1. Purpose

We annotate TECHNOLOGY tags and VALUE tags for patent map generation.

<table>
<thead>
<tr>
<th>Group</th>
<th>Delimiters</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>は、(ha), において、(nioite), ば、(ba)</td>
</tr>
<tr>
<td>Second</td>
<td>と、(to), とを(towo), 与え(mouke), 有り(yuhi), 有する(yusuru), 有する(yusuru), 用い(mochii), 介し(kaishi), 有る(fukumu)</td>
</tr>
</tbody>
</table>

Extraction of delimiters is as follows:
- long TECHNOLOGY tags: Entropy (Score) \[ H(t) = - \sum_{i \in \text{ASSY}} P(t) \log_2 P(t) , t = \text{delimiter} \]
- short TECHNOLOGY tags: annotated by using SVM

2. Our method

Annotation of EFFECT tags

Our method for annotation VALUE tags is as follows:
- Step 1: Collect an expression that is enclosed by VALUE tags and these expressions are candidates of VALUE expressions.
- Step 2: Select an appropriate VALUE expression from the candidates by using entropy-based score.

After annotation VALUE tags, our method for annotation ATTRIBUTE tags is as follows:
- Step 1: Extract bunsetsu \( W_\text{val} \) that appears before a VALUE expression and the word is selected as a candidate for ATTRIBUTE expression Att.
- Step 2: Extract bunsetsu \( W_\text{att} \) that appears before the candidate for ATTRIBUTE expression Att.
- Step 3: Add bunsetsu \( W_\text{adj} \) to Att when bunsetsu includes Japanese particles “の”, “を”, “が”, “や”, “おより”, and “及び”, otherwise select Att as an appropriate ATTRIBUTE expression.
- Step 4: Repeat Steps 2 and 3

3. Results and Discussions

We achieved high precision on each task, in particular, task of annotating VALUE tags.

Recall of our method is a low value.

The collection of appropriate delimiters and heuristic rules are non-exhaustive.

4. Conclusion

We annotated TECHNOLOGY and EFFECT tags by using delimiters and machine learning.

In order to choose a delimiter, we used a score based on entropy.

We achieved 0.55 precision and 0.27 recall.