Dan Bohus

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RESEARCH INTERESTS

artificial intelligence, machine learning, interactive systems, spoken language (and multimodal) interfaces, error detection and recovery in spoken language interfaces, learning from implicit user feedback and online knowledge acquisition, dialog management, natural language processing, spoken language understanding.

EDUCATION

Carnegie Mellon University, Pittsburgh, PA
Ph.D. Candidate in Computer Science, *expected graduation: March 2007*
Thesis: "Error Awareness and Recovery in Conversational Spoken Language Interfaces"
Advisors: Alexander Rudnicky, Roni Rosenfeld
Committee: Alexander Rudnicky, Roni Rosenfeld, Jeff Schneider, Eric Horvitz
M.S. in Computer Science, *May 2003*

Politechnica University, Timisoara, Romania
B.S. in Computer Science, *June 2000*
Thesis: "Stochastically-Based Semantic Analysis in Human-Computer Dialog"
Advisor: Marian Boldea

PUBLICATIONS

Refereed Conference Papers

Bohus, D., Raux, A., Harris, T.K., Eskenazi, M., and Rudnicky, A., 2007 – "Olympus: an open-source framework for conversational spoken language interface research", to appear in Bridging the Gap: Academic and Industrial Research in Dialog Technology Workshop, HLT-NAACL 2007, Rochester, NY.

Bohus, D., Grau, S.P., Huggins-Daines, D., Keri, V., Krishna, G., Kumar, R., Raux, A., and Tomko, S., 2007 – "Conquest – an Open-Source Dialog System for Conferences", to appear in Proceedings of HLT-NAACL 2007, Rochester, NY.

Tetreault, J., Bohus, D., and Litman, D., 2007 – *"Estimating the Reliability of MDP Policies: a Confidence Interval Approach"*, to appear in Proceedings of HLT-NAACL 2007, Rochester, NY.

Bohus, D., Langner, B., Raux, A., Black, A., Eskenazi, M., and Rudnicky, A., 2006 – *"On-line Supervised Learning of Non-understanding Recovery Policies"*, in Proceedings of IEEE Workshop on Spoken Language Technology, Palm Beach, Aruba

Raux, A., Bohus, D., Langner, B., Black, A., and Eskenazi, M., 2006 – *"Doing Research on a Deployed Spoken Dialog System: One Year of Let's Go! Experience"*, in Proceedings of InterSpeech 2006, Pittsburgh, PA.

Bohus, D., and Rudnicky, A., 2006 – *"A K Hypotheses + Other Belief Updating Model"*, in Proceedings of AAAI Workshop on Stochastic Methods in Spoken Dialog Systems, Boston, MA.

Bohus, D., and Rudnicky, A., 2005 – *"Constructing Accurate Beliefs in Spoken Dialog Systems"*, in Proceedings of ASRU-2005, San Juan, Puerto Rico.

Bohus, D., and Rudnicky, A., 2005 – *"Error Handling in the RavenClaw Dialog Management Architecture"*, in Proceedings of HLT-EMNLP 2005, Vancouver, Canada.

Bohus, D., and Rudnicky, A., 2005 – *"Sorry, I Didn't Catch That! – an Investigation of Non-understanding Errors and Recovery Strategies"*, in Proceedings of SIGdial 2005, Lisbon, Portugal.

Bohus, D., and Rudnicky, A., 2005 – *"A Principled Approach for Rejection Threshold Optimization"*, in Proceedings of InterSpeech 2005, Lisbon, Portugal.

Raux, A., Langner, B., Bohus, D., Black, A., and Eskenazi, M., 2005 – *"Let's Go Public! Taking a Spoken Dialog System to the Real World"*, in Proceedings of InterSpeech 2005, Lisbon, Portugal.

Bohus, D., and Rudnicky, A., 2003 – *"RavenClaw: Dialog Management Using Hierarchical Task Decomposition and an Expectation Agenda"*, in Proceedings of Eurospeech 2003, Geneva, Switzerland.

Aist, G., Dowding, J., Hockey, B.A., Rayner, M., Hieronymus, J., Bohus, D., Boven, B., Blaylock, N., Campana, E., Early, S., Gorrell, G., and Phan, S., 2003 – *"Talking Through Procedures: An Intelligent Space Station Procedure Assistant"*, in Proceedings of EACL 2003, Budapest, Hungary.

Bohus, D., and Rudnicky, A., 2002 – *"LARRI: A Language-Based Maintenance and Repair Assistant"*, in Proceedings of IDS 2002, Kloster Irsee, Germany.

Bohus, D., and Rudnicky, A., 2001 – *"Modeling the Cost of Understanding Errors in the CMU Communicator Dialog System"*, in Proceedings of ASRU 2001, Madonna di Campiglio, Trento, Italy.

Bohus, D., and Rudnicky, A., 2001 – *"Is This Conversation on Track?"*, in Proceedings of Eurospeech 2001, Aalborg, Denmark.

Bohus, D., and Boldea, M., 2000 – *"A Web-based Text Corpora Development System"*, in Proceedings of LREC 2000, Athens, Greece.

Journal Articles

Aist, G., Bohus, D., Boven, B., Campana, E., Early, S., and Phan, S., 2004 – *"Initial Development of a Voice-Activated Astronaut Assistant for Procedural Tasks: from Need to Concept to Prototype"*, in Journal of Interactive Instruction Development, Volume 16, Nr. 3, Winter 2004, pp 32-36.

