Can Who-Edits-What Predict Edit Survival?

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Motivation

Online collaborative projects: Wikipedia, Linux, OpenStreetMap, ...

User bases of tens of thousands...

Goal:
- Predict quality of contributions
- Match contributors to suitable tasks

Existing Solutions

Specialized classifiers: Powerful yet brittle

• Features limited / not transferable
• Tools not always available (e.g. NLP for Turkish?)
• No consideration of item differentiation

Bridging the gap: INTERANK

Uses only who-edits-what data, based on discrete choice models
- Simple
- Powerful
- Easy-to-interpret
- Generalizable

\[ p_{ui} = \frac{1}{1 + \exp[-(s_u - d_i + x_u^T y_i + b)]] \]

User skill
Item difficulty
User & item embedding (in full variant)

Wikipedia

Performance: comparable to state-of-the-art specialized classifier.

Goal:
- Powerful
- Simple
- Match
- Predict
- only
bases

French Wikipedia

Goal: match contributors to suitable tasks.

Linux

Performance: Better performance than state-of-the-art specialized classifiers.

Interpreting the difficulty: The five most easy and difficult subsystems to contribute to, with their acceptance rate and number of developers.

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Subsystem</th>
<th>%Acc.</th>
<th>#Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2.664</td>
<td>usr</td>
<td>1.88%</td>
<td>70</td>
</tr>
<tr>
<td>+1.327</td>
<td>include</td>
<td>7.79%</td>
<td>101</td>
</tr>
<tr>
<td>+1.038</td>
<td>lib</td>
<td>15.99%</td>
<td>707</td>
</tr>
<tr>
<td>+1.013</td>
<td>drivers/clk</td>
<td>34.34%</td>
<td>81</td>
</tr>
<tr>
<td>+0.865</td>
<td>include/trace</td>
<td>17.73%</td>
<td>81</td>
</tr>
<tr>
<td>-1.194</td>
<td>drivers/addi-data</td>
<td>78.31%</td>
<td>8</td>
</tr>
<tr>
<td>-1.080</td>
<td>net/tipc</td>
<td>43.11%</td>
<td>44</td>
</tr>
<tr>
<td>-0.993</td>
<td>drivers/ps3</td>
<td>44.26%</td>
<td>9</td>
</tr>
<tr>
<td>-0.936</td>
<td>net/nfc</td>
<td>73.04%</td>
<td>26</td>
</tr>
<tr>
<td>-0.796</td>
<td>arch/mn10300</td>
<td>45.40%</td>
<td>63</td>
</tr>
</tbody>
</table>

Wikipedia

Performance: comparable to state-of-the-art specialized classifier.

Goal:
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French Wikipedia

Interpretation: The most controversial articles on French Wikipedia [Yasseri et al. 2014] and the percentile difficulty for our model.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Article Title</th>
<th>Percentile of ( d_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ségolène Royal</td>
<td>99.840%</td>
</tr>
<tr>
<td>2</td>
<td>Unidentified flying object</td>
<td>99.229%</td>
</tr>
<tr>
<td>3</td>
<td>Jehovah’s Witnesses</td>
<td>99.709%</td>
</tr>
<tr>
<td>4</td>
<td>Jesus</td>
<td>99.953%</td>
</tr>
<tr>
<td>5</td>
<td>Sigmund Freud</td>
<td>99.841%</td>
</tr>
</tbody>
</table>

Interpreting the latent terms: t-SNE plots of latent features from 80 French articles.

High culture vs. popular culture: Highest & lowest articles along the first PCA axis of latent vectors on the Turkish Wikipedia.

INTERANK at a glance

- Goal: predict edit quality in online collaborative projects
- Simple model, yet matches state-of-the-art predictive performance
- Evaluated on Wikipedia and Linux datasets
- Key feature - Interpretability: Easily discover insights into the project from model parameters

Code available at github.com/lca4/interank