

Matthew Marge, Ph.D.

Email: mrmarge@cs.cmu.edu

Homepage: <http://www.cs.cmu.edu/~mrmarge>

RESEARCH INTERESTS

Spoken dialogue systems, human-robot interaction, machine learning, crowdsourcing, natural language processing, user interface design

EDUCATION

Ph.D., Language and Information Technologies 2015

Carnegie Mellon University, School of Computer Science

Thesis: “Miscommunication Detection and Recovery for Spoken Dialogue Systems in Physically Situated Contexts”

Committee: Alexander I. Rudnicky (Advisor), Alan W Black, Justine Cassell, Matthias Scheutz

M.S., Language Technologies 2011

Carnegie Mellon University, School of Computer Science

M.S., Artificial Intelligence 2007

University of Edinburgh, School of Informatics

Specialization: Natural Language and Language Engineering

Thesis: “An Evaluation of Comparison Generation in the Methodius Natural Language Generation System”

B.S. with Honors, Computer Science 2006

B.S. with Honors, Applied Mathematics and Statistics

Stony Brook University, College of Engineering and Applied Sciences

Graduated *summa cum laude* from Honors College

Specialization: Human-Computer Interaction

Thesis: “Experiments with the Stony Brook Rate-a-Course System: Adaptation in Initiative and Word Choice”

PROFESSIONAL EXPERIENCE

U.S. Army Research Laboratory, Adelphi, MD December 2014 – Present

Computer Scientist

- Developing methods for mobile robots to understand their surroundings and communicate via natural language in order to autonomously complete mission objectives.

Carnegie Mellon University, Pittsburgh, PA September 2007 – December 2014

Graduate Research Assistant

- Developed a spoken dialogue interface to robots that incorporates path planning, mapping, and nearest-neighbor learning to recover from miscommunication more effectively.
- Designed and conducted human subject experiments to study spatial language use in human-robot navigation tasks.
- Procured the TeamTalk Corpus¹ of route instructions directed towards robots.
- Developed crowdsourcing tools for spoken language transcription.
- Maintained and contributed to the TeamTalk² and RavenClaw/Olympus Spoken Dialogue System Framework³ open source projects.

¹<http://www.cs.cmu.edu/~robotnavcps>

²<http://wiki.speech.cs.cmu.edu/teamtalk>

³<http://wiki.speech.cs.cmu.edu/olympus>

iRobot Corporation, Bedford, MA

May 2010 – September 2010

Research Intern

- Designed and conducted experiment involving 30 participants to compare operation of a mobile robot capable of following a person and interpreting arm gestures to traditional teleoperation-based methods.
- Integrated a gesture recognition component onto a rugged mobile robot (iRobot 510 PackBot).

University of Edinburgh, Edinburgh, Scotland

September 2006 – August 2007

Graduate Research Assistant, Human Communication Research Centre, School of Informatics

- Developed an ontology for a “Digital DJ” system designed to generate aggregated facts and comparisons in classical and jazz music between music pieces.
- Designed and conducted a web study to evaluate comparison generation in a language generation tool.

Naval Research Laboratory, Washington, D.C.

May 2006 – September 2006

Student Contractor

- Developed a line-of-sight calculation module for a robot traversing an environment in stealth.
- Contributed to a cognitive model for spatial perspective-taking using ACT-R and Lisp.

Carnegie Mellon University, Pittsburgh, PA

June 2005 – August 2005

Undergraduate Research Assistant

- Worked under the Research Experience for Undergraduates Program (REU) from the National Science Foundation for developing parts of the dialogue system for Pearl, a robot designed for investigating human-robot interaction.
- Assisted in conducting experiment involving 49 participants that compared human-robot dialogue strategies based on a person’s expertise in cooking.
- Designed and developed web surveys for experiments that examine human-robot interaction.

Stony Brook University, Stony Brook, NY

December 2003 – May 2006

Undergraduate Research Assistant

- Worked under the Research Experience for Undergraduates Program (REU) from the National Science Foundation for building parts of a “Rate-A-Course” spoken dialogue system that allowed students to evaluate their courses.
- Designed and conducted experiments involving human subjects interacting with the “Rate-A-Course” system.

