Ekaterina (Katya) Ovchinnikova

Curriculum Vitae

Research interests

- computational natural language understanding
- human and automated reasoning
- knowledge representation and extraction
- scene recognition
- ontologies

Education

2007–2011	**PhD**, *Institute of Cognitive Science, University of Osnabrück, Germany*, summa cum laude honor, OLB first prize.
2001–2002	**Exchange student**, *Department of Computational Linguistics, University of Tübingen, Germany*.
1998–2003	**M.Sc.**, *Department of Mathematical, Applied and Computational Linguistic, Saint Petersburg State University, Russia*, diploma with distinction.

Professional positions

2012–2014	**Computer scientist**, *Information Sciences Institute, USC*, Los Angeles, USA.
2010–2011	**Visiting student researcher**, *Information Sciences Institute, USC*, Los Angeles, USA.
2001–2006	**Half-time researcher/researcher (HiWi/WiMi)**, University of Tübingen, Germany.

Projects

2013–Present **Heider-Simmel Interactive Theater**, *USC/ISI, USA*, `http://narrative.ict.usc.edu/heider-simmel-interactive-theater.html`.

This project is on interpretation and narrativization of simple two-dimensional videos in terms of goals, plans, beliefs, and emotions. In this project, I work on application of probabilistic abduction to scene recognition.

2013–Present **Photo Identification of Whale Images**, `https://github.com/benzel/socialwhales`.

We are developing a web service for uploading and annotating photographs of whales, matching new images against the accumulated whale catalogue, acquiring statistics about whale migration paths and population distributions. The main algorithm for automatic matching of whale images can be found at `https://github.com/eovchinn/WhalePhotoID_MATLAB`.

2012–2014 **Metaphor Interpretation for Cultural Schemas**, *USC/ISI, USA*, `https://github.com/eovchinn/Metaphor-ADP`.

This project is on detecting linguistic metaphors in English, Spanish, Russian, and Farsi texts, and mapping them to conceptual metaphors. I supervised a group (6 people) responsible for development of an abduction-based metaphor interpretation pipeline and corpus-based knowledge extraction.

2010–2011 **Machine Reading**, *USC/ISI, USA*.

This project is on acquiring knowledge by machine reading. I worked on turning lexical-semantic databases like WordNet and FrameNet into machine-readable FOL axioms applicable for reasoning.

2005–2006 **Adaptive Ontologies on extreme Markup Structures**, *University of Tübingen, Germany*, `http://coli.lili.uni-bielefeld.de/Texttechnologie/Forschergruppe/Ontologies/index.html`.

This project is on automatic extraction of ontological knowledge from text and updating existing knowledge bases. I developed algorithms for non-monotonic ontology updates including automatic resolution of ontological inconsistencies.

2003-2005 **Distributional Idiosyncrasies**, *SFB 441 at the University of Tübingen, Germany*, `http://www.english-linguistics.de/sfb441/a5/`.

This project is on studying how syntactic, semantic, and selectional properties constraint lexical elements in their contexts of use. I worked on developing a similarity measure for comparing grammatical structures and on implementing a web service for psycholinguistic experiments.

2001–2002 **Grammar Formalisms and Parsing**, *Department of Linguistics, University of Tübingen, Germany*, `http://www.sfs.uni-tuebingen.de/~fr/current/textbook.html`.

This project is on developing an online course for teaching grammar formalisms and parsing. I developed the Morph Moulder graphical tool for visualizing formal grammars.

Publications

Books Ovchinnikova, E. (2012) *Integration of World Knowledge for Natural Language Understanding*, Atlantis Press, Springer.

Book Chapters Inoue, N., E. Ovchinnikova, K. Inui, and J. R. Hobbs (2014). Weighted Abduction for Discourse Processing Based on Integer Linear Programming. In Sukthankar, G., Goldman, R. P., Geib, S., Pynadath, D. V., Hung, H. B. (eds.) : *Plan, Activity, and Intent Recognition*, pp. 33-55.

