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William Hartmann

Research Interests

Automatic speech recognition, spoken term detection, acoustic unit discovery and pronunciation generation, sub-word lexical units for OOV keyword spotting, robust speech recognition, auditory scene analysis, text-based speaker recognition.

Education

June 2012 **Ph.D. Computer Science (Artificial Intelligence)**, *The Ohio State University*, Columbus, OH.
Linguistics, Algorithms/Theory of Computation minors
Advisor: Eric Fosler-Lussier

June, 2010 **M.S. Computer Science (Artificial Intelligence)**, *The Ohio State University*, Columbus, OH.
Advisor: Eric Fosler-Lussier

May, 2006 **B.S. Computer Science**, *Northern Kentucky University*, Highland Heights, KY.
Mathematics minor

Professional and Academic Experience

2012–present **Post-Doctoral Researcher**, *Lori Lamel (Supervisor)*, LIMSI-CNRS.
Researched methods for improving pronunciation lexicons and automatically discovering acoustic units for under resourced languages. Explored sub-word lexical units for OOV term detection. Investigated text-based speaker recognition without acoustic information.

2007–2012 **Graduate Research Assistant**, *Eric Fosler-Lussier (Advisor)*, The Ohio State University.
Investigated lexical access and the effects of underspecified dictionaries on ASR systems. Researched methods for utilizing the Ideal Binary Mask in ASR. Developed a speech separation system that incorporated high-level linguistic information.

2011 **Graduate Teaching Assistant**, *Kathryn Reeves (Supervisor)*, The Ohio State University.
Taught a senior level course on Artificial Intelligence. Course topics included search, planning, logic, and uncertainty.

2008–2010 **Graduate Research Assistant**, *Donna Byron (Supervisor)*, The Ohio State University.
Developed a system using Experiment Builder and Eyelink to perform eye-tracking experiments on human subjects. Created necessary audio and video materials for the experiments. Performed data collection with human subjects.

2007–2008 **NSF GK-12 Fellow**, *Susan Olesik (Supervisor)*, The Ohio State University.
Worked with two 5th grade teachers in the Columbus Public school district to improve science education. Responsibilities included developing lesson plans, teaching classes, and serving as scientific advisor for elementary school teachers. Example lessons include water-powered rockets, cryptography, and robotics.

2006–2007 **Graduate Research Assistant**, *James W. Davis (Advisor)*, The Ohio State University.
Installed a motion sensor network on seven floors of Dreese Laboratories. Implemented a real-time system in C++ for creating activity maps for camera with pan and tilt control. Researched methods for activity pattern recognition.

2006 **Computer Programmer**, *Matthew Zacate (Supervisor)*, Northern Kentucky University.
Developed a physics application in C for simulating compounds with large concentrations of defects using a combined energy minimization-Monte Carlo technique.

2005–2006 **Undergraduate Research Assistant**, *Richard Fox (Advisor)*, Northern Kentucky University.
Worked on a hand-written character recognition system that incorporated abduction.

2005 **Running Start Leader**, *Barbara Hamilton (Supervisor)*, Northern Kentucky University.
Taught a supplemental course in developmental mathematics to assist students in meeting university requirements.

2003-2004 **English Tutor**, *Zhang Bin (Supervisor)*, Hefei, China.
Tutored Chinese students with their English. Performed the voices for English language instructional tapes. Gave talks at local elementary schools.

2001-2006 **Martial Arts Instructor**, *Dynamic Fighting Arts*, Cincinnati, OH.
Assisted in teaching Chinese Kuntao, Wushu, and fitness classes. Developed the curriculum and acted as head instructor for the Wushu program.

2000-2004 **Software Developer**, *ec link*, Cincinnati, OH.
Maintained and developed web-based applications using ASP, PHP, and Java that interacted with MySQL and Microsoft SQL Server databases. Designed and implemented an online attendance system for Wilmington School District. Assisted in developing on online system for creating posters.

Refereed Publications

[1] W. Hartmann, V.-B. Le, A. Messaoudi, L. Lamel, and J. L. Gauvain, "Comparing decoding strategies for subword-based keyword spotting in low-resourced languages," in *Proceedings of Interspeech*, 2014.

[2] V.-B. Le, L. Lamel, A. Messaoudi, W. Hartmann, J. L. Gauvain, C. Woehrling, J. Despres, and A. Roy, "Developing STT and KWS systems using limited language resources," in *Proceedings of Interspeech*, 2014.