COMPUTER SKILLS

Programming Languages: Java, Python, C++; also experience with Lisp, C, Perl, Prolog

Operating Systems: Unix, Linux, Mac OS X, Windows, ROS

Software: Olympus Spoken Dialogue Framework, Eclipse, Weka Machine Learning Toolkit, Protégé

Ontology Editor, JMP, Microsoft Visual Studio, UnrealEd Virtual Map Editor, ACT-R

PUBLICATIONS

Peer-Reviewed Journal Papers

1. H. Cuayáhuitl, L. Frommberger, N. Dethlefs, A. Raux, M. Marge, and H. Zender. (2014). Introduction to the special issue on machine learning for multiple modalities in interactive systems and robots. *ACM Transactions on Interactive Intelligent Systems*, 4(3), 12e. **ACM TiiS**.

Peer-Reviewed Conference Papers

1. M. Marge and A.I. Rudnicky. (2015). "Miscommunication Recovery in Physically Situated Dialogue". SIGdial Meeting on Discourse and Dialogue, Prague, Czech Republic. **SIGdial 2015**.
2. M. Marge and A.I. Rudnicky. (2013). "Towards Evaluating Recovery Strategies for Situated Grounding Problems in Human-Robot Dialogue". IEEE International Symposium on Robot and Human Interactive Communication, Gyeongju, South Korea. **RO-MAN 2013**.
3. M. Marge, A. Powers, J. Brookshire, T. Jay, O.C. Jenkins, and C. Geyer. (2011). "Comparing Heads-Up, Hands-Free Operation of Ground Robots to Teleoperation". Robotics: Science and Systems (RSS), Los Angeles, CA. **RSS 2011**.
4. M. Marge and A.I. Rudnicky. (2010). "Comparing Spoken Language Route Instructions for Robots across Environment Representations". SIGdial Meeting on Discourse and Dialogue, Tokyo, Japan. **SIGdial 2010**.
5. M. Marge, J. Miranda, A. Black, and A.I. Rudnicky. (2010). "Towards Improving the Naturalness of Social Conversations with Dialogue Systems". SIGdial Meeting on Discourse and Dialogue, Tokyo, Japan. **SIGdial 2010**.
6. M. Marge, S. Banerjee, and A.I. Rudnicky. (2010). "Using the Amazon Mechanical Turk for Transcription of Spoken Language". International Conference on Acoustics, Speech and Signal Processing, Dallas, Texas. **ICASSP 2010**.
7. M. Marge, A. Isard, and J. Moore. (2008). "Creation of a New Domain and Evaluation of Comparison Generation in a Natural Language Generation System". International Language Generation Conference, Salt Fork, Ohio. **INLG 2008**.
8. B. Fransen, V. Morariu, E. Martinson, S. Blisard, M. Marge, S. Thomas, A. Schultz, and D. Perzanowski. (2007). "Using Vision, Acoustics, and Natural Language for Disambiguation". ACM/IEEE Human-Robot Interaction Conference, Arlington, Virginia. **HRI 2007**.
9. W.G. Kennedy, M.D. Bugajska, M. Marge, B. Fransen, W. Adams, D. Perzanowski, A.C. Schultz, and J.G. Trafton. (2007). "Spatial Representation and Reasoning for Human-Robot Collaboration". Association for the Advancement of Artificial Intelligence (AAAI) Conference, Vancouver, British Columbia. **AAAI 2007**.
10. C. Torrey, A. Powers, M. Marge, S. Fussell, and S. Kiesler. (2006). "Effects of Adaptive Robot Dialogue on Information Exchange and Social Relations". ACM/IEEE Human-Robot Interaction Conference, Salt Lake City, Utah. **HRI 2006**.
11. A. Stent, M. Marge, and M. Singhai. (2005). "Evaluating Evaluation Methods for Generation in the Presence of Variation". CICLing, Mexico City, Mexico. **CICLing 2005**.

