

TREC-6 Interactive Track Report

Part 1: Experimental Procedure and Initial Results

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Introduction

The TREC-6 Interactive Track concentrated on Aspect-Oriented Retrieval: finding at least one document that covers each aspect of relevance to a given topic, as opposed to the usual information-retrieval task of simply finding documents containing as much information as possible about the topic. For this track, we at the Center for Intelligent Information Retrieval of the University of Massachusetts designed and ran our first-ever user study.

Hypotheses

We designed our systems with several hypotheses in mind about how best a system can help a user with aspect retrieval. The hypotheses that we were able to test in this experiment were:

1. A tool that is designed specifically to help the searcher keep track of aspects will be helpful.
2. A searcher will be likely to submit several queries on the same topic, so will benefit from a means for indicating which documents were seen on earlier queries.
3. Extracting the few most significant terms from a set of grouped documents (that represent an aspect) will help the searcher meaningfully label that aspect.
4. Ability to use a 3-D visualization will correlate with testable structural visualization ability.

Experimental Design

The TREC-6 interactive track experimental design specification [9] calls for six topics especially chosen from the TREC-6 adhoc topics and modified for use in the interactive track. The corpus consists of newspaper articles from the Financial Times of London 1991-1994, approximately 200,000 articles in all. This corpus is a subset of the TREC collection[5]. The basic experimental design calls for four participants, each running all six topics, but three with the control system and three with the experimental system. The order of

This material is based on work supported in part by the National Science Foundation, Library of Congress and Department of Commerce under cooperative agreement number EEC-9209623. This material is also based on work supported in part by the National Science Foundation, Central Intelligence Agency, Department of Defense (DARPA) and National Security Agency under grant number IRI-9619117.

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Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 2005		2. REPORT TYPE		3. DATES COVERED -	
4. TITLE AND SUBTITLE TREC-6 Interactive Track Report. Part 1: Experimental Procedure and Initial Results				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Defense Advanced Research projects Agency,3701 North Fairfax Drive,Arlington,VA,22203-1714				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT see report					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 33	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

topics is held the same for all participants but the systems are alternated: half use the control system first, and half use the experimental system first.

This basic design leads to six 2x2 Latin squares to estimate the difference between the control and experimental systems. We augmented the design as suggested by the specification, namely by adding more participants in groups of four to replicate the 4x6 design, and by adding a second experimental system and using the same 4x6 design for it. The basic design and these augmentations account for our groups 1 through 4. In addition, we had a fifth group use both experimental systems and no control system; this was not part of the experiment proper, and this group's searches will not affect results tabulated by NIST—though documents they chose will be judged by the NIST assessors. (See Table 1.)

Experimental Systems

As required by NIST, we ran their ZPRISE as a control system; the two experimental systems were basic and extended versions of one program. The extended version (“AspInquery Plus”) simply added a 3-D window to the basic system (“AspInquery”). Both versions use the well-known Inquery search engine. The core of our user interface has much in common with the ZPRISE interface, differing in two significant ways: ZPRISE displays the query terms contained in a document after the headline but our system does not, and our system color codes whether a document has been viewed but ZPRISE does not. Specifically, we write the headline information of a document in blue if it has not been viewed before, and purple if it has been seen. (This scheme was modeled after the default color scheme Web browsers use to show if a hypertext link has been followed or not.)

Both ZPRISE and our system accept plain text input for queries. Our system also supports a phrase operator, invoked by placing terms together within double quotes (e.g., "balanced budget"). The phrase operator increases the ranking assigned to documents where all terms in the phrase are found in close proximity. (In reality, our system supports the full syntax of Inquery, dozens of operators in all, but this is the only one we told participants about.)

Aspect Window

With a basic IR system, an analyst may be able to find the documents containing various aspects, but he or she has to use another window or a piece of paper to keep track of what has been found already. We implemented an “aspect window” tool to help with this task. The idea is to provide an area where documents on a particular aspect can be stored. To help label the information, statistical analysis of word and phrase occurrences is used to decide what terms and phrases are most distinctive about a document or set of documents in an aspect. We provided an area for the user to manually assign additional keywords or labels if needed.