Ovchinnikova, E., N. Montazeri, T. Alexandrov, J. R. Hobbs, M. C. McCord, and R. Mulkar-Mehta (2013). Abductive Reasoning with a Large Knowledge Base for Discourse Processing. In Hunt, H., Bos, J. and Pulman, S. (eds.) : *Computing Meaning*, vol. 4, pp. 104-124.

Wandmacher, T., Ovchinnikova, E., Mönnich, U., Michaelis, J., and Kühnberger, K.-U. (2011). Adaptation of Ontological Knowledge from Structured Textual Data. In Mehler, A., Kühnberger, K.-U., Lobin, H., Lüngen, H., Storrer, A. and Witt, A. (eds.): *Modeling, Learning, and Processing of Text Technological Data Structures*, pp. 129-153, Springer.

Journal Articles Zock, M., Wandmacher, T., and Ovchinnikova, E. (2010) Are vector-based approaches a feasible solution to the "tip-of-the-tongue" problem? In *eLexicography in the 21st century: New challenges, new applications*, vol. 7, pp. 355-365.

Ovchinnikova, E. and Kühnberger, K.-U. (2007). Automatic Ontology Extension: Resolving Inconsistencies. In *GLDV-Journal for Computational Linguistics and Language Technology* 22(2):19-33.

Ovchinnikova, E., Wandmacher, T., and Kühnberger, K.-U. (2007): Solving Terminological Inconsistency Problems in Ontology Design. In *the 4th issue of the International Journal of Interoperability in Business Information Systems (IBIS) on Information Modeling and Ontologies* 2(1):65-80.

Ovchinnikova, E. and Richter, F. (2007): Morph Moulder: Graphical Software for Teaching and Visualizing Logic for HPSG and Description Logics. In *Logic Journal of IGPL* 15(4):333-345.

Refereed Proceedings Ovchinnikova, E., Israel, R., Wertheim, S., Zaytsev, V., Montazeri, N., and Hobbs, J. (2014). Abductive Inference for Interpretation of Metaphors. In *Proc. of ACL 2014 Workshop on Metaphor in NLP. Baltimore, MD.,*, to appear.

Ovchinnikova, E., A. Gordon, J. R. Hobbs (2013). Abduction for Discourse Interpretation: A Probabilistic Framework. In *Proceedings of the Joint Symposium on Semantic Processing*, 42–50.

Inoue, N., E. Ovchinnikova, K. Inui, and J. R. Hobbs (2012). Coreference Resolution with ILP-based Weighted Abduction. In *Proceedings of COLING 2012*, pp.1291-1308.

Peñas, A. and Ovchinnikova, E. (2012) Unsupervised Acquisition of Axioms to Paraphrase Noun Compounds and Genitives. In *Proceedings of CICLing 2012*, Part I, LNCS 7181, pp. 388-401, Springer.

Ovchinnikova, E., Montazeri, N., Alexandrov, T., Hobbs, J., McCord, M. C., and Mulkar-Mehta, R. (2011). Abductive Reasoning with a Large Knowledge Base for Discourse Processing. In *Proceedings of IWCS 2011*, pp. 225-234.

Ovchinnikova, E., Borgo, S., Oltramari, A., Vieu, L., and Alexandrov, A. (2010). Data-Driven and Ontological Analysis of FrameNet for Natural Language Reasoning. In *Proceedings of LREC 2010*.

Ovchinnikova, E., Alexandrov, T., and Wandmacher, T. (2009). Automatic acquisition of the argument-predicate relations from a frame-annotated corpus. In *Proceedings of EMNLP 2009*, pp. 1388-1397.

Wandmacher, T., Ovchinnikova, E., and Alexandrov, T. (2008). Does Latent Semantic Analysis reflect Human Associations? In *Proceedings of the Lexical Semantics workshop at ESSLLI 2008*.

Wandmacher, T., Ovchinnikova, E., Krumnack, U.m, and Dittmann, H. (2007). Extraction, evaluation and integration of lexical-semantic relations for the automated construction of a lexical ontology. In T. Meyer and A.C. Nayak (eds.): *Proceedings of the Australasian Ontology Workshop (AOW)*, pp. 61-69.

