

ACL-08: HLT

Workshop on Mobile Language Processing

Proceedings of the Workshop

June 20, 2008
The Ohio State University
Columbus, Ohio, USA

Production and Manufacturing by
Omnipress Inc.
2600 Anderson Street
Madison, WI 53707
USA

©2008 The Association for Computational Linguistics

Order copies of this and other ACL proceedings from:

Association for Computational Linguistics (ACL)
209 N. Eighth Street
Stroudsburg, PA 18360
USA
Tel: +1-570-476-8006
Fax: +1-570-476-0860
acl@aclweb.org

ISBN 978-1-932432-13-8

Introduction

Mobile devices such as ultra-mobile PCs, personal digital assistants, and smart phones have many unique characteristics that make them both highly desirable as well as difficult to use. On the positive side, they are small, convenient, personalizable, and provide an anytime-anywhere communication capability. On the other hand, they have limited input and output capabilities, limited bandwidth, limited memory, and restricted processing power.

In anticipation of new and exciting applications for natural and spoken language processing on mobile devices, this workshop provided a forum for discussing some of the challenges that are unique to this domain. For instance, mobile devices are beginning to integrate sensors (most commonly for location detection through GPS, Global Positioning Systems) that can be exploited by context/location aware NLP systems. Another interesting research direction is the use of information from multiple devices for “distributed” language modeling and inference. To give some concrete examples, knowing the type of web queries made from nearby devices or from a specific location or ‘context’ can be combined for various applications and could potentially improve information retrieval results. Learned language models could be transferred from device to device, propagating and updating the language models continuously and in a decentralized manner.

Processing and memory limitations faced by the execution of NLP and speech recognition software on small devices need to be addressed. Several papers addressed this issue. In “*Information extraction using finite state automata and syllable n-grams*” Seon et al. proposed a modified HMM for information extraction in a mobile environment. This kind of model has the advantage of being compact. Huggins-Daines et al. proposed a simple entropy-based technique to improve the scalability of acoustic models in embedded systems; they showed a significant speed-up in recognition with a negligible increase in word error rate (“*Mixture Pruning and Roughening for Scalable Acoustic Models.*”) Ganchev and Dredze in “*Small Statistical Models by Random Feature Mixing*” showed how it is possible to do efficient NLP learning by reducing the number of parameters on resource constrained devices with little loss in performance; and “*A Wearable Headset Speech-to-Speech Translation System*” by Krstovski et al. shrunk a speech translation system to fit into a wearable speech-to-speech translation system.

Some applications and practical considerations may require a client/server or distributed architecture: what are the implications for language processing systems in using such architectures? Homola (“*A Distributed Database for Mobile NLP Applications*”) proposed a distributed database for lexical transfer in machine translation. The database contains data shared among multiple devices and automatically synchronizes them.

The limitation of the input and output channels necessitates typing on increasingly smaller keyboards which can be quite difficult, and similarly reading on small displays is challenging. Speech interfaces for dictation or for understanding navigation commands and/or language models for typing suggestions would enhance the input channel, while NLP systems for text classification, summarization and

information extraction would be helpful for the output channel. Speech and multimodal interfaces, language generation and dialog systems would provide a natural way to interact with mobile devices. A multimodal dialogue system for interacting with a home entertainment center via a mobile device was proposed by Gruenstein et al. in “*A Multimodal Home entertainment Interface via a Mobile Device.*”

Furthermore, the growing market of cell phones in developing regions can be used for delivering applications in the areas of health, education and economic growth to rural communities. Some of the challenges in this area are the limited literacy, the many languages and dialects spoken and the networking infrastructure.

For the health domain, Nikolova and Ma in their paper “*Assistive Mobile Communication Support*” discussed the role of mobile technologies in a system for communication support for people with speech and language disabilities.

We believe that the issues raised by the papers in this Workshop represent just the tip of the iceberg, and we hope that by raising awareness of these issues, more research will be aimed at mobile language processing. The ACL 2008 Workshop on Mobile Language Processing took place on June 20 in Columbus, Ohio following ACL-08: HLT with an invited talk by Dr. Lisa Stifelman, Principal User Experience Manager at Tellme/Microsoft, seven oral paper presentations, a poster and a demo session and a panel discussion.

