

Briefly Noted

The Spoken Language Translator

Manny Rayner, David Carter, Pierrette Bouillon, Vassilis Digalakis, and Mats Wirén (editors)

(SRI International, Speech Machines, University of Geneva, Technical University of Crete, and Telia Research)

Cambridge University Press (Studies in natural language processing, edited by Branimir Boguraev), 2000, xviii+337 pp; hardbound, ISBN 0-521-77077-7, \$59.95

The Spoken Language Translator consists of 21 chapters contributed by different authors who worked on the building of components and/or the overall system for the Spoken Language Translator (SLT), an early project in the area of automatic speech translation. The book presents a detailed description of various technologies developed during the period of the SLT project, with an emphasis on language and linguistic processing. It includes four parts: language processing and corpora, linguistic coverage, speech processing, and evaluation and conclusions.

The SLT used a multiengine machine translation architecture. The main machine translation engine is a complex, unification grammar-based system intended to perform deep analysis and to produce high-quality output. The authors claim that the hand-coded grammars used in SLT are linguistically motivated and generic in nature. Therefore, the grammar coverage is broad, and it is feasible to use these methods in serious applications. However, the translation task was evaluated only in the domain of air travel reservations. The authors also worked on methods to convert grammars generated for English to corresponding grammars for French and Swedish, as well as the possibility of writing a single large grammar for two closely related languages. The grammar-based subsystem is responsible for structural translation via the quasi-logical form transfer method.

Another translation engine used in SLT is a simple word-to-word system, intended for shallow processing, speed, robustness, and broad coverage. The word-to-word translation component simply uses rules to associate a source language phrase of one or more words with a target language phrase of

zero or more words. Source language words may be tagged with part-of-speech labels. This technique was intended to fill in the gaps (i.e., to translate utterances that are not covered by the grammars, including utterances that are grammatically incorrect, such as speech recognition errors or disfluencies in spontaneous speech).

The speech recognition technology used in SLT was a state-of-the-art hidden Markov model-based approach, with some interesting new techniques, such as discrete-mixture models, which run two to three times faster than continuous-density models with similar recognition performance. The speech recognition system was developed for multilingual speech and is capable of decoding a word string in any of a given set of languages. Both acoustic modeling and language modeling issues for a multilingual recognition system are addressed. Text-to-speech translation is an inevitable part of a speech-to-speech translation system. However, text-to-speech technology is not considered in this book, and prosody translation and prosody transfer are described only briefly.

A series of empirical evaluation experiments is thoroughly described and the results analyzed in chapter 20. Although all evaluations are subjective, several fine scales are used for quality judgment. Furthermore, the main system performance is compared when variations are generated either by replacing selected components or changing the values of the critical parameters. One interesting study discussed in this chapter is on "pipeline synergy," which is based on the intuition that "utterances that are hard to hear are also hard to understand and translate." The authors show that assuming that error rates for the individual components are independent can lead to serious overestimates of the system error rate. This chapter is worthwhile for readers who are interested in performance evaluation of speech-to-speech translation systems.

In general, this book is a useful resource for those who are interested in knowing how to build a speech-to-speech translation system, especially for those who are interested in grammar-based language processing approaches.—*Yuqing Gao, IBM T. J. Watson Research Center*

Yuqing Gao works on problems of large-vocabulary speech recognition and of speech-to-speech translation. She has been a research staff member at IBM T. J. Watson Research Center since 1995. Her address is IBM T. J. Watson Research Center, Yorktown Heights, NY 10598, e-mail: yuqing@us.ibm.com.

Many Morphologies

Paul Boucher (editor)
(University of Nantes)

Somerville, MA: Cascadilla Press, 2002,
xv+267 pp; paperbound, ISBN
1-57473-025-8, \$28.95

"The title of this collection of articles, *Many Morphologies*, is an allusion not only to the variety of morphological problems discussed, but also to the diversity of formal solutions offered by the authors. The papers examine Polish derivational morphology, French and English compounding, pluralization in Luiseño and Somali, and more, and though almost all of the papers are written in the generative grammar framework, there are considerable differences between the formal methods they apply to the problems at hand. We also include two papers which discuss computational morphology, one an overview of the current state of the field and the other an in-depth study of a current research project."—*From the introduction*

Parallel Corpora, Parallel Worlds

Lars Borin (editor)
(Uppsala University)

Amsterdam: Editions Rodopi (Language and computers: Studies in practical linguistics 43, edited by Jan Aarts and Willem Meijs), 2002, vii+220 pp; hardbound, ISBN 90-420-1530-6, \$50.00, €50.00

The volume contains selected papers from a symposium on parallel and comparable corpora that was held at Uppsala University in April 1999:

- "... And never the twain shall meet?" by Lars Borin
- "Towards a multilingual corpus for contrastive analysis and translation studies" by Stig Johansson
- "The PLUG project: Parallel corpora in Linköping, Uppsala, Goteborg: Aims and

achievements" by Anna Sågvald Hein
"The Uppsala Student English Corpus (USE): A multi-faceted resource for research and course development" by Margareta Westergren Axelsson and Ylva Berglund

"How can linguists profit from parallel corpora?" by Raphael Salkie

"Parallel corpora as tools for investigating and developing minority languages" by Trond Trosterud

"Reversing a Swedish-English dictionary for the Internet" by Christer Geisler

"Multilingual corpus-based extraction and the Very Large Lexicon" by Gregory Grefenstette

"The PLUG Link Annotator—Interactive construction of data from parallel corpora" by Magnus Merkel, Mikael Andersson, and Lars Ahrenberg

"Building and processing a multilingual corpus of parallel texts" by Peter Stahl

"Uplug—A modular corpus tool for parallel corpora" by Jörg Tiedemann

"Part-of-speech tagging for Swedish" by Klas Prutz

"Alignment and tagging" by Lars Borin

Computational Linguistics in the Netherlands 2001

Mariët Theune, Anton Nijholt, and Hendri Hondrop (editors)
(University of Twente)

Amsterdam: Editions Rodopi (Language and computers: Studies in practical linguistics 45, edited by Jan Aarts and Willem Meijs), 2002, viii+207 pp; hardbound, ISBN 90-420-0943-8, \$50.00, €50.00

The volume contains selected papers from the 12th Computational Linguistics in the Netherlands meeting, Enschede, November 2001:

- "Ideas on multi-layer dialogue management for multi-party, multi-conversation, multi-modal communication" by David R. Traum
- "The Alpino dependency treebank" by Leonoor van der Beek, Gosse Bouma, Rob Malouf, and Gertjan van Noord
- "Corpus-based acquisition of collocational prepositional phrases" by Gosse Bouma and Begonia Villada