WHUIR at the NTCIR-12 Temporalia Temporal Intent Disambiguation Task

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The huge volume of web pages makes the time an important factor in information retrieval. Using temporal information, e.g. the temporal intent of user’s queries, may improve IR systems’ accuracy. This task is to estimate a distribution of four temporal intent classes (Atemporal, Past, Recent, or Future) for a given query.

The Task

• Query logs are difficult to obtain
• Previous work shown results on queries features outperformed better than features from retrieved docs

Observation

Main Idea

• Extract features from queries only
• Machine Learning + Multi-Class SVR

Research Design

Query extract Features train Binary Classifiers test Learnt Probability Value normalize Submit Probability Vector

<table>
<thead>
<tr>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Entity</td>
<td>location, person, organization</td>
</tr>
<tr>
<td>Query Length</td>
<td>without stop-words removal</td>
</tr>
<tr>
<td>Year Number</td>
<td>words to express year; e.g. “2007”, “2013”</td>
</tr>
<tr>
<td>Core Verb Tense</td>
<td>verb reflecting the really tense of the whole sentence</td>
</tr>
<tr>
<td>Domain Keywords</td>
<td>the most frequent words shown in certain category</td>
</tr>
<tr>
<td>Time Gap</td>
<td>time interval between query focus time and submitted time</td>
</tr>
<tr>
<td>Temporal words</td>
<td>TempoWordNet</td>
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</tbody>
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Features Notes

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Experiment

• Dataset: TID English dataset
  - Dry Run: 73 training queries + 20 test queries
  - Formal Run: 300 test queries

• Off-the-shelf Tools
  - Stanford NLP
  - TempoWordNet
  - LIBSVM

• Results

<table>
<thead>
<tr>
<th>RUN ID</th>
<th>svm type</th>
<th>kernel type</th>
<th>Cosine Similarity</th>
<th>Per-class Absolute Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHU1</td>
<td>epsilon-SVR</td>
<td>sigmoid</td>
<td>0.6196</td>
<td>0.2662</td>
</tr>
<tr>
<td>WHU2</td>
<td>nu-SVR</td>
<td>linear</td>
<td>0.5225</td>
<td>0.2921</td>
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<tr>
<td>WHU3</td>
<td>nu-SVR</td>
<td>polynomial</td>
<td>0.6933</td>
<td>0.2520</td>
</tr>
</tbody>
</table>

Best Run Discussion

- Atemporal is hard to estimate
- estimate more probability values to some 0 probability value temporal class

Figure 1. The loss of predicted probability and the standard probability for four categories