Unsupervised Natural Language Generation for Task-Oriented Dialogue System

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Motivation

• Traditional e-commerce dialogue system generates response with fixed template, which can lack variety and entertainment.
• Typical machine learning needs labor-intensive and error-prone labels in data collection.
• Aim to proposes a label-free, annotation-free, unsupervised keywords-to-sentence generation

Data-Structures & Pre-processing

Dataset

• Data 1: 51426 text samples from E2E [1] dataset about the description of restaurant.
• Test Data: 4000 randomly selected sentences in E2E with less than 6 keywords.
• Only text, and no labels or annotations

Pre-processing

• POS tagging each word in the dataset with Stanford tagger into 16 different categories.

Evaluation & Discussion

Samples Output

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Reference</th>
<th>Generate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strada is a restaurant with an average customer rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aromi is a restaurant which provides Chinese food in the riverside area</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comparison

• With dataset about only restaurant, language models achieve perplexity of 3.9. Grammar model with 16 different tags achieve a perplexity of 2.1.
• With low perplexity, the sentences generated are generally grammatically correct, but without supervised label it sometimes adds extra information.
• The extra information lowers BLEU score, which is about precision. Rouge score about recall remains to be high.

Discussion

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Future work

• Build grammar model on a generalized corpus rather than only on restaurant
• Adapt the generated sentences based on user’s question.