Arnab Ghoshal

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Contact Information

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Research Interest

Image and video search, speech recognition, machine learning, multimodal information retrieval, robust learning.

Education

Johns Hopkins University February 2009 (expected)
Baltimore, MD, USA
Ph.D candidate, Department of Electrical Engineering
Graduate Research Assistant at Center for Language and Speech Processing

Johns Hopkins University May 2005
Baltimore, MD, USA
Master of Science in Engineering, Department of Electrical Engineering

Indian Institute of Technology May 2002
Kharagpur, WB, India
Bachelor of Technology, Department of Electrical Engineering

Research Experience

Johns Hopkins University Graduate Research Assistant
Baltimore, MD, USA September 2002 – present
Extend automatic speech recognition technologies like hidden Markov models, discriminative training, and model adaptation to the domain of content-based image and video retrieval. Investigate sensitivity of visual concept detection models to source mismatches in video data. Apply machine learning techniques for mismatched training-test conditions to improve robustness of video retrieval systems to source variability.

CLSP Summer Research Workshop Researcher
Baltimore, MD, USA Summer 2008
Utilize pronunciations extracted from online resources (dictionary sites, encyclopedias, news sites, blogs, etc.) to provide improved pronunciations of low-frequency words for tasks like automatic speech recognition, spoken document retrieval, and spoken term detection. Investigate pronunciation variations across websites, and develop models to normalize the pronunciations to a standard form.

Universität des Saarlandes Visiting Researcher
Saarbrücken, Saarland, Germany September 2007 – February 2008
Analyze effects of video source mismatch on a state-of-the-art content-based video retrieval system. Explore combination of multiple detectors for improving robustness of video retrieval.

Microsoft Research Summer Research Intern
Redmond, WA, USA Summer 2004
Implement efficient training algorithm for a maximum entropy model in order to incorporate linguistically motivated features in a language model.

Microsoft Research Summer Research Intern
Redmond, WA, USA Summer 2003
Test discriminative training algorithm for acoustic models. Build a competitive baseline speech recognizer using standard maximum likelihood training technique. Improve recognition performance through maximum mutual information training.

Awards

- Student Paper Contest Winner, IEEE ICASSP, Toulouse, France (2006)
- Jagadish Chandra Bose National Science Talent Search Test Award, India (1998)
- National Talent Search Scholarship, by National Council for Educational Research and Training, India (1996)

Publications

A. Ghoshal and S. Khudanpur, "Improving Content-Based Video Retrieval through Source-Dependent Modeling," in preparation for IEEE Transactions on Pattern Analysis and Machine Intelligence.

A. Ghoshal, S. Khudanpur and D. Klakow, "Impact of Novel Sources on Content-Based Image and Video Retrieval," submitted to IEEE International Conference on Acoustics, Speech, and Signal Processing, 2009.

A. Ghoshal, M. Jansche, S. Khudanpur, M. Riley and M. Ulinski, "Web-Derived Pronunciations," submitted to IEEE International Conference on Acoustics, Speech, and Signal Processing, 2009.

A. Ghoshal and S. Khudanpur, "Source Adaptation for Improved Content-Based Video Retrieval," in Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing, 2006. (*Winner, Student Paper Contest*)

A. Ghoshal, P. Ircing and S. Khudanpur, "Hidden Markov Models for Automatic Annotation and Content Based Retrieval of Images and Video," in Proceedings of the ACM SIGIR Conference on Research and Development in Information Retrieval, 2005.

A. Ghoshal, S. Khudanpur, J. Magalhães, S. Overell, S. Rüger and A. Yavlinsky, "Imperial College and Johns Hopkins University at TRECVID," in Proceedings of the NIST TRECVID Workshop, 2006.

B. Pytlik, A. Ghoshal, D. Karakos and S. Khudanpur, "TRECVID 2005 Experiments at Johns Hopkins University: Using Hidden Markov Models for Video Retrieval," in Proceedings of the NIST TRECVID Workshop, 2005.

Presentations

- JHU Summer Research Workshop, Baltimore, MD, August 2008.
- Universität des Saarlandes, Saarbrücken, Germany, September 2007.
- Combined IRTG/PIRE Annual Research Meeting, Trier, Germany, June 2007.
- IEEE International Conference on Acoustics, Speech, and Signal Processing, Toulouse, France, May 2006.
- Conference of the ACM Special Interest Group on Information Retrieval, Salvador, Brazil, August 2005.

Other Projects

Survey of Collaborative Speech Recognition Research in the World April 2008 - May 2008
Interview researchers from non-US institutions in Europe, Asia, Australia, South Africa, and Canada regarding current and recent collaborative research activities in the field of speech recognition. Prepare a report for the Johns Hopkins University Applied Physics Laboratory.

Text-to-speech system for Indian languages September 2001 - August 2002
Develop unconstrained TTS system for Hindi using concatenative synthesis. Apply intonation and duration modifications, and removal of concatenative mismatches for cleaner sounding speech.

Conversion of digital images to Braille December 2000 - July 2001
Convert digital images to Braille, for an integrated computing interface for the visually impaired. (Indian Copyright No. `CPR/410/MB/Y/070603`)

Qualifications

Programming:	C, C++, Perl, UNIX Shells
Libraries and Tools:	HTK (familiar with source code), AT&T FSM Library, OpenFST, MATLAB

Professional Service

Graduate Student Recruiting Committee member, Center for Language and Speech Processing.
Student Member, Institute of Electrical and Electronics Engineers, Inc.

Personal Details

Citizenship:	India
Languages:	English, Bengali (native), Hindi (conversational), German (basic)