Research Methodology
Abstractive or Extractive?
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Metamodeling Email Threads
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- Open Source Systems vs Industrial Projects
- One-to-one emails vs mailing list archives
- Smallest, yet representative, samples

**Not Only Natural Language**
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- Stuck trace
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Scoring Extracted Parts

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Metamodeling Email Threads

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Not Only Natural Language

Alice wrote:

Dear users, after starting up argoUML on my MacOS X system (Java 2)
we experience a runtime exception very often. You'll find the
stack trace below. I hope someone knows a solution. Thanks a lot!

Exception in thread "main" java.lang.NoClassDefFoundError
at java.io.InputStreamnioDoFullRead0阋215(J dalvikvm-hours.java)
at at java.util.Scanner.<init>Scanner0(Scanner.java)
The problem is in the if condition, see the diff:

+ startMenu selectedItem = menu.getActiveItem() +
- String selectedItem = menu.getActiveItem().toString();

Probably MetaTree is also affected, if we please change it ! Cheers, Carl

Participants

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Task Difficulty
Extractive Summaries
Experiment
Experiment

System A

Thread with Stack
Thread with Code
Threads with NL
Thread with Patch

System B

Thread with Stack
Thread with Code
Threads with NL
Thread with Patch
Experiment

System A

Thread with Stack
Thread with Code
Threads with NL
Thread with Patch

System B

Thread with Stack
Thread with Code
Threads with NL
Thread with Patch

Thread 1.A
Thread 2.A
Thread 1.B
Thread 2.B
Experiment

System A
- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

System B
- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

Thread 1.A
Thread 2.A

Thread 1.B
Thread 2.B

Description of System A
Description of System B
Experiment
Experiment

System A
- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

System B
- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

Pre-test Questionnaire

Thread 1.A
Thread 2.A
Description of System A

Thread 1.B
Thread 2.B
Description of System B
Experiment
Experiment

System A
- Thread with Stack
- Thread with Code
- Thread with NL
- Thread with Patch

System B
- Thread with Stack
- Thread with Code
- Thread with NL
- Thread with Patch

Thread 1.A
Thread 1.B
Thread 2.A
Thread 2.B

Description of System A
Description of System B

Pre-test Questionnaire
Post-test Questionnaire
Experiment

System A

- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

System B

- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

Description of System A

- Thread 1.A
- Thread 2.A

Description of System B

- Thread 1.B
- Thread 2.B

Pre-test Questionnaire

Post-test Questionnaire
Experiment

System A

- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

System B

- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

Pre-test Questionnaire

Post-test Questionnaire

Description of System A

Description of System B

Thread 1.A

Thread 1.B

Thread 2.A

Thread 2.B
Experiment

System A
- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

System B
- Thread with Stack
- Thread with Code
- Threads with NL
- Thread with Patch

Description of System A
- Thread 1.A
- Thread 2.A

Description of System B
- Thread 1.B
- Thread 2.B

Pre-test Questionnaire

Post-test Questionnaire

Commit
Comments
Threads with NL
Threads with Stack
Threads with Code
Threads with Patch
Participants: 9 People

5 undergraduate students

2 graduate students

2 industrial programmers
Participants: Task

I. Complete the pre-test questionnaire
II. Select sentences from threads in system A
III. Select sentences from threads in system B
IV. Complete the post-test questionnaire
Thanks for your answer, but I'm not sure if I have understood your suggestions.

I have used swidget version add(LabelledLayout.getSeperator()); earlier and it worked fine.

However, after transfer to new ArgoUML version there was no error in code, but elements were not arranged in two columns any more.
<table>
<thead>
<tr>
<th>Sentence</th>
<th>Participant 1 Score</th>
<th>Participant 2 Score</th>
<th>Participant 3 Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thanks for your answer, but I'm not sure if I have understood your suggestions.</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I have used swidget version add(LabelledLayout.getSeperator()); earlier and it worked fine.</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>However, after transfer to new ArgoUML version there was no error in code, but elements were not arranged in two columns any more.</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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</tr>
<tr>
<td>-----------------------------------------------------------------------------------------------</td>
<td>---------------------</td>
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Metamodelling Email Threads
<table>
<thead>
<tr>
<th>Sentence</th>
<th>Participant 1 Score</th>
<th>Participant 2 Score</th>
<th>Participant 3 Score</th>
<th>Include?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thanks for your answer, but I'm not sure if I have understood your suggestions.</td>
<td>2</td>
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<td>1</td>
<td>5</td>
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<td>I have used swidget version add(LabelledLayout.getSeparator()); earlier and it worked fine.</td>
<td>0</td>
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<td>1</td>
<td>3</td>
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<td>0</td>
<td>0</td>
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</tr>
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</table>
Devising features

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<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Devising features

