Attribute Selection Using Relative Attribute Groupings Obtained from the Test Data

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Modifying the Reference Solver of TAP

We based our work on TAP (Text Arranging Pipeline)

TAP is a set of interfaces that define generic functionality for a pipeline of tasks oriented towards natural language generation

The Reference Solver from TAP has been modified to aim for identification, minimality, and system-human match

It is guided by the order in which to consider the attributes that are used - as in the list of preferred attributes, in order of preference, described in (Reiter & Dale, 1992).

- Identification evaluation:
  - It was not necessary to modify the module

- Minimality evaluation
  - The list of attributes that are considered can be ordered by their discriminatory power

- System-human match using the Dice coefficient
  - The order of the attributes is fixed by studying the training data
Training data was studied separately for each domain
- Psychological considerations when referring to a piece of furniture or a person might be different

The *type* attribute was used as distinguishing in the furniture domain, but not in the people domain

Minimal Expression vs. Dice Coefficient
- Initial experiments demonstrated that minimal references produced low Dice results

<table>
<thead>
<tr>
<th></th>
<th>Minimal</th>
<th>Dice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>100,00%</td>
<td>24,33%</td>
</tr>
<tr>
<td>People</td>
<td>100,00%</td>
<td>31,33%</td>
</tr>
</tbody>
</table>

We concentrated on improving the Dice coefficient results
The attribute order that generates the best results was
determined empirically
   - All the possible order combinations of the attributes were generated
   - For each of them the whole process of generating the attribute
     selection of the examples in the training corpus was executed

Experiments revealed that the results seemed to be dependant
on the relative order of ‘groups’ of attributes, rather than the
order of attributes in general:
   - Furniture features [colour, type, size]
   - Spatial situation [orientation, x-dimension, y-dimension]

Best results with
[t: type, colour, size,
orientation, x-dimension, y-dimension]
People domain: heuristical statistical approach

- With 11 attributes there were too many combinations to test
  - We established different groups of attributes based on intuition
  - We tested only variations of relative orders between those groups

- The best option found was grouping attributes depending on the relevance of their presence or absence
  - For example, to have beard or to wear glasses are usually more perceivable than to wear a tie (especially if the person is also wearing a suit)

- Best results with
  - [hasGlasses, hasBeard, hairColour, hasHair, hasSuit, hasTie, hasShirt, age, x-dimension, y-dimension, orientation]
Conclusions

<table>
<thead>
<tr>
<th></th>
<th>Identification</th>
<th>Minimal</th>
<th>Dice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>100%</td>
<td>0.00%</td>
<td>75.21%</td>
</tr>
<tr>
<td>People</td>
<td>100%</td>
<td>33.82%</td>
<td>44.78%</td>
</tr>
</tbody>
</table>

- Unbalanced results: good for furnitures, bad for people
  - Training data was studied statistically for the furniture domain
  - For the people domain we have no time for exhaustive computation and we applied a heuristic that did not work

- Efforts like this challenge seem very fruitful for the NLG community
  - Sharing techniques and results over the same data

- May be interesting to explore similar tasks
  - References for target elements in a text
    - Taking into account the elements already mentioned in the text
    - Working also with defined and undefined references and pronouns
Attribute Selection for Matching the Task Corpus Using Relative Attribute Groupings Obtained from the Test Data

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