

Ian Lane

Ian Lane
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Carnegie Mellon University

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I am a Research Assistant Professor at Carnegie Mellon University and currently perform research in the area of spoken language translation at InterACT laboratories. My research interests include speech recognition, natural language processing, machine learning and the application of these technologies. I have published over 30 peer-reviewed papers in these fields and have received several patents and awards based on my work. I have been heavily involved in the development of speech translation systems at CMU, both research systems (GALE, TransTAC, TC-STAR, and IWSLT) and commercial products. Before joining Carnegie Mellon University I was an intern researcher at ATR Spoken Language Communication Laboratories, Japan. I obtained my postgraduate degrees (Masters and PhD) from Kyoto University and performed my undergraduate studies at Massey University, New Zealand.

RECENT SUCCESSSES

Research:

- Developed a novel approach for unsupervised topic adaptation of Speech Recognition and Machine Translation models (joint work with Dr. Wilson Tam and Prof. Tanja Schultz)
- Developed a novel field maintainable speech-to-speech translation architecture which enables end-users to add vocabulary to speech-translation systems while in the field (with Prof. Alex Waibel)
- Developed second ranked Iraqi-English speech-translation system at the DARPA-TransTAC evaluation - Names task (2008)
- Developed top ranking Japanese-English speech-translation system at the global IWSLT evaluation (2007)
- Led research team focused on system integration for speech translation within the DARPA-GALE project (2006 and 2007)
- Developed new technologies to enable the localization and classification of acoustic events on ubiquitous sensor networks (with Dr. Pei Zhang)

Commercially Deployed Systems:

- Project lead for "Tsujiro" Speech-Translation product by Source-Next: Release Date July 2nd, 2010
- Project lead for Japanese-English Jibbig System: First commercial speech-to-speech translation system on iPhone and top grossing App on iTunes in February, 2010

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WORK
EXPERIENCE

2009–Present, *Assistant Professor*
2006–2009, *Visiting Researcher*

InterACT, CMU-SV, LTI
Carnegie Mellon University
Moffett Field & Pittsburgh, USA

At Carnegie Mellon University I perform research in the area of spoken language translation at InterACT laboratories. My current research focuses on approaches to incorporate discourse-context into spoken language translation systems, focusing on topic and dialog-act modeling, situational context, and the use of participant information including discourse role and gender. I have co-supervised seven graduate students on projects ranging from PhD theses to single semester projects and have instructed classes on speech translation and spoken dialog systems. I taught the LTI graduate course on "*Speech Recognition and Understanding*" in 2008 and will again this year. I have published over 30 peer-reviewed articles in the areas of speech recognition, speech translation, spoken dialog systems and acoustic event classification.

As a visiting researcher at InterACT laboratories, from 2006–2008 I headed a research team focused on system integration for speech translation within the DARPA-GALE project under supervision of Prof. Tanja Schultz. I co-supervised five graduate students investigating specific problems within this research area, specifically, tight integration of speech recognition and machine translation; estimation of sentence and translation-unit boundaries; recognition and translation of unknown words; handling of spoken disfluencies, machine translation of spoken language, and adaptation to the topic of discourse. Our approaches were successfully implemented within the ROSETTA system, which includes collaborators from IBM, JHU and Stanford. From 2008 I jointly lead the development of speech-to-speech translation systems for Iraqi, Dari and Pashtu languages within the DARPA-TransTAC project with Prof. Alex Waibel and Prof. Alan Black. I supervised research on pronunciation modeling of Iraqi, real-time language identification, and in recent work, incremental system adaptation, disfluency removal and discourse modeling.

2009–Present, *Research Consultant*

Mobile Technologies
Pittsburgh, USA

At Mobile Technologies, a spin-off company from CMU, I consult on spoken language translation technologies and assist in the development of commercial products. I am the inventor of key technologies used within the company and lead the development of speech-to-speech translation products for the Japanese market. This is currently the largest project within the company. In 2009 my team successfully released PC software for educational institutions in Japan, and in 2010 we released the Japanese-English version of the iPhone based Jibbiggo system (www.jibbiggo.com). Our Jibbiggo system was the top grossing iTunes app in Japan and has been broadly covered by the media.