Each area of the aspect window has a colored border, a text field at the top for entering a descriptive label, and an automatically generated list of the five noun phrases that most distinguish the group of documents assigned to this aspect from the remainder of the collection. The description field is solely for the user's convenience and need not be filled. If the user wants a description they can type or paste into it, or drag automatically generated phrases into it. Figure 1 shows an example of the aspect window. The system shows two groups of documents (two aspects) already identified and a third area waiting for the next aspect. The first aspect contains one document, 91512. The user entered this document into the aspect by dragging a listed document from the ranked list display (part of the basic interface) into the aspect's document list. The system then analyzed the selected document and found five phrases that describe the aspect: the four shown are “alzheimer”, “app”, “dementia”, “brain”, and the phrase “brain cell”. The analyst did not find those phrases

descriptive enough, so he or she manually inserted the term “velnacrine”. For the second aspect the automatically identified term “sumatriptan” is an adequate descriptor.

The purpose of the aspect window is to assist the user in categorizing the information as it is discovered, and to keep an overview of the information discovered so far. In an aspect-oriented or briefing type setting this step is required for the task to be completed properly, but to our knowledge no systems have been built so far which provide any assistance for this task.

Visualization: 3-D Window

Another important step in the aspect oriented retrieval task is deciding (repeatedly) which document to look at next. In a ranked retrieval system the documents are presented in the order of probability of relevance, so the user is more likely to encounter relevant documents at the top of the list than further down. Nearly always the headline is used to decide if the full text is worth reviewing or not. Some systems [6, 11], ZPRISE among them, give information about the query terms that appear in the document, expecting that they can be used to help decide whether to investigate further. But for an aspect retrieval task, the deciding point of whether to investigate a document further is not the information content, but the marginal information content—i.e., the information content in the context of what has already been seen. We believe that documents that are similar in terms of information content will also be lexically similar. The Cluster Hypothesis [10] states that relevant documents tend to cluster, and it has been shown to be valid in top-ranked documents [3, 7]. Aspects represent different forms of relevance, and we believe that they will group together within the set of relevant documents.

AspInquery Plus compares documents in an extremely high-dimensional space (approximately 400,000 for this collection) where each dimension corresponds to a feature in the collection and the distance was measured by the sine of the angle between the vectors. That space was collapsed to three dimensions for visualization using a spring embedding algorithm [8]. The interface included a slider for adjusting the threshold that determined the tightness of the generated clusters. The resulting visualization is similar in style to BEAD [2], differing in a few key aspects: BEAD was used on an entire (though small) corpus, and this display is used only on the retrieved set; the vectors used by BEAD were based on document abstracts but the vectors used by this display are based on full text.

Documents that are nearby in 3-space are generally nearby in the high dimensional space also (though the spring embedding dimensional reduction occasionally forces unrelated documents to be near one another), meaning that they share information content to a considerable degree. For that reason, the 3-D display provides the user with information about whether the document is worth investigating further, helping the user to sort through documents more quickly. Documents that have not been assigned to any aspect have the same blue/purple (read/unread) color scheme that is used in the main window. Documents in the 3-D window are persistent between queries: when new documents are retrieved they are colored light blue (light purple when read) and are placed in the 3-D window by the forces exerted from already placed documents. Figure 2 shows five newly retrieved documents in light gray. It is easy to see that three of these documents fall into a group of two previously seen documents (upper right of figure) and the other new documents fall into the small group in the upper left and the large group. An analyst who is under time pressure could use the 3-D display to decide that the unjudged document near that aspect is probably on the same aspect and so not worth examining. A retrieved document that is far from any already-marked aspect is more likely to be useful. (We have been investigating variations on the visualization that enhance the ability for a user to find new and interesting material. [1])

The three windows—result list, aspect, and 3-D—were tightly integrated. If a document is selected by a mouse click in any of the three windows, that document is highlighted in all windows in which it is visible. A document can be opened for viewing by double clicking in any of the three windows. The colors were coordinated between the windows: if a document has been saved to an aspect, that aspect's color is assigned to the document in the 3-D window and also placed before the document in the list.