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID_AUTHOR</td>
<td>author of the sentence</td>
</tr>
<tr>
<td>ABS_POS_NORM</td>
<td>absolute position in the thread, normalized</td>
</tr>
<tr>
<td>CHARSi</td>
<td>number of characters</td>
</tr>
<tr>
<td>FIRST_AUTH</td>
<td>1 if written by the author with $id = 1$, otherwise 0</td>
</tr>
<tr>
<td>GREET</td>
<td>1 if a greeting, otherwise 0</td>
</tr>
<tr>
<td>IS_FIRST</td>
<td>1 if first of the email, otherwise 0</td>
</tr>
<tr>
<td>IS_LAST</td>
<td>1 if last of the email, otherwise 0</td>
</tr>
<tr>
<td>IS_QUESTION</td>
<td>1 if a question, otherwise 0</td>
</tr>
<tr>
<td>LAST_AUTH_ANSW</td>
<td>last author who answered to the sentence</td>
</tr>
<tr>
<td>LINES_ANSWRD</td>
<td>number of lines answered</td>
</tr>
<tr>
<td>LINK</td>
<td>1 if it contains a web link, otherwise 0</td>
</tr>
<tr>
<td>NUM_ADJECTS_NORM</td>
<td>number of adjectives, normalized</td>
</tr>
<tr>
<td>NUM_ANSWERS</td>
<td>number of answers received</td>
</tr>
<tr>
<td>NUM_CONSNTS_NORM</td>
<td>number of consonants, normalized</td>
</tr>
<tr>
<td>NUM_NOUNS_NORM</td>
<td>number of nouns, normalized</td>
</tr>
<tr>
<td>NUM_NUMS_NORM</td>
<td>number of digits, normalized</td>
</tr>
<tr>
<td>NUM_STOPW_NORM</td>
<td>number of stop-words, normalized</td>
</tr>
<tr>
<td>NUM_VERBS_NORM</td>
<td>number of verbs, normalized</td>
</tr>
<tr>
<td>NUM_VOCALS_NORM</td>
<td>number of vocals, normalized</td>
</tr>
<tr>
<td>NUM_WORDS</td>
<td>number of words</td>
</tr>
<tr>
<td>QUOTS</td>
<td>1 if it contains a citation or a quoted sentence, otherwise 0</td>
</tr>
<tr>
<td>REL_POS_NORM</td>
<td>relative position in the email, normalized</td>
</tr>
<tr>
<td>SUBJ_WORDS</td>
<td>number of words also in the subject, normalized</td>
</tr>
</tbody>
</table>

3.4 Benchmark creation

Once collected a sample of 72 human generated summaries during Round 1, we decided the names of the features to be used as attributes in the benchmark.

We added to this set the following features that would have been useful to classify the sentences during the machine learning phase.

- HMN_SCORE: score gained from the test
- BINARY_SCORE: 1 if the HMN_SCORE is different from 0, otherwise 0
- CLASS: "non-relevant" if BINARY_SCORE is 0, otherwise "relevant"

For every thread, we manually inserted all the original text in a CSV file (one sentence per line) and we annotate, for each participant that summarized the thread, a score of 2 points for the sentence if it has been marked as "essential", of 1 point if it has been marked as "optional", of 0 if it has not been extracted at all. Then we extract the value of each attribute from every sentence and we store everything in the same CSV file. When we completed this job, we have our benchmark ready and its aspect is similar to this (the complete view of all the attributes is in Appendix B.3):
Devising features

<table>
<thead>
<tr>
<th>ID_AUTHOR</th>
<th>ABS_POS _NORM</th>
<th>CHAR</th>
<th>SUBJ_WORDS</th>
<th>Include?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.2</td>
<td>80</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>0.49</td>
<td>92</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
<td>131</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Using Machine Learning for Feature Selection
Using Machine Learning for Feature Selection

chars

subj_words_norm

num_nouns_norm

num_verbs_norm

num_stopw_norm

rel_pos_norm
Classification Tree

```
num_stopw_norm
  <= 0.14
  num_verbs_norm
    <= 0.15
    non-relevant
    > 0.15
    chars
      <= 40
      num_verbs_norm
        <= 0.4
        non-relevant
        > 0.4
        rel_pos_norm
          <= 0.65
          relevant
          > 0.65
          non-relevant
  > 0.14
  subj_words_norm
    <= 0.04
    rel_pos_norm
      <= 0.48
      relevant
      > 0.48
      num_stopw_norm
        <= 0.63
        relevant
        > 0.63
        non-relevant
```
Implementation
Implementation

```java
package freenet.client.filter;

import java.io.BufferedReader;
import java.io.BufferedInputStream;

public class HTMLFilter implements ContentDataFilter, CharsetExtractor {
    // Code implementation...
}
```

A page with a chronological list of events, as they were when they were created, whether or not they've been dismissed?

Hmmmm... in the complex case, we only display the summary, so we can dismiss the summary and make the events go away with it.

In the simple case, an event is handled as an alert.

You want to be able to silence the event generator permanently?

You could do this on a per-event-generator basis by overriding onDismiss?

I'm not convinced.

You'd have to have a single object that represents the potential to create events, plus one object per actual events; unregister infinitely could run on the former.

But it may be better to just pass it on and keep the flag in the actual originator??

You'd have to do a load of refactoring of event generators either way...

@freenetproject.org http://emu.freenetproject.org/cgi-bin/mailman/listinfo/devl
Implementation
Participants: 9 People

- 5 undergraduate students
- 2 graduate students
- 2 industrial programmers

Scoring Table:

<table>
<thead>
<tr>
<th>Sentence</th>
<th>Participant 1 Score</th>
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<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>I have used excel2pip and add_input, but I get an error, and I had tried the</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>However, after transfer to a new ArgUML version, there were no errors to read, but the interface was not ergonomic in two situations any more.</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
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Experiment

Participants: 9 People

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Scoring

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<tbody>
<tr>
<td>...</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>...</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>...</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Devising features

Using Machine Learning for Feature Selection

chars
subj_words_norm
num_nouns_norm
num_verbos_norm
num_stopw_norm
rel_pos_norm
**Extractive Summaries**

**Corpus:** Open Source Mailing Lists

**Sentences**

**Experiment**

**Participants:** 9 People

- **5 undergraduate students**
- **2 graduate students**
- **2 industrial programmers**

**Scoring**

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<tbody>
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<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
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</table>

**Devising features**

- **char**
- **num_nouns_norm**
- **num_stopw_norm**
- **subj_words_norm**
- **num_verbs_norm**
- **rel_pos_norm**

**Using Machine Learning for Feature Selection**