Exploiting Alignment Techniques in MaTrEx: the DCU MT System for IWSLT 2008

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Proper training on large data is always preferential.
Syntax-enhanced word alignment leads to improvements.
Treebank phrase extraction improves inconsistently.
Word packing leads to drops in performance.
Smoothing and case/punctuation restoration techniques also effective.

MaTrEx (Machine Translation using Examples) is a hybrid system which can exploit EBMT, SMT and syntax-based techniques to build a combined translation model. MaTrEx is built following established Design Patterns and consists of a number of extensible and re-implementable modules. Some significant modules include:

- **Word Alignment Module**: outputs a set of word alignments given a parallel corpus;
- **Chunking Module**: outputs a set of chunks given an input corpus;
- **Chunk Alignment Module**: outputs aligned chunk pairs given source and target chunks from comparable corpora;
- **Decoder**: returns optimal translation given a set of aligned sentences, chunk/phrase and word pairs.

### Introduction

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### New Alignment Techniques

#### Word Packing

- **Candidate Extraction**
  
  白葡萄酒：white wine
  抱歉：excuse me
  报警：call the police
  fifteen：十五
  here：在这里

- **Reliability Estimation**

- **Bootstrapping Estimation**

#### Syntax-Enhanced Word Alignment

- **Anchor Word Alignment**

- **Discriminative Syntax-Enhanced Word Alignment**

- **Search**

  c: 我 1 打 2 网球 3 时 4 扭伤 5 的 6
  e: I 1 twisted 2 it 3 playing 4 tennis

#### Treebank-based Phrase Alignment

- **Candidate Selection**

- **Translation-based Punctuation Restoration**

- **Majority voting techniques to restore the final punctuation mark**

### Official Results

<table>
<thead>
<tr>
<th>System</th>
<th>Challenge Task</th>
<th>BTEC</th>
<th>Pivot</th>
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<td>ZH-EN</td>
<td>EN-ZH</td>
<td>AR-EN</td>
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<td>27.14</td>
<td>40.80</td>
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<td>Word Packing</td>
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<td>Syntax Enhanced</td>
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<td>29.31</td>
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<td>Treebank</td>
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<tr>
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<tr>
<td>All Smoothing</td>
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<tr>
<td>Data Combo</td>
<td>36.40</td>
<td>30.86</td>
<td>46.30</td>
</tr>
</tbody>
</table>

### Discussion

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