Bohus, D., 2001 – *"Stochastic Speech Understanding for Human-Computer Dialogue"*, in Romanian Journal of Information Science and Technology, Volume 4, Nr. 3-4, 2001, pp 261-272.

Book Chapters

Bohus, D., and Rudnicky, A., 2006 – *"An Investigation of Non-understanding Errors and Recovery Strategies"*, to appear in "Recent Trends in Discourse and Dialogue", editors Laila Dybkjær and Wolfgang Minker, Springer.

Bohus, D., and Rudnicky, A., 2005 – *"LARRI: A Language-Based Maintenance and Repair Assistant"*, in "Spoken Multimodal Human-Computer Dialogue in Mobile Environments", Springer 2005, ISBN 1402030738

Technical Reports and Other Non-Refereed Publications

Bohus, D., 2004 – *"Error Awareness and Recovery in Task-Oriented Spoken Dialog Systems"*, Thesis Proposal, January 2004, Carnegie Mellon University, Pittsburgh, PA.

Bohus, D., and Rudnicky, A., 2002 – *"Integrating Multiple Knowledge Sources for Utterance-Level Confidence Annotation in the CMU Communicator Spoken Dialog System"*, Technical Report CS-190, Carnegie Mellon University, Pittsburgh, PA.

Invited Talks

Belief Updating in Spoken Dialog Systems, Institute for Human and Machine Cognition, Pensacola, FL, *April 2006.*

Constructing Accurate Beliefs in Task-Oriented Spoken Dialog Systems, AT&T Research, Florham Park, NJ, *October 2005.*

Misunderstandings, Corrections and Beliefs in Spoken Language Interfaces, Conversational Interfaces class, Carnegie Mellon University, *September 2005.*

A Scalable Reinforcement Learning Approach for Error Handling in Spoken Dialog Systems, EU PASCAL workshop on Principled Methods for Trading Exploration and Exploitation, London, UK, *July 2005.*

Belief Updating in Task-Oriented Spoken Dialog Systems, Cambridge University, Cambridge, UK, *July 2005.*

RESEARCH EXPERIENCE

Thesis Research, Carnegie Mellon University*, 2003 – present.*
A persistent and important problem in the development of spoken language interfaces is their lack of robustness when faced with understanding-errors. The problem stems mostly from the unreliability of current speech recognition technology and is present across all domains and interaction types. My dissertation research aims to address this problem by: (1) endowing spoken language interfaces with better error awareness, (2) constructing and evaluating a rich repertoire of error recovery strategies, and (3) developing scalable, data-driven approaches for making error handling decisions.

Research in Dialog Management, Carnegie Mellon University, *2000-present.*
Developed RavenClaw, a dialog management framework for complex, task-oriented spoken dialog systems. RavenClaw isolates the domain-specific aspects of dialog control from domain-independent conversational behaviors. To date, this framework has been used to construct and successfully deploy several spoken dialog systems spanning different domains and interaction types (see www.ravenclaw-olympus.org). Furthermore, RavenClaw provides the infrastructure for a number of research projects investigating issues like error-handling, turn-taking and multi-participant dialog.

Summer Internship, Adaptive Systems and Interaction, Microsoft Research, *2003.*
With Tim Paek and Eric Horvitz, I addressed the problem of belief updating in spoken dialog systems. We designed and performed a user study aimed at validating the scalability of a Dynamic Bayesian Network approach for updating the system beliefs throughout a conversation.

Summer Internship, SSRP program, NASA Ames/RIACS, *2002.*
With Gregory Aist, I developed a dialog management component for the initial prototype of the Intelligent Procedure Assistant (IPA) system. The IPA is a multi-modal spoken dialog system aimed at providing guidance and support to astronauts on the International Space Station during the execution of large procedural tasks.

TEACHING EXPERIENCE	**Teaching Assistant,** 15-211 Data Structures and Algorithms, *Spring 2003.* Prepared and delivered weekly recitations; held office hours; contributed to the design and grading of lab assignments and exams.
	Teaching Assistant, 15-381 Artificial Intelligence, *Fall 2003.* Held office hours; delivered one lecture; contributed to the design and grading of lab assignments and exams.
PROFESSIONAL ACTIVITIES	**Student Liaison** for the Special Interest Group on Discourse and Dialogue (SIGdial), *2004-present*
	Scientific review committee member for SLT-2006, NAACL-HLT 2007, ICASSP-2007, UM-2007, and the Journal of Dialogue Systems.
	Advisory committee member for the 2006 Young Researchers' Roundtable on Spoken Dialog Systems, *http://www.yrrsds.org*
	Organizer for the 1st Young Researchers' Workshop on Spoken Dialog Systems (2005), *http://www.cs.cmu.edu/~dod/roundtable*
	Organizer for the Dialogs on Dialogs Student Reading Group at Carnegie Mellon University, *http://www.cs.cmu.edu/~dod*
	Admissions Committee Member in the Computer Science Department at Carnegie Mellon University, *2004 and 2005*
PROFESSIONAL AFFILIATIONS	**Student member** of AAAI, IEEE, ACL and ESCA.
PERSONAL INFORMATION	**Citizenship**: Romanian **Visa Status**: F-1 Student
REFERENCES	**Available upon request**