[3] A. Laurent, W. Hartmann, and L. Lamel, "Unsupervised acoustic model training for the korean language," in *Proceedings of ISCSLP*, pp. 469–473, 2014.

[4] W. Hartmann, L. Lamel, and J. L. Gauvain, "Efficient rule scoring for improved grapheme-based lexicons," in *Proceedings of EUSIPCO*, 2014.

[5] W. Hartmann, L. Lamel, and J. L. Gauvain, "Cross-word sub-word units for low-resource keyword spotting," in *SLTU*, pp. 112–117, 2014.

[6] A. Roy, H. Bredin, W. Hartmann, V.-B. Le, C. Barras, and J. L. Gauvain, "Lexical speaker identification in TV shows," *Multimedia Tools and Applications*, pp. 1–20, 2014.

[7] W. Hartmann, A. Roy, L. Lamel, and J. L. Gauvain, "Acoustic unit discovery and pronunciation generation from a grapheme-based lexicon," in *Proceedings of IEEE ASRU*, pp. 350–355, 2013.

[8] W. Hartmann, A. Narayanan, E. Fosler-Lussier, and D. L. Wang, "A direct masking approach to robust ASR," *IEEE Transactions on Audio, Speech, and Language Processing*, vol. 21, no. 10, pp. 1993–2005, 2013.

[9] W. Hartmann and E. Fosler-Lussier, "Improved model selection for the ASR-driven binary mask," in *Proceedings of Interspeech*, (Portland), pp. 1203–1206, 2012.

[10] W. Hartmann and E. Fosler-Lussier, "ASR-driven top-down binary mask estimation using spectral priors," in *Proceedings of IEEE ICASSP*, (Kyoto, Japan), pp. 4685–4688, 2012.

[11] W. Hartmann and E. Fosler-Lussier, "Investigations into the incorporation of the ideal binary mask in ASR," in *Proceedings of IEEE ICASSP*, (Prague, Czech Republic), pp. 4804–4807, 2011.

[12] R. Prabhavalkar, P. Jyothi, W. Hartmann, J. Morris, and E. Fosler-Lussier, "Investigations into the crandem approach to word recognition," in *Proceedings of NAACL-HLT*, (Los Angeles), pp. 725–728, 2010.

[13] W. Hartmann and E. Fosler-Lussier, "Investigating phonetic information reduction and lexical confusability," in *Proceedings of Interspeech*, (Brighton, England), pp. 1659–1662, 2009.

[14] R. Fox and W. Hartmann, "Using context to improve hand-written character recognition," *International Society for Advanced Science and Technology Transactions on Computers and Intelligent Systems*, vol. 1, no. 1, pp. 40–49, 2009.

[15] R. Fox and W. Hartmann, "An abductive approach to hand-written character recognition for multiple domains," in *The Proceedings of the 2006 International Conference on Artificial Intelligence* (H. Arabnia, ed.), vol. 2, (Las Vegas), pp. 349–355, CSREA Press, 2006.

[16] R. Fox and W. Hartmann, "Hand-written character recognition using layered abduction," in *the Proceedings of SCSS* (T. Sobh and K. Elleithy, eds.), Advances in Systems, Computing Sciences and Software Engineering, pp. 141–147, Springer, 2005.

Honors and Awards

OSU CSE Research Exhibition Best Poster Award, 2012

NSF GK-12 Fellowship, 2007

The Ohio State University Fellowship, 2006

COMAP MCM, Meritorious Winner, 2005, 2006 (Consortium for Mathematics and Applications, Mathematical Contest in Modeling)

William H. Greaves Scholarship, 2004, 2005

Dean's Scholarship, 2003

COMAP MCM, Honorable Mention, 2003

Professional Activities

North American Computational Linguistics Olympiad (NACLO) Local Organizer, 2011-2012

Buckeye Language Network Steering Committee, The Ohio State University, 2010-2012

Reviewer for IEEE Transactions on Audio, Speech, and Language Processing

Reviewer for Neurocomputing

Reviewer for EURASIP Journal on Audio, Speech, and Music Processing

Reviewer for Interspeech

Computer skills

Languages:	C/C++, Python, Matlab, Perl, Java
Applications:	Kaldi, HTK, OpenFST, Quicknet, Latex
OS:	Linux, Windows, Mac OS X