Keynotes

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Data-intensive approaches for ASR

Sadaoki Furui, Tokyo Institute of Technology

Although many important scientific advances have taken place in automatic speech recognition research, we have also encountered a number of practical limitations which hinder a widespread deployment of applications and services. In most speech recognition tasks, human subjects produce one to two orders of magnitude fewer errors than machines. One of the most significant differences exists in that human subjects are far more flexible and adaptive than machines against various variations of speech, including individuality, speaking style, additive noise, and channel distortions. How to train and adapt statistical models for speech recognition using a limited amount of data is one of the most important research issues.

What we know about human speech processing and the natural variation of speech is very limited. It is important to spend more effort to clarify especially the mechanism underlying speaker-to-speaker variability, and devise a method for simultaneously modeling multiple sources of variations based on statistical analysis using large-scale databases. Future systems need to have an efficient way of representing, storing, and retrieving various knowledge resources.

Data-intensive science is rapidly emerging in scientific and computing research communities. The size of speech databases/corpora used in ASR research and development is typically 100 to 1,000 hours of utterances, which is too small considering the variety of sources of variations. We need to focus on solving various problems before efficiently constructing and utilizing huge speech databases, which will be essential to next-generation ASR systems.

Short Bio:

Sadaoki Furui received the B.S., M.S., and Ph.D. degrees from the University of Tokyo, Japan in 1968, 1970, and 1978, respectively. After joining the Nippon Telegraph and Telephone Corporation (NTT) Labs in 1970, he has worked on speech analysis, speech recognition, speaker recognition, speech synthesis, speech perception, and multimodal human-computer interaction. From 1978 to 1979, he was a visiting researcher at AT&T Bell Laboratories, Murray Hill, New Jersey. He was a Research Fellow and the Director of Furui Research Laboratory at NTT Labs and is currently a Professor Emeritus as well as an Institute Professor at Tokyo Institute of Technology. He has authored or coauthored over 900 published papers and books including “Digital Speech Processing, Synthesis and Recognition.” He was elected a Fellow of the IEEE (1993), the Acoustical Society of America

(ASA) (1996), the Institute of Electronics, Information and Communication Engineers of Japan (IEICE) (2001) and the International Speech Communication Association (ISCA) (2008). He has received the Paper Award and the Achievement Award from the IEICE (1975, 88, 93, 2003, 2003, 2008), and the Paper Award from the Acoustical Society of Japan (ASJ) (1985, 87). He has received the Senior Award and Society Award from the IEEE SP Society (1989, 2006), the ISCA Medal for Scientific Achievement (2009), and the IEEE James L. Flanagan Speech and Audio Processing Award (2010). He has also received the Achievement Award from the Minister of Science and Technology and the Minister of Education, Japan (1989, 2006), and the Purple Ribbon Medal from Japanese Emperor (2006).

Meaning-Equivalent Semantics for Understanding, Generation, Translation, and Evaluation

Daniel Marcu, University of Southern California:

We propose to use meaning-equivalent semantics as foundation for developing novel understanding, generation, translation, and evaluation algorithms. We discuss preliminary work that assesses the ability of people to create large-scale, meaning-equivalent representations and the utility of these representations for automatically estimating the quality of machine translation technology and human translators.

Short Bio:

Daniel Marcu is the Chief Technology Officer of SDL Language Technologies and a Research Project Leader at the Information Sciences Institute, University of Southern California. His published work includes an MIT Press book and more than 100 papers, two of which have received best paper awards. Daniel Marcu has also co-founded Language Weaver Inc.

Resource-rich Research on Natural Language Processing and Understanding

Junichi Tsujii, Microsoft Research Asia

Corpus-based NLP techniques have been intensively studied in the past two decades and become dominant in our fields, including machine translation, language modeling, dependency parsing, etc. However, the limitation of the corpus-based approach has also been becoming apparent. Any systems, such as a speech-translation system, etc., which have to deal with language as intelligently and robustly as human being should be able to treat semantic and pragmatic aspects of language. Since these two aspects are concerned with the relationships of language with the world (semantics) and the context (pragmatics), to observe and use language corpus alone would not solve problems related with these aspects. We have to introduce extra-linguistic elements in our paradigm which have been excluded as non-observable from the corpus-based or the empirical approach. My talk focuses on how to

exploit ontological resources and context-sensitive data and introduces some of our recent research.

Short Bio:

Dr. Junichi Tsujii is a Principal Researcher of Microsoft Research Asia. He joined MSRA in May, 2011. Before joining MSRA, he was Professor of Natural Language Processing in the Department of Computer Science, University of Tokyo and Professor of Text Mining in the School of Computer Science, University of Manchester. His recent research achievements include (1) Deep semantic parsing based on feature forest model, (2) Efficient search algorithms for statistical parsing, (3) Improvement of estimator for maximum entropy model, and (4) Construction of the gold standard corpus (GENIA) for Bio Text Mining.

Dr. Tsujii has received numerous awards such as the IBM Science Award (1989), SEYMF Visiting Professorship in Hong Kong (2000), Daiwa-Adrian Prize (2004), IBM Faculty Award (2005) , Achievement Award of Japan Society for Artificial Intelligence (2008), Fellow of Information Processing Society Japan (2010) and the Medal of Honor with Purple Ribbons (2010). He was President of ACL (Association for Computational Linguistics, 2006), President of IAMT (International Association for Machine Translation (2002-2004), and President of AFNLP (Asian Association for Natural Language Processing, 2007).