Participants

We were interested in how librarians perform search tasks as compared to a more general user population. To that end, we recruited 20 participants: eight librarians and 12 general users. Table 1 shows the types of participants in and the systems used by the different groups in the experiment.

The librarians were enlisted via personal contacts. All were staff members at the University of Massachusetts/Amherst; all had MLS degrees, and several had an additional graduate degree. Seven of the eight librarians were over forty (the eighth was in their twenties). Six of the librarians were women and two were men. The librarians had very substantial experience with online searching, over periods ranging from 2 to 20 years and averaging 10. Furthermore, they had considerable experience in every category of searching we asked about (library catalogs, CDROMs, commercial services, and the WWW). They had relatively little experience with ranked lists or relevance feedback.

Of the general participants, 10 were recruited by flyers distributed on campus, while the other two were neighbors of a staff member. (We actually had over 20 responses to the flyers; we accepted volunteers on a first come/first served basis.) In most ways this was a very diverse group: the 10 recruited via flyers were all students, ranging from undergraduates to a post-doctoral student; the neighbors both had college degrees but no current academic connection. (None of the general participants had a degree in library science, and none was employed as a librarian.) However, these people were much younger than the librarians: except for a woman in her forties, who was assigned to group 5 and hence will not affect the official NIST results, the oldest participant was in their thirties. Five were women and seven were men. These people had far less experience with online searching than the librarians: one had no such experience, while the most experienced had 5 years and the average was 2.75. They had significantly less experience than the librarians in searching CDROMs and commercial services, and with ranked lists and relevance feedback.

See Appendix 2 for detailed characteristics of the searchers.

Participants were told that the study would take about 3-1/2 hours and that they would be paid \$35 if they completed it. While 20 people completed the study, one general participant did not: as a result of system problems, the experimenter ended his session early. The incomplete data we gathered for this participant is not included here.

Group	Type	Control	Experimental	Size
1	General	ZP	AI	4
2	Librarian	ZP	AI	4
3	General	ZP	AI+	4
4	Librarian	ZP	AI+	4
5	General	AI	AI+	4

Table 1. Experimental Setup

Procedures

The experiment was run in our usability laboratory on the University of Massachusetts/Amherst campus. A “facilitator” was in the room with the participant all of the time except while the participant was doing the tutorials; the procedure the facilitator followed is given by the checklist in Appendix 1. The same person acted as facilitator for all participants except for the last two in group 5.

First, each participant filled out a questionnaire to give us basic demographic information (age, gender, degrees, general computer experience, experience with various types of searching, etc.). Each participant also took two standard psychometric tests from ETS [4]: a test of verbal fluency (Controlled Associations, test FA-1), and a test of structural visualization (Paper Folding, test VZ-2).

Next, the participant was given a tutorial to learn one system, then they worked on the first three topics. After a short break they were given a tutorial on another system, then they worked on the other three topics. Each search had a 20-minute time limit, and the participant was instructed to stop the search if they had not finished in 20 minutes.

We gave each participant a piece of scratch paper before each search, and a short questionnaire after each. After all the searches were finished the participant was given a final questionnaire, and then “debriefed”. The study was conducted single blind: the participants were not told until the debriefing which system was the control and which was the experimental system.

We ran each participant through the entire study in a single essentially continuous period of slightly over three to slightly over four hours, with no breaks longer than about 15 minutes.

Grading the Tests

The Paper Folding test is multiple choice, and grading it posed no problems. However, the Controlled Associations test asks the subject to come up with a list of words with meanings “the same as or similar to” a given word: clearly, this is an open-ended question. For each of the given words, ETS supplies a list of from 22 to 65 acceptable words, but participants used many additional words. To score these, first, four persons (the present authors and the wife of one author) separately judged which of the additional words should be accepted. Then the present authors met and reviewed the four lists of acceptable words. Where three or all four judges agreed, we followed the unanimous or majority opinion; where two judges would accept a term and two would not, we discussed it and reached a consensus one way or the other.

To obtain the list of additional words we accepted for each given word, contact one of the authors.

