Haolang Zhou

CONTACT INFORMATION	Haolang Zhou Center for Language and Speech Processing Johns Hopkins University 3400 North Charles Street Baltimore, MD 21218 USA	**Mobile:** (410) 900-0327 **Fax:** (410) 516-5050 **E-mail:** haolangzhou@jhu.edu **Web:** www.clsp.jhu.edu/~hzhou

AREAS OF INTEREST

Speech Recognition, Machine Learning, Semi-supervised Learning, Dimensionality Reduction, Model Adaptations

EDUCATION

Johns Hopkins University, Baltimore, MD USA **Present**

Ph.D. Candidate, Department of Electrical and Computer Engineering
Thesis title: Semi-supervised Heteroscedastic Linear Discriminant Analysis
Expected graduation date: Summer 2010

Master of Science in Engineering, Department of Electrical and Computer Engineering **2009**

Graduate research assistant at Center for Language and Speech Processing

Peking University, Beijing, China **2003**

Master of Science, National Laboratory on Machine Perception, Center for Information Science

Peking University, Beijing, China **2000**

Bachelor of Science, Department of Electronics

COMPUTER SKILLS

Languages: C, Perl, MATLAB, R, Python, Shell scripts.

Toolkits: Cambridge Hidden Markov Model (HTK) Toolkit,
IBM Attila Speech Recognition Toolkit,
SRI Language Modeling Toolkit,
AT&T Finite State Machine Toolkit.

RESEARCH EXPERIENCE

Johns Hopkins University, Baltimore, MD USA
Semi-supervised Heteroscedastic Linear Discriminant Analysis
(Advisor: Prof. Damianos Karakos and Prof. Andreas G. Andreou) **2008 - Present**
Heteroscedastic Linear Discriminant Analysis (HLDA) is widely used as a dimensionality reduction technique before later classification, it extends Linear Discriminant Analysis (LDA) to the more general problem of heteroscedastic distributions.
- We developed a semi-supervised version of HLDA, allowing the use of unlabeled data in addition to labeled data.
- Semi-supervised HLDA applies the expectation-maximization (EM) algorithm, which at each iteration estimates a class posterior distribution for each unlabeled data sample using the conditional distributions estimated in the previous iteration, and then updates the class-conditional parameters.
- Estimation of the HLDA transformation matrix is part of the optimization of the EM objective function (expected log-likelihood of training data).
- We show that using more unlabeled data usually results in better performance while never exceeding the performance of using the same amount of labeled data.

Johns Hopkins University, Baltimore, MD USA
Participated in the DARPA Global Autonomous Language Exploitation Program (GALE)
(as a member of GALE IBM team)
(Advisor: Prof. Damianos Karakos and Prof. Izhak Shafran)   **2005 - 2007**
The goal of the DARPA GALE program is to develop and apply computer software technologies to absorb, translate, analyze, and interpret huge volumes of speech and text in multiple languages, eliminating the need for linguists and analysts, and automatically providing relevant, concise, actionable information.
- Research on using multiple Heteroscedastic Linear Discriminant Analysis transforms for speech recognition.
- Participated in the rescoring of state-of-the-art speech recognizer outputs with different language models.
- Participated in the system combination of the multiple state-of-the-art machine translation systems.

Johns Hopkins University, Baltimore, MD USA
Effective Affordable Reusable Speech-to-text (EARS) Speech Recognizer
(Advisor: Prof. Izhak Shafran)   **2005**
The objective of the DARPA EARS program is developing speech-to-text (automatic transcription) technology whose output is substantially richer and much more accurate than currently possible. This will make it possible for machines to do a much better job of detecting, extracting, summarizing, and translating important information.
- Implemented Vocal Tract Length Normalization (VTLN) for the JHU EARS speech recognition system, include training and decoding.