Peer-Reviewed Workshop Papers

1. M. Marge. (2012). "Exploring Human-Robot Communication through Spoken Dialogue and Gesture." HRI Pioneers Workshop at the International Conference on Human-Robot Interaction, Boston, MA.
2. M. Marge and A.I. Rudnicky. (2011). "Towards Overcoming Miscommunication in Situated Dialogue by Asking Questions". AAAI Fall Symposium - Building Representations of Common Ground with Intelligent Agents, Arlington, VA. **AAAI FSS 2011**.
3. M. Marge and A.I. Rudnicky. (2011). "The TeamTalk Corpus: Route Instructions in Open Spaces". RSS Workshop on Grounding Human-Robot Dialog for Spatial Tasks, Los Angeles, CA.
4. A.I. Rudnicky, A. Pappu, P. Li, and M. Marge. (2010). "Instruction Taking in the TeamTalk System". AAAI Fall Symposium - Dialog with Robots, Arlington, VA. **AAAI FSS 2010**.
5. M. Marge, S. Banerjee and A. I. Rudnicky. (2010). "Using the Amazon Mechanical Turk to Transcribe and Annotate Meeting Speech for Extractive Summarization". NAACL Workshop on Creating Speech and Language Data with Amazon's Mechanical Turk, Los Angeles, CA.
6. M. Marge, A. Pappu, B. Frisch, T. K. Harris and A.I. Rudnicky. (2009). "Exploring Spoken Dialog Interaction in Human-Robot Teams". Robots, Games, and Research: Success stories in USARSim IROS Workshop, St. Louis, MO, USA.
7. A. Stent, S. Stenichikova, and M. Marge. (2006). "Dialog Systems for Surveys: The Rate-A-Course System". Proceedings of the 1st IEEE/ACL Workshop on Spoken Language Technology, Aruba. **SLT 2006**.

Theses

1. M. Marge. (2015). "Miscommunication Detection and Recovery for Spoken Dialogue Systems in Physically Situated Contexts", PhD Thesis, Carnegie Mellon University.
2. M. Marge. (2007). "An Evaluation of Comparison Generation in the Methodius Natural Language Generation System", MSc Thesis, University of Edinburgh.
3. M. Marge. (2006). "Experiments with the Stony Brook Rate-a-Course System: Adaptation in Initiative and Word Choice", BSc Thesis, Stony Brook University.

TEACHING EXPERIENCE

Computer Science Courses

1. **11-344** Teaching Assistant, Applied Machine Learning (Fall 2012).
2. **15-211** Teaching Assistant, Fundamental Data Structures and Algorithms (Spring 2010).

AWARDS & MERITS

- Outstanding Presentation, Carnegie Mellon University Language Technologies Institute Student Research Symposium (2010).
- National Science Foundation Graduate Research Fellowship (2007-10)
- Saint Andrew's Society of the State of New York Scholarship (one United States recipient; 2006)
- State University of New York (SUNY) Chancellor's Award (highest SUNY undergraduate honor; 2006)
- Barry M. Goldwater Scholarship (2005)
- Theresa Montenaro 200% Student Leadership Award (2005)

PROFESSIONAL ACTIVITIES

Organizing Committee Member

- Human-Robot Interaction Pioneers Workshop (2013)
- Robotics: Science and Systems Workshop on Grounding Human-Robot Dialog for Spatial Tasks (2011)
- Young Researchers' Roundtable on Spoken Dialog Systems (2009)

Associate Editor

- IEEE RO-MAN International Symposium on Robots and Human Interactive Communications (2011, 2013, 2016)
- ACM Transactions on Interactive Intelligent Systems Special Issue on Machine Learning for Multiple Modalities in Interactive Systems and Robots (2014)

Ad-Hoc Reviewer

- NAACL (2016)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (2015)
- International Workshop on Spoken Dialogue Systems (2013)
- Language Technologies Institute Student Research Symposium (2013)
- ACM/IEE International Conference on Human-Robot Interaction (2007, 2008, 2011, 2012)
- IEEE International Conference on Robotics and Automation (2010)

Member

- Language Technologies Institute Student Activities Committee (2007-2014)
- PhD Student-Faculty Liason, Language Technologies Institute (2010)

LEADERSHIP ACTIVITIES

Dialogs on Dialogs Reading Group

June 2009 – February 2014

Chief Organizer

- Held periodic in-person and teleconference meetings with young researchers in speech technology, where members alternate presenting their work or recent work by others and have an open forum for discussion.
- Managed LinkedIn Group of over 170 members.

IEEE Speech & Language Processing TC Newsletter

November 2009 – September 2013

Staff Reporter

- Contributed quarterly articles of interest to speech researchers.

Stony Brook Robot Design Team

May 2004 – May 2006

Team Leader

- Team awarded honor for Interdisciplinary Field Integration at the Association for the Advancement of Artificial Intelligence's (AAAI) 2005 Robot Competition.
- Team awarded prize for Open Interaction at the AAAI 2004 Robot Competition.

MEMBERSHIPS

SIGdial, Phi Beta Kappa, Sigma Xi, Upsilon Pi Epsilon Computer Science Honor Society

CITIZENSHIP

United States of America

REFERENCES

Available upon request.