A Competitive Environment for Exploratory Query Expansion

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The University of Waikato | New Zealand
Create a search engine that uses Wikipedia as a knowledge base

- Can Wikipedia’s structure help people locate information?
- How can Wikipedia’s structure be applied to the retrieval process?

→ interactive query expansion
Koru Structure

Related Topics

New Zealand
Challenge

- “we should work to design clever and creative techniques for encouraging users to be loquacious rather than reticent, both during their initial querying and during follow-up interactions”
  - Kelly and Fu (2007)
Games!

- http://images.google.com/imagelabeler/
- pairs of users try to attach labels to an image
  - Without seeing each other’s guesses
- Output = agreed labels for images
  - Useful data for image retrieval
- ‘Games with a Purpose’ (CMU)
  - http://www.gwap.com/
Two aims

- A game to help players identify
  - how good their searching skills are
  - how they stack up against other searchers
  - what can they do to improve their searching

- A dataset that captures effective query expansion behavior
Game environment

- Simplified version of Koru
  - Minus thesaurus-expansion assistance
- AJAX-based searching environment
  - XML SOAP
- Backed with a Greenstone 3 server
  - Lucene indexer
  - Separate database for usage data
Game environment 2

- Using tasks, documents and relevance judgments from *TREC Hard 2005*
  - *Aquaint* newswire corpus
  - Restrict to 20 tasks & 1 source (*NY Times*)
  - 4,700 documents, average length of 1200 words

- Scoring feedback
  - Explicit feedback based on F-measure
  - Highlighting of relevant surrogates
  - Scoreboards
Koru Game | interface

Searching is a task you probably perform every day, but have you ever stopped and thought:

- How good are my searching skills?
- How do they stack up against other searchers?
- What can I do to search better?

Well, this is where you find out.

Here you are going to interact with a search engine that already knows what you are looking for. You'll use it to investigate a range of topics, from death-row inmates to teenage pregnancy, and it will tell you exactly how good your searching skills are.

47 other searchers are already doing the same thing, so let's see how well you stack up!
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<tbody>
<tr>
<td>transportation tunnel disasters</td>
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<tr>
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<td>7th</td>
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<td>6th</td>
</tr>
<tr>
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<td>7th</td>
</tr>
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What disasters have occurred in tunnels used for transportation? A relevant document identifies a disaster in a tunnel used for trains, motor vehicles, or people. Wind tunnels and tunnels used for wiring, sewage, water, oil, etc. are not relevant. The cause of the problem may be fire, earthquake, flood, or explosion and can be accidental or planned. Documents that discuss tunnel disasters occurring during construction of a tunnel are relevant if lives were threatened.
Current Task: What disasters have occurred in tunnels used for transportation?

Query Results

Documents Tray

Best Query 159 pts

21st
Current Task: What disasters have occurred in tunnels used for transportation?

Query Results

Documents 1-10 of over 100

1. European Tunnels Faulted for Inadequate Rescue Systems
   - phosphorescence of an Alpine tunnel ... In the wake of the Mont Blanc and Tauern disasters

2. Fire Kills at Least 35 in Alps Tunnel Linking France and Italy
   - Fire kills at least 35 in Alps tunnel linking France and ... transportation from highways to railroads

3. Editorial: The Full Second Avenue Subway
   - Transportation Authority ... s new tunnel from the suburbs

4. Pataki's Economic Adviser Is Subpoenaed in Contract Inquiry
   - the Queens Midtown Tunnel in May 1997 ... Transportation Authority
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22 December 1999

EUROPEAN TUNNELS FAULTED FOR INADEQUATE RESCUE SYSTEMS

FRANKFURT, Germany _ Even self-assured drivers can feel pangs of anxiety after driving miles through the dusky phosphorescence of an Alpine tunnel.

But after two deadly tunnel fires this year _ 39 people killed in March in the Mont Blanc tunnel between France and Italy, and 12 people killed in May in an Austrian tunnel _ European officials have also become nervous.

In both cases, travelers were trapped in excruciating heat and poisonous smoke. It took rescue workers two days to control the Mont Blanc fire and 15 hours to extinguish the one in the Tauern tunnel in Austria.

Now, after numerous investigations, a growing number of European traffic experts argue that rescue systems are not always adequate.
FIRE KILLS AT LEAST 35 IN ALPS TUNNEL LINKING FRANCE AND ITALY
... FIRE KILLS AT LEAST 35 IN ALPS TUNNEL LINKING FRANCE AND...
... Transport Minister Jean

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... phosphorescence of an Alpine tunnel ... We have to train people

20 DIE IN CABLE CAR ACCIDENT IN FRENCH ALPS
... The accident was the worst cable car disaster in France ... highway tunnel March 24 under Mont Blanc in which 41 people

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<td>Query</td>
<td>Recall</td>
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<tr>
<td>transportation tunnel disasters</td>
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<tr>
<td>transportation tunnel disasters die</td>
<td>85%</td>
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<tr>
<td>(tunnel AND die)</td>
<td>23%</td>
</tr>
<tr>
<td>(tunnel AND die) OR (train AND die)</td>
<td>23%</td>
</tr>
<tr>
<td>(tunnel AND die)</td>
<td>23%</td>
</tr>
<tr>
<td>(tunnel AND die) OR (underground AND die)</td>
<td>23%</td>
</tr>
<tr>
<td>(tunnel AND (die OR hurt OR death OR damage))</td>
<td>62%</td>
</tr>
<tr>
<td>(tunnel AND (die OR hurt OR death OR damage)) NOT (power OR wind)</td>
<td>62%</td>
</tr>
<tr>
<td>(tunnel AND (die OR hurt OR death OR damage)) NOT (power OR wind OR &quot;carpal tunnel&quot;)</td>
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Deploying the Game

Deployed 3 places:

- on the Web
- in a 4th year CS class
- at a University Open Day for prospective students
In-class usage data

![Graph showing the relationship between queries issued and score. The x-axis represents queries issued, ranging from 0 to 2000. The y-axis represents score, ranging from 0 to 6000. The graph includes multiple data points marked with green circles.]
“I'd also like to thank you for allowing me to play this game. It really helped me learn about new techniques I can apply during my time on the internet that will help me acquire better search results.”

- Open Day participant
Game extension

- **1001 Paraphrases game**
  - Chklovski (2005)
  - uses partial obfuscations of previous (correct) user contributions
  - Koru: High scoring queries can be obfuscated, or degraded, and...
    - used as new starting points—or hints—for users who are scoring poorly
What makes a (good) game?

- Originality, freshness & replayability
- Surprise, equal opportunity (at start)
- Winning chances (until end)
- No early elimination
- Reasonable waiting times
- Creative control

[http://www.thegamesjournal.com/articles/WhatMakesaGame.shtml]
Recent ethnographic research in an alcohol-facilitated context:
- “must be a learning curve”
- “failing is fun”
- “you to fail at first”
- Games ≠ competitions
- “you have to learn something from failure”
Conclusion

Output dataset
not that large so far but is available
email David Milne: dnk2@cs.waikato.ac.nz

Game as a learning tool
possibly – but still early

Game as a dataset gatherer
yes – but too artificial?