our long-term goal is to develop methods and techniques of decision modeling, support them with software and integrate them with data-mining systems. In 2010 we started implementing a method for qualitative multi-attribute decision making DEX into the Decision Deck platform. Decision Deck is an open platform that facilitates a uniform incorporation and connection of various multi-attribute modeling methods

- In 2010 we were partners in 21 EU projects.
- Tomaž Erjavec, together with Matija Ogrin from ZRC SAZU, received a Google Digital Humanities Research Award to support their research on Language Models for Historical Slovene.
- Nada Lavrač was a keynote speaker at the MedInfo World Congress on Medical Informatics in Cape Town, South Africa, held in September 2010.
- Tomaž Erjavec gave an invited lecture at the 2010 Conference and Members' Meeting of the Text Encoding Initiative, held in November 2010 in Zadar, Croatia.



Figure 1: The book "Inductive Databases and Constraint-based Data Mining", edited by S. Džeroski, B. Goethals and P. Panov, was published in 2010 by Springer. The book gives an introduction to the area of inductive databases, an overview of the methods for constraint data mining and their applications in bioinformatics. It presents the main achievements of the FP7 project IQ, which was coordinated by our department

and algorithms. Also, we started with the development of new methods for the ranking of alternatives in qualitative, multi-attribute models, with the aim to improve their sensitivity.

We used the method DEX and the supporting computer program DEXi in the European project HEALTHREATS (Integrated Decision Support System for HEALTH THREATS and crises management), which was successfully concluded in 2010. We developed models for an internal evaluation of project's results. We have also collaborated in the development of various decision models in agronomy: models of the assessment of soil quality and the suitability of cropping systems. These models were successfully applied in the European project ENDURE (European Network for the Durable Exploitation of Crop Protection Strategies) as well as in collaboration with INRA, the French National Institute of Agronomical Research.

In the area of **text and web mining** our work activities on the FP7 Network of Excellence PASCAL2 (Pattern Analysis, Statistical Modeling and Computational Learning 2) were mainly on research in text mining and natural language processing. Activities on the FP7 project VIDI (Visualising the impact of legislation by analyzing public discussions using statistical means) were mainly on the visualization of dynamic text data – discussion forums and on user profiling and recommendation based on previously read discussion items. We have started work on two new FP7 projects. In METANet (Net Technologies for the Multilingual European Information Society) we have mainly focused on developing methods and services for automatic constructions on multilingual corpora. In the MultilingualWeb project we are dealing with standards and best practices that support the creation, localization and use of multilingual web-based information.

In the area of the **Semantic Web** we have successfully concluded our work in the FP6 project NeOn (Lifecycle Support for Networked Ontologies) that resulted in an extension of the NeOn Toolkit with several plug-ins related to contextualized access to ontologies. Activities in the FP7 IP project ACTIVE (Enabling the Knowledge Powered Enterprise) were mainly in the direction of modeling informal knowledge processes in an organization based on context mining and process mining. We have started work on the FP7 project ENVISION (ENVironmental Services Infrastructure with ONtologies) where we have focused on semantic annotations, stream mining and semantic sensor data.

In the area of **knowledge management** we are continuing with the research and development work in the areas of networked organizations, interoperability and collaboration in the FP7 integrated project COIN (COLlaboration and INTERoperability for networked enterprises) with the focus on the extracting and modeling of internal competences for professional communities. We have continued with the development of Cargo Intelligence (CI) services for the FP7 project EURIDICE (European Inter-Disciplinary Research on Intelligent Cargo for Efficient, Safe and Environment-friendly Logistics), where we have finished with anomaly detection, knowledge extraction and prediction services. We have also introduced the CI framework, which is now being integrated into the solution.

In the area of **language technologies** we, have in 2010, joined the 7FP EU project IMPACT (Improving Access to Text), which aims to significantly improve access to historical text and to take away the barriers that stand in the way of the mass digitisation of the European cultural heritage. Apart from the JSI, the National and University Library of Slovenia is also a member of the project, and together we are now working on achieving the project aims for Slovene language and literature from the XIXth and XVIIIth centuries. At the JSI we have started working

on a lexicon of archaic Slovene words and have implemented a prototype tagger and lemmatiser for historic Slovene texts. At the end of the year we have also joined the COST action MUMIA (Multilingual and multifaceted interactive information access).

