DUTH at TREC 2013 Contextual Suggestion Track

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Summary
Summary of this work

- **Context processing**
  - Collect POIs from Google Places, Foursquare and Yelp
  - The collected POIs are enriched by adding snippets from the Google and Bing search engines using crowdsourcing techniques

- **Suggestion processing methods**
  1. The 1st method submits each candidate place as a query to an index of rated examples and scores it based on the top-k user's ratings
  2. The 2nd method is based on Rocchio's algorithm and uses the rated examples per profile to generate a personal query which is then submitted to an index of places
Overview of Context Processing

Request Places for Contexts → Contexts

- Google Places: Contextual List of Places
- Foursquare: Contextual List of Places
- Yelp: Contextual List of Places

Merging Process Based on URL and Phone → Merged Contextual List of Places

Crowdsourcing to Extract Place URL of Yelp URLs

Pool with Detailed Places per Context → Merging Descriptions

Crowdsourcing

- Google Search Engine
- Bing Search Engine

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TREC '13
Collected Data

Table 1: Statistical information about the contextual list of places.

<table>
<thead>
<tr>
<th>Context</th>
<th>Google</th>
<th>Foursquare</th>
<th>Yelp</th>
<th>Merged / Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crestview, FL</td>
<td>103</td>
<td>33</td>
<td>38</td>
<td>131 / 174</td>
</tr>
<tr>
<td>Anniston, AL</td>
<td>139</td>
<td>53</td>
<td>26</td>
<td>168 / 218</td>
</tr>
<tr>
<td>Sumter, SC</td>
<td>147</td>
<td>52</td>
<td>40</td>
<td>173 / 239</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Orlando, FL</td>
<td>590</td>
<td>328</td>
<td>497</td>
<td>1008 / 1415</td>
</tr>
<tr>
<td>Atlanta, GA</td>
<td>694</td>
<td>559</td>
<td>738</td>
<td>1378 / 1991</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>812</td>
<td>1126</td>
<td>1275</td>
<td>2378 / 3213</td>
</tr>
<tr>
<td>Total (with URLs)</td>
<td>14945</td>
<td>7664</td>
<td>8394</td>
<td>22600 / 31003</td>
</tr>
<tr>
<td>Total (retrieved)</td>
<td>—</td>
<td>68517</td>
<td>15787</td>
<td>—</td>
</tr>
</tbody>
</table>
Suggestion Processing
Suggestion Model based on $k$–NN Classification
(Run DuTH_A)
Suggestion Model Based on a Rocchio-like Method
(Run DuTH_B)

Pool with Detailed Places per Context

Examples

Profiles of Users for Examples

Indexing: Title, Description, Place Types

Index per Context

Retrieve the Results of Query for Every Index

Suggestions per User and Context

Generate Personalized Queries with Rocchio Algorithm

Weighted Query per User

\[ Q_u = \sum_{j=0}^{4} \left( j - 2 \right) \frac{1}{|R_{j,u}|} \sum_{D \in R_{j,u}} D \]
Official Results
Table 2: Mean of results over all the profiles and contexts for P@5, MRR and TBG measures.

<table>
<thead>
<tr>
<th>Runs</th>
<th>P@5</th>
<th>MRR</th>
<th>TBG</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuTH_A</td>
<td>0.3283</td>
<td>0.4836</td>
<td>1.3109</td>
</tr>
<tr>
<td>DuTH_B</td>
<td>0.4090</td>
<td>0.5955</td>
<td>1.8508</td>
</tr>
</tbody>
</table>

**Difference:**

| DuTH_B vs _A | +24.58% | +23.14% | +41.19% |

Table 3: Number of context–profile pairs with Median–or–better and Best scores per measure.

<table>
<thead>
<tr>
<th>Runs</th>
<th>Median-or-better</th>
<th></th>
<th>Best</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P@5</td>
<td>MRR</td>
<td>TBG</td>
</tr>
<tr>
<td>DuTH_A</td>
<td>189</td>
<td>175</td>
<td>151</td>
</tr>
<tr>
<td>DuTH_B</td>
<td>209</td>
<td>206</td>
<td>185</td>
</tr>
</tbody>
</table>
Conclusions
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- Both approaches seem very promising
- DuTH_B performed better than DuTH_A
- Compared to other groups
  - DuTH_B scored almost firmly above the median (in P@5 and MRR)
  - DuTH_B achieved the best results in almost half of the judged context–profile pairs (at MRR)

Future work
- Failure analysis
- Further parameterize and tune the Rocchio–like approach
- Apply our suggestion methods in our funded ATLAS (Advanced Tourism PLAnning System) Project
Thank you, any questions?