Krumnack, U., Ovchinnikova, E., and Wandmacher, T. (2007). LexO: Constructing a lexical ontology from heterogenous resources. In *Proceedings of the Lexicon/Ontology Interface Workshop (OntoLex)*.

Kühnberger, K.-U., Wandmacher T., Schwering, A., Ovchinnikova, E., Krumnack, U., Gust, H. and Geibel, P. (2007): I-Cog: A Computational Framework for Integrated Cognition of Higher Cognitive Abilities. In *Proceedings of 6th Mexican International Conference on Artificial Intelligence (MICAI)*, LNAI 4827, pp. 203-214, Springer.

Kühnberger, K.-U., Wandmacher, T., Ovchinnikova, E., Krumnack, U., Gust, H. and Geibel, P. (2007): Modeling Human-Level Intelligence by Integrated Cognition in a Hybrid Architecture. In P. Hitzler, T. Roth-Berghofer, S. Rudolph (eds.): *Foundations of Artificial Intelligence (FAInt), Workshop at KI 2007, CEUR-WS*, vol. 277, pp. 1-15.

Mönnich, U., Michaelis, J., Ovchinnikova, E., Wandmacher, T. and Kühnberger, K.-U. (2007). Information Extraction from Annotation Graphs Serving for the Adaptation of Ontologies - Position Paper. In *Proceedings of the Workshop "Learning from Non-Vectorial Data" (LNVD) held in conjunction with KI 2007*, Osnabrück.

Ovchinnikova, E. and Kühnberger, K.-U. (2007). Automatic Ontology Extension: Resolving Inconsistencies - Extended Abstract . In *Proceedings "Ontologies and Text Technology: Approaches to Extract Semantic Knowledge from Syntactic Information"*, PICS, vol. 2007-1, pp. 93-98.

Azarova, I., Ivanov, V., Ovchinnikova, E., and Sinopalnikova, A. (2006): RussNet as a Semantic Component of the Text Analyser for Russian. In *Proceedings of the Third International WordNet Conference (GWC)*, pp. 19-27.

Azarova, I., Ivanov V., and Ovchinnikova, E. (2006): Inheritance of the Valency Frames in RussNet Thesaurus for the Automatic Text Analysis. In *Computer linguistics and intellectual technologies, Proceedings of the international conference "Dialog"*, pp. 18-25.

Ovchinnikova, E. and Richter, F. (2006): Morph Moulder: Graphical Software for Teaching and Visualizing RSRL and Description Logics. In *Proceeding of the Second International Congress on Tools for Teaching Logic (SICTTL)*, pp. 143-147.

Azarova, I. and Ovchinnikova, E. (2006): Semantic Interpretation of the Noun Phrases in Russian Corpora. In *Proceedings of the International Conference on Corpus Linguistics*.

Ovchinnikova, E. and Kühnberger, K.-U. (2006). Adaptive ALE-TBox for Extending Terminological Knowledge. In A. Sattar and B. H. Kang (eds.): *Proceedings of the 19th ACS Australian Joint Conference on Artificial Intelligence*, LNAI 4304, Springer, pp. 1111-1115.

Ovchinnikova, E. and Kühnberger, K.-U. (2006). Aspects of Automatic Ontology Extension: Adapting and Regeneralizing Dynamic Updates. In M. Orgun (Hrsg.): *Advances in Ontologies, Proceedings of the Australasian Ontology Workshop (AOW), Conferences in Research and Practice in Information Technology*, vol. 72, pp. 52-60.

Azarova, I., Ivanov, V., and Ovchinnikova, E. (2005): Semantic Structure of the Proposition in the Procedure Extracting Facts from Russian Texts. In Koboseva, Nariniani, Selegea (eds.): *Computer linguistics and intellectual technologies, Proceedings of the international conference "Dialog"*, pp. 6-11.