In 2010 we concluded our work in the EU project Mondilex (Conceptual Modelling of Networking of Centres for High-Quality Research in Slavic Lexicography and their Digital Resources), in which we have in the last three years investigated the possibilities of using Grid technologies for the processing and dissemination of large corpora, extended the MULTTEXT-East multilingual language resources by several new Slavic languages, and organized a project meeting and open workshop with published proceedings. We have also finished work in the bilateral Slovenia-France project with the INALCO institute in Paris, where we investigated the definition of syntactic-semantic structure of the Slovene verb. In the EU project FlareNet (Fostering Language Resources Network) we continued working on the compilation of language resources for the Slovene language.

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bolj in bolj v pobožnosti in bolj in bolj v pobožnosti in bolj in bolj v pobožnost in Rgp Ce Rgp Sl Nef Ce = = = [z--sh+s--l] =	sveti sveti svet App [s--l]	boshji ljubezni rastla, ko je božji ljubezni rastla, ko je božji ljubezni rasti - ko biti App Nef Vmp - Cs Va- [z--sh] [z--s] [s--l] = =
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perjasnimi befedami: "Vsemi ta prijaznimi besedami: "vsemi ta prijazni beseda - ves ta App Nef - - Pq Pd [ri--er+z--s] [s--l] = = =	sveti sveti svet App [s--l]	krish, o Genofefa, kterege ti tvoj križ, o - , kterege ti tvoj križ - o - , kateri ti tvoj Nem - Sl - - Pq Pp Ps [z--sh] = = [kat--@kt] =

Figure 2: Concordances of old Slovene texts, together with automatically assigned modern-day equivalents, lemmas, morphosyntactic descriptions and transcription rules.

Some outstanding publications in the past year

1. Elena Ikononovska, João Gama, Sašo Džeroski. Learning model trees from evolving data streams. *Data Mining and Knowledge Discovery*, 2010, doi:10.1007/s10618-010-0201-y.
2. Ingrid Petrič, Bojan Cestnik, Nada Lavrač, Tanja Urbančič. Outlier detection in cross-context link discovery for creative literature mining. *The Computer Journal*, 2010, doi:10.1093/comjnl/bxq074.
3. Mojca Arsenijević, Marko Bohanec. Towards the ecotourism : a decision support model for the assessment of sustainability of mountain huts in the Alps. *Journal of environmental management*, 2010, vol. 91, no. 12, pp. 2554-2564.
4. Matjaž Juršič, Igor Mozetič, Tomaž Erjavec, Nada Lavrač. LemmaGen : multilingual lemmatisation with induced Ripple-Down rules. *Journal of Universal Computer Science*, 2010, vol. 16, no. 9, pp. 1190-1214.
5. Elena Simperl, Ian Thurlow, Paul Warren, Frank Dengler, J. Davies, Marko Grobelnik, Dunja Mladenić, Jose Gomez-Perez, Carlos Ruiz Moreno. Overcoming information overload in the enterprise : the active approach. *IEEE internet computing*, 2010, vol. 14, no. 6, pp. 39-46.

Awards and appointments

1. Blaž Fortuna, Marko Grobelnik and prof. dr. Dunja Mladenić: Innovations for Economy, Ljubljana, Technology Transfer Conference, Jožef Stefan Institute, OntoGen
2. Asst. Prof. Tomaž Erjavec, Google Digital Humanities Research award, California, USA, Google Inc., Research on language models for Historical Slovene

Organization of conferences, congress and meetings

1. EBI Bionformatics Roadshow, Ljubljana, Slovenia, 16–18 Feb. 2010
2. Workgroup meeting of European project GENDERA, Ljubljana, Slovenia, 10 May 2010
3. Subconference: Third Generation Data Mining: Towards Service-Oriented Knowledge Discovery on European Conference ECML/PKDD 2010, Barcelona, Spain, 24 Sept. 2010
4. Subconference: Conference on Data Mining and Data Warehouses on conference Information Society - IS 2010, Ljubljana, Slovenia, 12 Oct. 2010.
5. Project meeting of European project GENDERA, Bled, Slovenia, 22 and 23 Nov. 2010
6. Project meeting of European project e-LICO, Ljubljana, Slovenia, 8 and 9 Nov. 2010