Appendix 1. Facilitator's Checklist

Before each participant comes:

- Consider sending e-mail to all IR lab people, asking them to go easy on the test machine.
- Make sure the test room is properly set up and reasonably neat.
- Make sure the computer is ready: login to the test computer.
- Make sure the camcorder and cassette recorder are on and each contains a properly-positioned and labelled tape. Check that the computer's entire screen is visible thru the camcorder's lens.
- Make sure the documentation is in place: tutorials for ZPRISE, AspInquery, AspInquery Plus; task instructions; search topics; sample payment forms.
- Have a pad and pens/pencils for taking notes, plus a stopwatch.
- Have an ink pen ready for participant to sign the consent form.
- Check the folder for participant. It should contain:
 - Payment forms
 - Form 1. informed consent form
 - Form 2. entry ("PRE-SEARCH") questionnaire
 - Controlled Association test
 - Paper Folding test
 - Form 3. interview form
 - Form 4. six (6) searcher (aspect) worksheets
 - Form 5. six (6) post-search questionnaires
 - Form 6/6p. exit questionnaire (version for AI or AIP, as appropriate)

At the beginning of each test session:

- Greet participant; check their name to be sure they're the one we expect.
- Show participant where to sit.
- Make participant comfortable. Offer coffee, juice, snacks.
- Show participant the video camera and cassette recorder. Tell them someone will be watching the video live and may make a few comments.
- Ask participant to fill out both payment forms. Tell them they may not be paid for a few weeks.
- Ask participant to read and sign the informed consent form.
- Ask participant to fill out the entry questionnaire.
- Give participant the Controlled Associations test (6 min./page).
- Give participant the Paper Folding test (3 min./page).
- Give participant the task instructions.
- Give participant the interview form.
- Start zprise, AspInquery, or AspInquery Plus (commands are respectively zp, ai, aip); if zprise, also connect to the database.
- Move participant to the computer, and give them the tutorial for the first system.

- Have participant click the appropriate reset button (in zprise, “Stop search, clear results”; in our systems, “Reset”).
- Ask if participant has any questions (or wants a break).
- Remind participant to think out loud, including saying what they like or dislike; tell them why we want them to do this.
- Remind participant to wait for you to say when to start the first task, to tell you when he or she has finished the first task, and then to wait for you to say when to start the second task.
- Tell participant not to write on the list of topics, and offer them a worksheet.

For $n = 1$ to 6 do:

- Check time left on videotape; if less than 25 min., change it.
- If $n=1$ or 4, start the camcorder.
- Offer participant a worksheet (unless they have a clean one from a previous search; in that case, remind them that they have one).
- Have participant start the next search.

Allow 20 minutes for each search. At the end:

- Have participant click the appropriate reset button (in zprise, “Stop search, clear results”; in our systems, “Reset”).
- Ask participant to fill out a post-search questionnaire.
- If $n = 3$, stop the camcorder; switch to the second test system and give participant the tutorial for it.

End do.

- Stop the camcorder. Start the cassette recorder.
- Ask participant to fill out the exit questionnaire.
- Thank participant for his or her help.
- Debrief participant. Go over their responses to the exit questionnaire.
- Thank participant, and show him or her out.

After participant leaves:

- Stop the cassette recorder.
- Put all the forms in participant’s folder.
- Check that the video and audio tapes are properly labelled and put them away.

Appendix 2. Detailed Characteristics of Participants

The following is a summary of the participants' responses to the Entry questionnaire.

A. General information. For Education, we show only the highest level achieved by each participant.

	Librarians	General	Total
Education:			
Undergraduate	-	6	6
Bachelor's degree	-	1	1
Master's student	-	1	1
Master's degree	7	2	9
Doctoral student	-	1	1
Doctoral degree	1	1	2
Age:			
Under 21	-	3	3
21-30	1	7	8
31-40	-	1	1
41-50	5	1	6
51-60	2	-	2
Over 60	-	-	-
Male/Female	2 Male / 6 Female	7 Male / 5 Female	9 Male / 11 Female

B. Computer and searching experience. All figures given are means followed by medians ("mean, median"). Except for "Years searching", all are on a scale of 1 to 5, with 1 = none, 5 = a lot.