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2003–2006, *Intern Researcher*
2001–2003, *Research Assistant*

Dept. Spoken Language Research
Advanced Telephony Research
Kyoto, Japan

At ATR I developed novel approaches to detect out-of-domain utterances and speech recognition errors using “higher-level” knowledge sources, including topic consistency and discourse flow. I obtained three patents related to this work and my research results were implemented as modules within ATRs commercial speech translation product ATRASR. In earlier work, I developed a novel speech recognition framework combining topic detection and topic-dependent language modeling and also investigated robust acoustic features for speech recognition in noisy environments within the DARPA SPINE-II evaluation.

EDUCATION

Ph.D. Program in Informatics Kyoto University, Japan. 2006
“Flexible Spoken Language Understanding based on Topic Classification and Domain Detection,” Advisor: Prof. Tatsuya Kawahara

Masters of Informatics Kyoto University, Japan. 2003
“Language Model Switching based on Topic Detection for Multi-Domain Dialogue Speech Recognition,” Advisor: Prof. Hiroshi G. Okuno

Bachelor of Technology (Honors) Massey University, New Zealand. 2000

TEACHING

- Instructor: LTI graduate course Speech Recognition and Understanding, 2008, 2010.
- Instructor: LTI graduate classes on Spoken Language Translation and Spoken Dialog Systems, 2006.
- Teaching Assistant: Kyoto University Summer workshop Speech Recognition and Spoken Dialogue Technologies, 2004, 2005

PROFESSIONAL ACTIVITIES

- Program Chair: IWSLT 2010
- Organizing Committee: Interspeech 2006
- Program Committee: IWSLT 2007, NAACL-HLT 2007, The YRR on Spoken Dialog Systems 2007
- Reviewer (Conference): AMAT 2010, HLT 2007, IWSLT 2007
- Reviewer (Journal): Computer Speech and Language 2010, IEICE Trans. on Information and Systems 2009
- Member of ACL, AMTA, ISCA, IEEE Signal Processing Society

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SKILLS

- Strong management, communication and technical writing skills
- **Programming Skills:** Python, C, C++. Experienced Unix/Linux user. Some Windows and iPhone development.
- **Languages:** native English, proficient Japanese

AWARDS

- Japanese Government Monbukagakusyo PhD. Scholarship, 2003-2006
- Japanese Government Monbusyo Graduate Scholarship, 2001-2003

REFERENCES

- Professor Tanja Schultz, Karlsruhe Institute of Technology, Germany
- Professor Tatsuya Kawahara, Kyoto University, Japan
- Associate Professor Alan Black, Carnegie Mellon University, USA

