Usability Related Qualities through Sentiment Analysis

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Problem

Qualities have antagonist relations of impact among them
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“the trade-off between usability and security is not completely secure” [1]

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Through Sentiment Analysis
Opportunity

To reuse content from GitHub through the finding of qualities, even with more precision by finding its interdependencies.
Strategy

Usability knowledges bases
3 catalogues used*

Related qualities extraction
using part of speech tagger

* [2][3][4]
Strategy

"...a number of factors external to EHRs may have considerable effects on usability, such as: regulatory requirements..."

Corpus of Usability Issues from GitHub

Big data information
145 issues descriptions*

Identifying qualities in issues using keyword in context

* [5]
Strategy

**usability** challenges will be defined as product features or situations in which the design and implementation of EHRs do not align with the cognitive

Location of correlated qualities
adjacency of two words

Interdependencies among qualities
through sentiment analysis
## Results

### Usability Correlated Qualities on Github Issues *

<table>
<thead>
<tr>
<th>Quality keywords</th>
<th>Correlation value</th>
</tr>
</thead>
<tbody>
<tr>
<td>cognitive</td>
<td>0.95</td>
</tr>
<tr>
<td>timeliness</td>
<td>0.95</td>
</tr>
<tr>
<td>appropriate</td>
<td>0.92</td>
</tr>
<tr>
<td>accessibility</td>
<td>0.43</td>
</tr>
<tr>
<td>usefulness</td>
<td>0.28</td>
</tr>
<tr>
<td>custom</td>
<td>0.34</td>
</tr>
<tr>
<td>security</td>
<td>0.13</td>
</tr>
</tbody>
</table>

*Corpus used for the query “usability+chat+messaging”. Sources at https://git.io/fNij6*
### Results

Words found to identify sentiment in Issues

<table>
<thead>
<tr>
<th>Adverbs</th>
<th>Modal Verbs</th>
<th>Verbs</th>
<th>Plural Nouns</th>
<th>SentiStrength (nouns and adj.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>not</td>
<td>should</td>
<td>reclaim</td>
<td>challenges</td>
<td>challenges</td>
</tr>
<tr>
<td>urgently</td>
<td>will</td>
<td>affect</td>
<td>effects</td>
<td>care</td>
</tr>
<tr>
<td>very</td>
<td>can</td>
<td>deal</td>
<td></td>
<td>lack</td>
</tr>
<tr>
<td>however</td>
<td>cannot</td>
<td>face</td>
<td></td>
<td>jail</td>
</tr>
<tr>
<td>potentially</td>
<td>would</td>
<td>agree</td>
<td></td>
<td>cumbersome</td>
</tr>
<tr>
<td>maybe</td>
<td>could</td>
<td>interrupt</td>
<td></td>
<td>poor</td>
</tr>
<tr>
<td>manually</td>
<td>may</td>
<td>improve</td>
<td></td>
<td>worthwhile</td>
</tr>
</tbody>
</table>

**Not identified by SentiStrength**

**Verbs/nouns identified by SentiStrength**

We could have identified if not filtered adjectives with suffixes “ity” or “ness”
Conclusion

- Finding chunks of text, where qualities are mentioned together presents the opportunity of looking for “sentiment” in this context.

- We envisage the possibility of speeding up the elicitation of possible conflicts among NFRs early on, as requirements engineers are acquainted with the domain.
5. All resources about this paper: https://github.com/nitanilla/Usability-Related-Qualities-through-Sentiment-Analysis
Usability Related Qualities through Sentiment Analysis

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