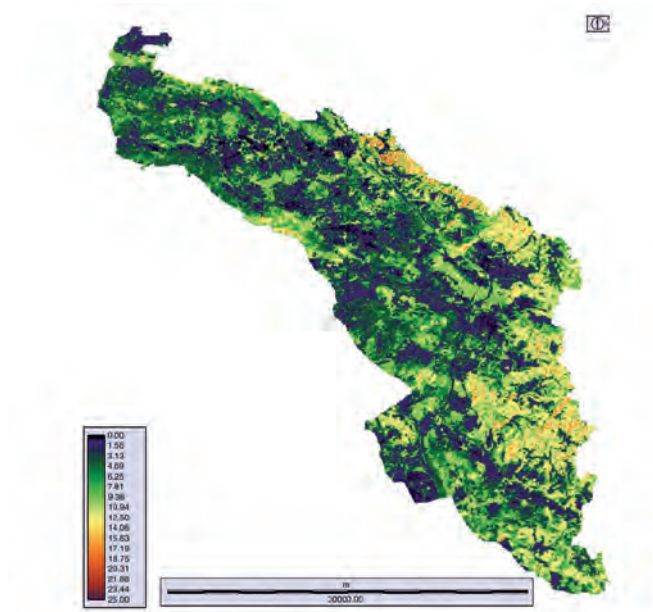


Figure 3: Map of the vegetation height for the Kras region, generated by using a random forest of a multi-target regression-trees model. The legend shows the vegetation height in metres.

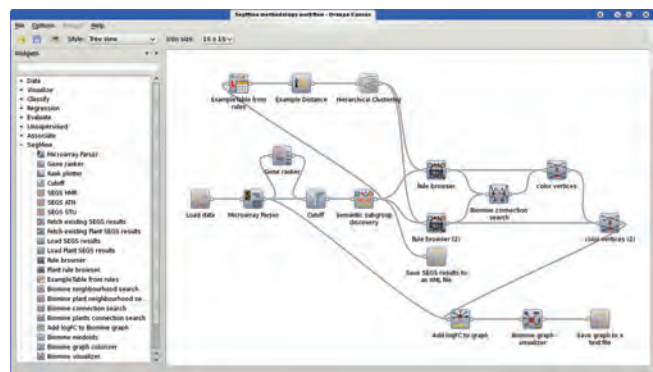


Figure 4: A screenshot of Orange4WS running a workflow of components for a semantic analysis of microarray data. Orange4WS is a service-oriented environment for knowledge discovery that integrates the concepts of data-mining workflows and service-oriented computing.

INTERNATIONAL PROJECTS

1. e-Laboratory for Collaborative Interdisciplinary Research in Data Mining and Data Intensive Sciences
e-LICO
7. FP, 257680
EC; Dr. Melanie Hilario, Université de Geneve, Carouge, Switzerland
Prof. Nada Lavrač, Dr. Martin Žnidaršič
2. Active Support and Real-time Coordination based on Event Processing in Open Source Software Development
ALERT
7. FP, 258098
EC; Dr. Ljiljana Stojanovic, Forschungszentrum Informatik an der Universität Karlsruhe, Karlsruhe, Germany
Prof. Dunja Mladenić, Marko Grobelnik, Mitja Jermol, M. Sc.
3. Large Scale Information Extraction and Integration Infrastructure for Supporting Financial Decision Making
FIRST
7. FP, 257928
EC; Tomas Pariente Lobo, Atos Origin Sociedad Anónima Espanola, Madrid, Spain
Miha Grčar, B. Sc., Prof. Nada Lavrač
4. PlanetData
7. FP, 257641
EC; Dieter Fensel, Universitaet Innsbruck, Christoph-Probst-Platz, Innsbruck, Austria
Marko Grobelnik, Prof. Dunja Mladenić, Mitja Jermol, M. Sc., Asst. Prof. Mihael Mohorčič
5. Reflecting Knowledge Diversity
RENDER
7. FP, 257790
EC; Hartmut Schmeck, Karlsruhe Institute of Technology, Karlsruhe, Germany
Prof. Dunja Mladenić, Marko Grobelnik, Mitja Jermol, M. Sc.

