MaTrEx: a Quick Overview

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Outline

Overview

Description

Recent additions
The MaTrEx Project

Goals

▶ Re-writing prototypes to build re-usable systems
▶ Synchronizing development, avoiding duplicates
▶ Scaling to larger datasets (for evaluations, etc.)
▶ Working as a team: learning from each other, benefiting from others’ skills, etc.

Properties in mind

▶ Modularity, so that anyone can add new features and adapt the system to its own needs
▶ Maintainability (short turnovers . . .)
▶ Efficiency, to deal with large datasets and to allow for more experiments, etc.
MaTrEx History

System’s core: re-implementation of prototypes

- Marker-Based EBMT (Nano Gough, PhD 2005, CL 2003)
- Hybrid Data-Driven MT (Declan Groves, PhD 2007, MT 2006)

Evaluations

- OpenLab 2006
- NIST 2006
- IWSLT 2006
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MaTrEx: A Hybrid EBMT/SMT System

Overview of the system

- A word alignment component ($GIZA++$)
- A chunking component
- A chunk alignment component
- Two phrase alignment components:
  - “SMT”-style phrase aligner (standard phrase extraction from $GIZA++$ alignments)
  - “EBMT”-style phrase aligner (phrases are extracted from (i) the chunker and (ii) the chunk aligner)
- A minimum-error rate training component (wrapper around $MOSES$)
- A decoder (wrapper around $MOSES$)
- A case and punctuation restoration component
MaTrEx: architecture

- Aligned Sentences
- Aligned Words
- Aligned Chunks
- Decoder

Word aligner:
- Source marker words
- Source chunks

Chunk aligner:
- Target marker words
- Target chunks

Input sentence → Decoder → Output translation
Chunking and Chunk alignment

Several chunking strategies

- Marker-based chunking
  - surface chunking based on marker words
- Treebank-based chunking
  - learner trained on annotated data extracted from treebanks

Several chunk alignment strategies

- Edit-distance-like alignment
- Edit-distance-(with jumps)-like alignment
- IBM model-1-like alignment
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Recent additions
Recent addition (1): Word Packing

Word-packing and bilingually-motivated tokenisation (Ma et al., ACL 2006)

- Word alignment relies on segmenting sentences into basic units ("words")
- Word packing: packing (consecutive) words together when they correspond to a single word in the opposite language
- ⇒ We can obtain a tokenisation suited to the case of bilingual word alignment

A bootstrap approach

- Word-packing can be performed using 1-to-\(n\) word alignment
- Word alignment can benefit from word packing

More at Yanjun’s talk...
Recent addition (2): Super-Tagging

Integrating Syntax into SMT using supertags (Hassan et al., ACL 2006)

- Syntax modeled with supertags (CCG, TAG)
- one idea consists of giving preference to sequences of words that form a valid sequence of supertags
- useful for languages with different constituent orders ⇒ syntax-driven re-ordering
Ongoing and Future Work

- Suffix-array based decoding (EBMT, phrase-based)
- Taking syntactical features into account in various contexts
- Synchronisation with work on tree-to-tree translations (more at Mary’s talk)
- …
Thank you for your attention

http://www.nclt.dcu.ie/mt/