On a Combination of Probabilistic and Boolean IR Models for GeoTime Task
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Motivation

Information retrieval for Question Answering about a particular named entity
Documents that do not contain information about the entity are irrelevant.
Query: When Paul Nitze die?

Score of IR System
With Partial match
IR for QA

 modification of okapi
 • Use BM25 formula to calculate each document score
 \[
 w(k) = \frac{1}{k + q_f} (r + 0.5)/(N - n + R + 0.5)
 \]

Modification of ABRIR for QA

IR System (Probabilistic IR Model)

Combination of Two IR Models

Experimentait Results

<table>
<thead>
<tr>
<th>Runs</th>
<th>Boolean for NE</th>
<th>Boolean for others</th>
</tr>
</thead>
<tbody>
<tr>
<td>JA-JA-01-D</td>
<td>Filter</td>
<td>Filter</td>
</tr>
<tr>
<td>JA-JA-02-DN</td>
<td>Filter</td>
<td>Filter</td>
</tr>
<tr>
<td>JA-JA-03-D</td>
<td>Penalty</td>
<td>Penalty</td>
</tr>
<tr>
<td>JA-JA-04-D</td>
<td>Penalty</td>
<td>No</td>
</tr>
<tr>
<td>JA-JA-05-D</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Run  01-D</td>
<td>02-DN</td>
</tr>
<tr>
<td>AP</td>
<td>0.3697</td>
<td>0.3867</td>
</tr>
<tr>
<td>nDCG</td>
<td>0.4117</td>
<td>0.4268</td>
</tr>
<tr>
<td>Q</td>
<td>0.5710</td>
<td>0.5685</td>
</tr>
</tbody>
</table>

Statistical Significance Test between 03-D and 05-D (Baseline: Okapi)
Statistically significant:
t-Test for a two-sided tests: nDCG(0.018) and Q(0.040)
Wilcoxon Signed rank test: AP(0.0015), nDCG(0.0006) and Q(0.0024)

Conclusion

Proposal of using ABRIR as an IR system for question and answering for particular named entities.
From the evaluation experiment, we confirm that ABRIR can make appropriate Boolean query and penalty based system outperform the baseline system (probabilistic IR model: Okapi BM25).