6. Improving Access to Text
IMPACT
7. FP, 215064
EC; Lieke Ploeger, Koninklijke Bibliotheek, Haag, The Netherlands
Asst. Prof. Tomaž Erjavec, Jan Jona Javoršek, B. Sc.
7. Technologies for the Multilingual European Information Society
MetaNet
7. FP, 249119
EC; Dr. Stefan Busemann, DFKI - German Research Center for Artificial Intelligence, Saarbrücken, Germany
Marko Grobelnik, Prof. Dunja Mladenić, Mitja Jermol, M. Sc.
8. Environmental Services Infrastructures with Ontologies
ENVISION
7. FP, 249120
EC; Bjorn Skjellaug, Arne J. Berre, Stiftelsen Sintef, Trondheim, Norway
Prof. Dunja Mladenić, Miha Grčar, B. Sc., Prof. Nada Lavrač, Mitja Jermol, M. Sc.
9. Gender Debate in the European Research Area
GENDERA
7. FP, 244499
EC; Dr. Dora Groo, Hungarian Science and Technology Foundation, Tudományos Es Technológiai Alapítvány, Budapest, Hungary
Prof. Dunja Mladenić, Mitja Jermol, M. Sc.
10. Systems Biology of Phagosome Formation and Maturation, Modulation by Intracellular Pathogens
PHAGOSYS
7. FP, 223451, HEALTH-F4-2008-223451
EC; Dr. Brian D. Robertson, Imperial College London, Centre for Molecular Microbiology and Infection, London, Great Britain
Prof. Sašo Džeroski
11. Bisoction Networks for Creative Information Discovery
BISON
7. FP, 211898
EC; Prof. Michael Berthold, Universität Konstanz, Konstanz, Germany
Prof. Nada Lavrač
12. Conceptual Modelling of Networking of Centres for High-Quality Research in Slavic Lexicography and Their Digital Resources
MONDILEX
7. FP, 211938
EC; Prof. Ludmila Dimitrova, Institute of Mathematics and Informatics of the Bulgarian Academy of Science, Sofia, Bulgaria
Asst. Prof. Tomaž Erjavec, Jan Jona Javoršek, B. Sc.
13. Enabling the Knowledge Powered Enterprise
ACTIVE
7. FP, 215040
EC; Dr. Paul Warren, British Telecommunications plc, London, Great Britain
Marko Grobelnik, Prof. Dunja Mladenić, Mitja Jermol, M. Sc., Asst. Prof. Mihael Mohorčič
14. Pattern Analysis, Statistical Modelling and Computational Learning 2
PASCAL 2
7. FP, 216886
EC; Prof. John Shawe-Taylor, University of Southampton, Southampton, Great Britain
Prof. Dunja Mladenić, Marko Grobelnik, Mitja Jermol, M. Sc.
15. European Inter-Disciplinary Research on Intelligent Cargo for Efficient, Safe and Environment-friendly Logistics
EURIDICE
7. FP, 216271
EC; Dr. Paolo Paganelli, INSIEL - Informatica per il Sistema degli Enti Locali s.p.a, Trieste, Italy
Marko Grobelnik, Prof. Dunja Mladenić, Mitja Jermol, M. Sc.
16. Collaboration and Interoperability for networked enterprises
COIN
7. FP, 216256
EC; Dr. Claudia Guglielmina, TXT e-Solutions Spa, Milano, Italy
Prof. Dunja Mladenić, Marko Grobelnik, Mitja Jermol, M. Sc.
17. Lifecycle Support for Networked Ontologies
NEON
6. FP, 027595
EC; Prof. Enrico Motta, Kmi, The Open University, Milton Keynes, Great Britain
Prof. Dunja Mladenić, Marko Grobelnik, Mitja Jermol, M. Sc.
18. Advancing the Multilingual Web
MultilingualWeb
CIP - Competitiveness and Innovation
250500
EC; Jérôme Chailloux, Caroline Baron, Celine Bitoune, GEIE ERCIM, Sophia Antipolis, France