Johns Hopkins University, Baltimore, MD USA
Accoustic Model Adaptations
(Advisor: Prof. Izhak Shafran)   **2004 - 2005**
- Research on various acustic model adaptation techniques, including speaker adaptation, Cluster Adaptive Training (CAT) and Speaker Adaptive Training (SAT).

Johns Hopkins University, Baltimore, MD USA
Dialectal Chinese Speech Recognition
(as a member of the 2004 CLSP Summer Workshop team)   **Summer 2004**
- Research on employing dialect-related knowledge and training data (in relatively small quantities) to modify a non-dialect baseline system to obtain a dialectal Chinese recognizer.

Peking University, Beijing, China
Speaker Recognition and Speaker Segmentation
(Advisor: Prof. Huisheng Chi)   **2000-2003**
- Research on speaker recognition and speaker segmentation.
- Organized the recording of a speech database for speaker recognition (involving more than 150 people and maximum of 10 sessions).

TEACHING
EXPERIENCE
Johns Hopkins University, Baltimore, MD, USA
Teaching Assistant   **July 2005, 2007, 2009**
- Assisted in laboratories at the JHU Summer School on Human Language Technology.

Johns Hopkins University, Baltimore, MD, USA
Teaching Assistant   **Spring of 2006 and 2009**
- Information Extraction from Speech and Text, by Prof. Sanjeev Khudanpur
- Held problem sessions and graded homework for graduate level course

Johns Hopkins University, Baltimore, MD, USA
Teaching Assistant   **Spring of 2005**
- Fields, Matter & Waves, by Prof. Frederic M. Davidson
- Held problem sessions and graded homework

Johns Hopkins University, Baltimore, MD, USA
Teaching Assistant   **Fall of 2004**
- Basic Communications, by Prof. Frederic M. Davidson
- Held problem sessions and graded homework

Johns Hopkins University, Baltimore, MD, USA
Teaching Assistant   **Spring of 2004**
- Signals and Systems, by Prof. Wilson J. Rugh
- Held problem sessions and graded homework, also held weekly section teaching

PUBLICATIONS

[1] **Haolang Zhou**, Damianos Karakos, and Andreas G. Andreou. A Semi-supervised Version of Heteroscedastic Linear Discriminant Analysis. In *Proceedings of Interspeech 2009*. (Awarded ISCA Student Grant)

[2] **Haolang Zhou**, Damianos Karakos, Sanjeev Khudanpur, Andreas G. Andreou, and Carey E. Priebe, On Projections of Gaussian Distributions using Maximum Likelihood Criteria. In *Proceedings of the Information Theory and Applications Workshop, La Jolla, California, February 2009.*

[3] Izhak Shafran and **Haolang Zhou**, Multiple Heteroscedastic Linear Discriminant Analysis. *CLSP Research Note 54.*

[4] Yanli Zheng, Richard Sproat, Liang Gu, Izhak Shafran, **Haolang Zhou**, Yi Su, Dan Jurafsky, Rebecca Starr and Su-Youn Yoon, Accent Detection and Speech Recognition for Shanghai-Accented Mandarin. In *Proceedings of the InterSpeech 2005.*

[5] **Haolang Zhou**, Lan Wang, and Ke Chen, A Mandarin Speech Database for Speaker Recognition. In *Proceedings of NCMMSC-6, 2001* (in Chinese).

Other papers on Semi-supervised Version of Heteroscedastic Linear Discriminant Analysis in preparation.

PROFESSIONAL
ACTIVITIES

Student Member of Institute of Electrical and Electronics Engineers (IEEE).
Student Member of International Speech Communication Association (ISCA).

PERSONAL
DETAILS

Citizenship: P. R. China
Languages: Fluent in English, native in Mandarin Chinese.
Life Experience: Attended middle school and first year of high school in U.S.
                   A.A. Kingston Middle School, Potsdam, NY
                   Broughton High School, Raleigh, NC
                   Finished high school education after returning to China and then entered into
                   Peking University after participating in the China National Higher Education
                   Entrance Examination.

REFERENCE   Available on request.