We thank the members of the Program Committee for their diligent and insightful reviews, as well as our illustrious Panel Session members.

Barbara Rosario and Tim Paek
Co-Organizers

Organizers:

Barbara Rosario, Intel Research
Tim Paek, Microsoft Research

Program Committee:

Alex Acero, Microsoft Research
Alan Black, CMU
Dilek Hakkani Tur, ICSI
Marti Hearst, iSchool, UC Berkeley
Michael Johnston, AT&T
Maryam Kamvar, Google and Columbia University
Kevin Knight, USC/Information Sciences Institute
Julian Kupiec, Google
Dekang Lin, University of Alberta, Canada
Maryam Mahdavian, University of British Columbia, Canada
Wolfgang Minker, University of Ulm, Germany
Noah Smith, CMU
Bo Thiesson, Microsoft Research
Gokhan Tur , SRI
Fuliang Weng, Bosch
Thomas Zheng , Tsinghua University
Geoffrey Zweig, Microsoft Research

Invited Speaker:

Lisa Stifelman, Principal User Experience Manager at Tellme/Microsoft.

Table of Contents

<i>A Multimodal Home Entertainment Interface via a Mobile Device</i> Alexander Gruenstein, Bo-June (Paul) Hsu, James Glass, Stephanie Seneff, Lee Hetherington, Scott Cyphers, Ibrahim Badr, Chao Wang and Sean Liu	1
<i>A Wearable Headset Speech-to-Speech Translation System</i> Kriste Krstovski, Michael Decerbo, Rohit Prasad, David Stallard, Shirin Saleem and Premkumar Natarajan	10
<i>Information extraction using finite state automata and syllable n-grams in a mobile environment</i> Choong-Nyoung Seon, Harksoo Kim and Jungyun Seo	13
<i>Small Statistical Models by Random Feature Mixing</i> Kuzman Ganchev and Mark Dredze	19
<i>Mixture Pruning and Roughening for Scalable Acoustic Models</i> David Huggins-Daines and Alexander I. Rudnicky	21
<i>Assistive Mobile Communication Support</i> Sonya Nikolova and Xiaojuan Ma	25
<i>A Distributed Database for Mobile NLP Applications</i> Petr Homola	27

Workshop Program

Friday, June 20, 2008

- 8:45–9:00 Opening Remarks
- 9:00–10:00 Invited Talk by Dr. Lisa Stifelman, Principal User Experience Manager at Tellme/Microsoft. *Say it and See it! Applying User-Centered Design to Mobile and Multimodal Search.*
- 10:00–10:30 *A Multimodal Home Entertainment Interface via a Mobile Device*
Alexander Gruenstein, Bo-June (Paul) Hsu, James Glass, Stephanie Seneff, Lee Hetherington, Scott Cyphers, Ibrahim Badr, Chao Wang and Sean Liu
- 10:30–11:00 Break
- 11:00–11:25 *A Wearable Headset Speech-to-Speech Translation System*
Kriste Krstovski, Michael Decerbo, Rohit Prasad, David Stallard, Shirin Saleem and Premkumar Natarajan
- 11:25–11:50 *Information extraction using finite state automata and syllable n-grams in a mobile environment*
Choong-Nyoung Seon, Harksoo Kim and Jungyun Seo
- 11:50–12:15 *Small Statistical Models by Random Feature Mixing*
Kuzman Ganchev and Mark Dredze
- 12:15–1:15 Lunch
- 1:15–1:40 *Mixture Pruning and Roughening for Scalable Acoustic Models*
David Huggins-Daines and Alexander I. Rudnicky
- 1:40–2:05 *Assistive Mobile Communication Support*
Sonya Nikolova and Xiaojuan Ma
- 2:05–2:30 *A Distributed Database for Mobile NLP Applications*
Petr Homola
- 2:30–3:30 Demos and Posters
- 3:30–4:00 Break
- 4:00–5:00 Panel Session