Marko Grobelnik, Asst. Prof. Dunja Mladenić
19. Integrated Decision Support System for HEALTH THREATS and Crises Management
HEALTHTHREATS
Public Health Programme (PHEA)
2006203
EC; Carmelo Scarcella, Azienda Sanitaria Locale di Brescia (ASL Brescia), Brescia, Italy
Prof. Nada Lavrač, Dr. Martin Žnidaršič
20. Visualising the Impact of the Legislation by Analysing Public Discussions Using Statistical Means
VIDI
e-PARTICIPATION, EP-08-01-014
EC; Nenad Stojanović, Forschungszentrum Informatik an der Universität Karlsruhe, Karlsruhe, Germany
Prof. Dunja Mladenić, Marko Grobelnik
21. Fostering Language Resources Network
FLaReNet
e-Contentplus, ECP-2007-LANG-617001
EC; CNR-ILC, Consiglio Nazionale delle Ricerche, Rome, Italy
Asst. Prof. Tomaž Erjavec
22. Communication in Slovenian Language
MŠS
Simon Krek
23. Network of Research Values Development in Youth
SIM-RIS, 3311-09-986011
Prof. Dunja Mladenić
24. European Concepts and Approaches to GM Maize Production
Training Placement Agreement
Florence Leprince, ARVALIS - Institut du Végétal, Montardon; Paris, France
Prof. Marko Debeljak
25. Regional Level Co-existence Advisory Systems for Maize
Contractual Agreement
Florence Leprince, ARVALIS - Institut du Végétal, Montardon, France
Prof. Marko Debeljak
26. The Effects of Genetically Modified Maize on Conventional Maize Production: Co-existence Advisory System (CAS)
BI-FR/09-10-PROTEUS-018
PROTEUS
Dr. Florento Leprince, Arvalis Institut du végétal, Montardon, France
Prof. Marko Debeljak
27. Definition of a Syntaxico-Semantic Verbal Frame of the Slovenian on the Model of Czech Vallex (Action Coordinated with a Barrande Project)
BI-FR/09-10-PROTEUS-015
PROTEUS
Prof. Patrice Pognan, Inalco et Université de Paris 4, Paris, France
Asst. Prof. Tomaž Erjavec
28. Decision Support System for a Safe Vegetable Production on Garden Soils in Urban Environments (Gardentox)
BI-FR/09-10-INRA-003
Prof. Christophe Schwartz, Nancy Université, INPL (ENSAIA) / INRA, UMR 1120, Laboratoire Sols et Environnement (Laboratory for Soil and Environment), Vandoeuvre-lès-Nancy, France
Prof. Marko Debeljak
29. Inductive Rule Learning
BI-HR/09-10-019
Dr. Dragan Gamberger, Ruder Bošković Institute, Zagreb, Croatia
Prof. Nada Lavrač
30. Japanese/Slovene Resources for Second Language Learners
BI-JP/08-10/006
Prof. Yoshiko Kawamura, Tokyo International University, Saitama, Japan
Asst. Prof. Tomaž Erjavec
31. Understanding Human Behavior for Video Surveillance Applications
BI-RO/10-11-010
Dr. Maria Magdalena Zaharescu, Ilie Murgulescu Institute of Physical Chemistry, Bucharest, Romania
Prof. Dunja Mladenić
32. Correlating Images and Words: Enhancing Image Analysis through Machine Learning and Semantic Technologies
BI-SR/10-11-029
dr. Mirjana Ivanović, Faculty of Science, Department of Mathematics and Informatics, Novi Sad, Serbia
Prof. Dunja Mladenić
33. Google Digital Humanities Award
Award dtd. 15.12.2010
Alfred Spector, Google Inc, Mountain View, CA, USA
Asst. Prof. Tomaž Erjavec