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- PATENTS Ian Lane, Alex Waibel, *System and Methods for Maintaining Speech-to-Speech Translation in the Field*, International Patent. Feb., 2008.
- Ian Lane, and Tatsuta Kawahara, *Method to Assess Recognition Confidence Incorporating Measures of In-Domain Confidence and Discourse Coherence*, Japanese Patent. Mar., 2005.
- Ian Lane, Tatsuta Kawahara, Tomoko Matsui, and Satoshi Nakamura, *Training Device for Domain Verifier, Domain Verifying Device for Input Data, and Computer Program*, Japanese Patent JP2005164836. Jan., 2003.
- Ian Lane, Tatsuta Kawahara, Tomoko Matsui, and Satoshi Nakamura, *A Speech Recognition Framework Combining Hierarchical Topic Detection and Topic-Dependent Language Modeling*, Japanese Patent JP2004198597. Dec., 2002.
- JOURNALS Y. Tam, Ian Lane and T. Schultz, *Bilingual-LSA based Adaptation for Statistical Machine Translation*. Machine Translation, Springer Netherlands, Vol. 21, No. 4, pp. 931–938, December 2008,
- Ian Lane, T. Kawahara, T. Matsui, and S. Nakamura, *Out-Of-Domain Utterance Detection using Classification Confidences of Multiple Topics*. IEEE Trans. Audio, Speech & Language Process., Vol.15, No.1, pp. 150–161, 2007.
- Ian Lane, and T. Kawahara, *Verification of Speech Recognition Results Incorporating In-Domain Confidence and Discourse Coherence Measures*. IEICE Trans., Vol.E89-D, No.3, pp. 931–938, 2006.
- Ian Lane, T. Kawahara, T. Matsui, and S. Nakamura, *Dialogue Speech Recognition by Combining Hierarchical Topic Classification and Language Model Switching*. IEICE Trans., Vol. E88-D, No.3, pp. 446–454, 2005.
- BOOK CHAPTERS Y. Tam, Ian Lane and T. Schultz *Rapid Unsupervised Topic Adaptation - A Latent Semantic Approach*. Machine Translation of Speech, Chapter 3.4.3 (2010)
- S. Chu, H. Kuo, L. Mangu, Q. Shi, S. Zhang, Y. Qin, Q. Jin, I. Lane, and Y. Tam *Toward the State of the Art in Automatic Mandarin Broadcast Speech Transcription*. Machine Translation of Speech, Chapter 3.5.2 (2010)
- R. Hsiao, M. Fuhs, Y. Tam, Q. Jin, Ian Lane and T. Schultz *CMU/InterACT Mandarin Speech Recognition System for GALE*. Machine Translation of Speech, Chapter 3.5.3 (2010)
- U. Nallasamy, Ian Lane, M. Fuhs, M. Noamany, Y. Tam, Q. Jin and T. Schultz *CMU/InterACT Arabic Speech Recognition System for GALE*. Machine Translation of Speech, Chapter 3.6.4 (2010)
- M. Paulik, Ian Lane, T. Schultz *Improving Machine Translation of Spoken Language*. Machine Translation of Speech, Chapter 3.7.2 (2010)

- Ian Lane, A. Waibel. *Data-Driven Morphological Decomposition and Named-Entity Projection for Field Maintainable Speech-to-Speech Translation*. Submitted Interspeech, 2010
- Z. Sun, A. Purohit, K. Yang, N. Pattan, D. Siewiorek, A. Smailagic, Ian Lane and P. Zhang. *VMA: An Indoor Acoustic Sensing Platform for In-home Patient Monitoring*. Submitted ACM SenSys, 2010
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- Ian Lane, M. Eck, K. Rottmann and A. Waibel. *Tools for Collecting Speech Corpora via Mechanical-Turk*. In Proc. Creating Speech and Language Data With Amazons Mechanical Turk, 2010
- H. Al-Haj, R. Hsiao, Ian Lane and A. Waibel. *Pronunciation Modeling for Dialectal Arabic Speech Recognition*. In Proc. ASRU, pp. 525–528, 2009.
- D. Lim and Ian Lane. *Language Identification for Speech-to-Speech Translation*. In Proc. Interspeech, pp. 2362–2365, 2009.
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- M. Paulik, S. Rao, Ian Lane, S. Vogel and T. Schultz. *Sentence Segmentation and Punctuation Recovery for Spoken Language Translation*. In Proc. IEEE-ICASSP, pp. 2362–2365, 2008.
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- S. Rao, Ian Lane, and T. Schultz. *Improving Spoken Language Translation by Automatic Disfluency Removal : Evidence from Conversational Speech Transcripts*. In Proc. MT Summit XI, pp. 385–389, 2007.
- S. Rao, Ian Lane, and T. Schultz. *Optimizing Sentence Segmentation for Spoken Language Translation*. In Proc. Interspeech, pp. 2845–2848 , 2007.
- N. Bach, M. Noamany, Ian Lane, and T. Schultz. *Handling OOV Words In Arabic ASR Via Flexible Morphological Constraints*. In Proc. Interspeech, pp. 2373–2376 2007.
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- Ian Lane, T. Kawahara, and T. Matsui. *Language model Switching based on Topic Detection for Dialog Speech Recognition*. In Proc. IEEE-ICASSP, Vol.1, pp. 616–619, 2003.

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TECHNICAL
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ARTICLES

Matthias Eck, Ian Lane and Alex Waibel. *Evaluating Translations Produced by Amazon Mechanical Turk*. CMU-LTI-10-010, LTI Technical Report, 2010

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