Richter, F., Ovchinnikova, E., Trawinski, B., and Meurers, D. (2002): Interactive Graphical Software for Teaching the Formal Foundations of Head-Driven Phrase Structure Grammar. In Gerhard Jäger, Paola Monachesi, Gerald Penn, and Shuly Wintner (eds.): *Proceedings of Formal Grammar 2002*, pp. 137-148.

Abstracts   Gordon, A., Hobbs, J., Ovchinnikova, K., Roemmele, M., and Morency, L. (2013) Abduction of mental states with a formal theory of commonsense psychology. Abstract. *Workshop on Mental model ascription by language-enabled intelligent agents*, July 31, 2013, Berlin, Germany.

Theses

PhD thesis.

Title	*Integration of Word Knowledge for Natural Language Understanding*
Year	2011
Advisor	Prof. Dr. Kai-Uwe Kühnberger
Institution	Institute of Cognitive Science, University of Osnabrück

Diploma thesis.

Title	*Interactive graphical visualization of the mathematical foundations of the formal grammars*
Year	2003
Advisor	Dr. Irina V. Azarova
Institution	Department of Mathematical, Applied and Computational Linguistics, St.Petersburg State University

Teaching

2009	Concepts and Words: Theoretical and Empirical Perspectives Interdisciplinary seminar, University of Osnabrück, Teacher
2008	Lexicons and Ontologies Independent Study Course, University of Osnabrück, Teacher
2001	Grammar Formalisms and Parsing Lectures and Seminar, University of Tübingen, Teaching Assistant

Selected Invited Talks

Jul. 2014	Natural Language Understanding with World Knowledge and Inference (tutorial), 14th International Conference on Principles of Knowledge Representation and Reasoning, Vienna, Austria
Jan. 2014	Inference-Based Natural Language Understanding, Allen Institute for AI, Seattle, USA
Nov. 2013	Heider-Simmel Interactive Theater, Laboratory for Applied Ontology, Trento, Italy
Feb. 2012	ILP-based Weighted Abduction for Natural Language Understanding, Universidad Nacional de Educacion a Distancia, Madrid, Spain
May 2011	World Knowledge for Natural Language Understanding using Abductive Reasoning, Seminar für Sprachwissenschaft, Tübingen, Germany
Mar. 2011	World Knowledge for Natural Language Understanding using Abductive Reasoning, Informatiekunde RijksuniversiteitGroningen, Groningen, Netherlands

Academic service (committees, reviewer)

AGI'13'14, CICLing'12'13'14, COLING'12'14, Co-SLI-3, IWCS'13, LREC'10'11'12'13'14, NLPAR'15, OTT'06, STARTSEM'13, Concept Types and Frames (book chapter), NSF grant proposal

Awards

2012	The PhD project won the OLB first prize (`https://www.olb.de/dieolb/16532.php`) (5.000 Euro award)
2007	The PhD project was supported by a 3-year scholarship from the German Academic Exchange Service (DAAD)

Programming and web-oriented skills

Python, Perl, Java, Prolog, OWL and other Semantic-Web-related standards, XML, HTML, JavaScript

Languages

Russian (Mothertongue)

English (Fluent)

German (Fluent)

Italian (Conversational)

Spanish (Basic)

References

Jerry Hobbs, *ISI, University of Southern California*, 4676 Admiralty Way, Marina del Rey, CA 90292, USA, Telefon: 1-310-448-9140, Fax: 1-310-811-0751, Email: hobbs@isi.edu.

Andrew Gordon, *ICT, University of Southern California*, 12015 Waterfront Drive, Los Angeles, CA 90094-2536, USA, Telefon: 1-310-574-5700, Fax: 1-310-574-5725, Email: gordon@ict.usc.edu.

Kai-Uwe Kühnberger, *Institute of Cognitive Science, University of Osnabrück*, Albrechtstrasse 28, 49076 Osnabrück, Germany, Telefon: +49-541 969.3384, Fax: +49-541 969.3381, Email: kkuehnbe@uos.de.

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