R & D GRANTS AND CONTRACTS

1. Analysis and Scenario of Development and Exploration of Forests in Slovenia
Prof. Marko Debeljak
2. Slovene Research Atlas
Prof. Dunja Mladenić
3. Advanced ML Methods for Automated Modelling of Dynamic Systems
Prof. Sašo Džeroski
4. Data Mining for Integrative Data Analysis in Systemic Biology
Prof. Sašo Džeroski

5. Systemic Biology Approaches to Analyzing Interactions between Pathogens and Plants
Prof. Nada Lavrač
6. Basic Research Project: Semantic Rule Discovery in the Context of Web Services
Prof. Nada Lavrač
7. Slovene Translation Studies - Resources and Research
Asst. Prof. Tomaž Erjavec
8. Influence of Gene Transfer, Genetic Diversity and Cultivation Technology on Sustainability and Tracing Methods
Prof. Marko Debeljak

9. NRSS - Unknown 17th and 18th Century Manuscripts of Slovenian Literature: Information Technology Aided Register, Scholarly Editions and Analyses
Asst. Prof. Tomaž Erjavec

RESEARCH PROGRAM

1. Knowledge technologies
Prof. Nada Lavrač

MENTORING

Ph. D. Thesis

1. Aneta Trajanov, *Analysis of results of ecological simulation models with machine learning* (mentor Sašo Džeroski)

M. Sc. Theses

1. Janez Bucik, *A program module for online analytical data processing in the Navision information System* (mentor Marko Bohanec)
2. Mateja Košir, *Slovenian Film Terminology in a Corpus of Film Reviews* (mentor Tomaž Erjavec)
3. Janez Kralj, *Targeting clients through knowledge discovery from databases* (mentor Marko Bohanec)
4. Helena Plahuta, *Corpus Linguistics Methods in the Drafting of Equestrian Terminology Dictionary* (mentor Tomaž Erjavec)
5. Damjana Šajne, *Preparation and assessment of e-learning materials for primary schools with an example in teaching engineering and technology* (mentor Tanja Urbančič)
6. Petra Vide Ogrin, *Development of digital library tools for history studies* (mentor Maja Žumer; co-mentor Tomaž Erjavec)
7. Aljaž Vidmar, *Usage of WEB 2.0 technologies for the development of modern web applications* (mentor Branko Kavšek)

VISITORS FROM ABROAD

1. Dr. Monika Žakova, Czech Technical University in Prague (CTU), Prague, Czech, 18 Jan.–12 Feb. 2010
2. Peter Hollis and Michael Witbrock, Cycorp, Austin, Teksas, USA, 22–31 Jan. 2010
3. Hannu Toivonen, Kimmo Kulovesi, Laura Longohr, Atte Hinkka, University of Helsinki, Faculty of Science, Department of Computer Science, Helsinki, Finland, 25–28 Jan. 2010
4. Raluca Brehar and Sergiu Nedevschi, Technical University of Cluj-Napoca, Romania, 8–12 Feb. 2010
5. Dr. Dragan Gamberger, Rudjer Bošković Institute, Zagreb, Croatia, 12 Feb. 2010
6. Mario Karlovec, Faculty of Organization and Informatics, University of Zagreb, Zagreb, Croatia, 4–31 Mar. 2010
7. Jerome Corte, Cristophe Schwartz and Benjamin Key, Vandoeuvre-les-Nancy, France, 8–16 Mar. 2010
8. Dr. Elizabeth Coppock, Cycorp, Austin, Teksas, USA, 1–20 Mar. 2010, 5–10 June 2010
9. Dr. Igor Trajkovski, Faculty of Electrical Engineering and Information Technologies, University "Ss. Cyril & Methodius", Skopje, Macedonia, 18 Mar.–4 Apr. 2010 and 9–21 Aug. 2010

10. Dr. Primož Škraba, INRIA, Le Chesnay Cedex, France, 26 Mar. 2010
11. Dr. Stephen Muggleton, Department of Computing, Imperial College, London, United Kingdom, 7–8 Apr. 2010
12. Jasmina Smalović, Hermes SoftLab, Banja Luka, Bosnia and Herzegovina, 8–10 Apr. 2010
13. Dr. Werner Dubitzky, University of Ulster, Ulster, Ireland, 1–17 Apr. 2010
14. Rayid Ghani, Accenture, Chicago, USA, 9 Apr. 2010
15. Dr. Geoff Squire, Scottish Crop Research Institute, Invergowrie, Dundee, Scotland, United Kingdom, 11–15 Apr. 2010
16. Dr. Mirjana Ivanović, Miloš Radovanović and Dejan Mitrović, University of Novi Sad, Faculty of Science, Novi Sad, Serbia, 18–23 Apr. 2010
17. Dr. Florence Leprince, ARVALIS - Institut du végétal, Montardon, France, 24–27 May 2010 and 5–7 Oct. 2010
18. Claudiu Mihăilă, Universitatea "Alexandru Ioan Cuza", Faculty of Computer Science, Iași, Romania, 30 May–6 June 2010
19. Dr. Donald G. Hodges, University of Tennessee, Forestry, Wildlife, and Fisheries, USA, 2 June 2010
20. Thomas Michael Bohnert, University of Coimbra, Portugal, 9–11 June 2010
21. Dr. Sabrina Guettes, Mathematics Department, University of Wisconsin, USA, 18 Aug. 2010
22. Marko Brakus, Varaždin, Croatia, 1–30 Sept. 2010
23. Dr. Alexander Komarov, Institute of Physico-Chemical and Biological Problems in Soil Science of Russian Academy of Sciences, Moscow, Russia, 3 Sept. 2010
24. Stefan Haun, University of Magdeburg, Magdeburg, Germany, 7–11 Sept. 2010
25. Dr. Sonia Ayachi Ghannouchi, Tunisian Institut Supérieur de Gestion de Sousse, Tunisia, dr. Karim Moustaghfir, University of Ifrane, Morocco and dr. Božidar Šarler, University of Nova Gorica, Slovenia, 28 Sept. 2010.
26. Dr. Jean Tsao, Michigan State University and dr. Graham Hickling, University of Tennessee, USA, 28 Sept. 2010
27. Laura Langohr, University of Helsinki, Helsinki, Finland, 1 Oct. 2010–22 Mar. 2011
28. Andreea Bizau, Babes-Bolyai University, Cluj-Napoca, Faculty of Mathematics and Informatics, Cluj, Romania, 7 Oct. 2010 and 19 Oct.–21 Dec. 2010
29. Achim Klein, University of Hohenheim, Hohenheim, Germany, 18–19 Oct. 2010
30. John Shawe-Taylor, University College London, Great Britain and Michael Witbrock, Cycorp, Austin, Teksas, USA, 25–29 Oct. 2010
31. Rayid Ghani, Divna Djordjević and Chad Cumby, Accenture, Chicago, USA, 2–5 Nov. 2010.
32. Dr. Larisa Soldatova, Aberystwyth University, Department of Computer Science, Aberystwyth, Great Britain, 3 Nov. 2010–3 Jan. 2011
33. Liqun Wu, Institute for Geoinformatics, University of Münster, Münster, Germany, 22 Nov.–6 Dec. 2010
34. Dr. Patrice Pognan, INALCO (Institut National des Langues et Civilisations Orientales) and LALIC-CERTAL (Langues, Logiques, Informatique et Cognition - Centre d'études et de recherche en traitement automatique des langues), Paris, France, 5–15 Dec. 2010

STAFF

Researchers

1. Prof. Marko Bohanec
2. Dr. Damjan Bojadžiev
3. Dr. Bojan Cestnik*
4. Prof. Marko Debeljak
5. Prof. Sašo Džeroski
6. Asst. Prof. Tomaž Erjavec
7. **Prof. Nada Lavrač, Head**
8. Prof. Dunja Mladenić
9. Prof. Tanja Urbančič*

Postdoctoral associates

10. Dr. Branko Kavšek*
11. Dr. Petra Kralj Novak
12. Dr. Aneta Trajanov
13. Asst. Prof. Bernard Ženko
14. Asst. Prof. Martin Žnidaršič

Postgraduates

15. Luka Bradeško, B. Sc.
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18. Blaž Fortuna, B. Sc.
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20. Miha Grčar, B. Sc.
21. Elena Ikononovska, M. Sc.
22. Mitja Jermol, M. Sc.
23. Matjaž Juršič, B. Sc.
24. Dragi Kocev, B. Sc.
25. Simon Krek*, B. Sc.
26. Blaž Novak, B. Sc.
27. Panče Panov, B. Sc.
28. Vid Podpečan, B. Sc.
29. Jan Rupnik, B. Sc.
30. Ivica Slavkov, B. Sc.
31. Borut Šluban, B. Sc.
32. Tadej Štajner, B. Sc.
33. Mitja Trampuš, B. Sc.
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35. Marko Brakus, B. Sc.
36. Dr. Sabrina Guettes
37. Dr. Igor Mozetič
38. Matjaž Rihtar, B. Sc.

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 40. Živa Antauer, B. Sc.
 41. Tina Anžič, B. Sc.
 42. Milica Bauer, B. Sc.
 43. Dr. France Dacar
 44. Dr. Damjan Demšar
 45. Marko Grobelnik

46. Jolanda Jakofčič
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