	Librarians	General	Total
Computer usage	3.63, 3	3.92, 4	3.8, 4
Years searching	10.0, 8.5	2.75, 2.25	5.65, 4
Search library catalogs	4.63, 5	3.67, 4	4.05, 4
Search CDROMs	3.88, 4.5	2.42, 2	3.0, 3
Search commercial services	3.63, 4	1.33, 1	2.25, 2
Search the WWW	3.5, 3.5	3.75, 4	3.65, 4
Search other	2.0, 1	1.57, 1	1.73, 1

Full-text databases	3.0, 3	2.75, 2.5	2.85, 3
Ranked output	2.75, 3	1.73, 1	2.16, 2
Relevance feedback	2.38, 2.5	1.58, 1	1.9, 1.5
Mouse-based interface	3.63, 3.5	4.42, 4.5	4.1, 4
3-D interfaces	1, 1	2.1, 1.5	1.65, 1

Appendix 3. Test Scores

The following is a summary of the participants' responses to the psychometric tests. Figures given are means followed by medians ("mean, median").

	Librarians	General	Total
Controlled Associations (FA-1)	38.125, 35.5	27.25, 26.5	31.6, 32
Paper Folding (VZ-2)	9.375, 9.125	10.79, 12	10.23, 10.88

Appendix 4. Protocol for One Topic

Following is the log of the interaction for Participant 13, Topic 1 (326i). Spoken words are shown in italics. “U:” (for “User”) precedes remarks and actions by the participant; “F:” precedes remarks by the Facilitator.

Time set at Tue Aug 12 09:24:57 1997

query is ferry sinking casualties

Query is: ferry sinking casualties

bl->term_freq = 0, default_belief = 0.400000, totalhits = 2932

bl->doc_cnt = 20

24 s Tue Aug 12 09:25:21 1997

Number of docs found is 20

1: 177935: FT943-312: FT 30 SEP 94 / Ferries in six 'near accidents': Finland and Sweden order checks after Estonia sinking

2: 205199: FT944-15661: FT 17 OCT 94 / World News in Brief: Bangladesh ferry sinks

3: 174281: FT943-178: FT 30 SEP 94 / Leading Article: Defying the cruel sea

4: 204595: FT944-15057: FT 20 OCT 94 / Improved ferry safety urged

5: 194241: FT944-5773: FT 02 DEC 94 / World News in Brief: Manila ferry sinks

6: 200503: FT944-11367: FT 07 NOV 94 / Pounds 45m car-ferry research planned

7: 199238: FT944-10102: FT 12 NOV 94 / Tighter ferry rules proposed

8: 208111: FT944-18217: FT 05 OCT 94 / World News in Brief: Check on ferries ordered

9: 200184: FT944-11048: FT 08 NOV 94 / Bow doors faulty on 33% of ferries using UK ports: Government to increase safety checks on vessels

10: 208769: FT944-18875: FT 01 OCT 94 / What future for the ferry?: Questions raised by the Baltic tragedy

11: 178166: FT943-543: FT 29 SEP 94 / Bow doors leak reported after 800 die in Baltic ferry sinking

12: 193552: FT944-5084: FT 06 DEC 94 / Ro-ro ferry study agreed

13: 75524: FT931-8485: FT 19 FEB 93 / Crowded ferry sinks off Haiti

14: 199245: FT944-10109: FT 12 NOV 94 / Tighter ferry rules proposed

15: 193716: FT944-5248: FT 05 DEC 94 / Sea safety review focuses on ferries

16: 178159: FT943-536: FT 29 SEP 94 / Safety rules that failed the Estonia: It was a modern ship, well maintained and partly Swedish owned. But are even the best ro-ro ferries vulnerable?

17: 177939: FT943-316: FT 30 SEP 94 / Ferries face calls for safety curbs: Estonia disaster brings reports of other 'near accidents'

18: 199989: FT944-10853: FT 09 NOV 94 / Eurotunnel hits at government on ferry safety

19: 39232: FT923-4546: FT 05 SEP 92 / Swan wins order for Tyne ferry

20: 39203: FT923-4517: FT 05 SEP 92 / Ferry order for Tyne yard

38 s, Reading doc 177935:FT943-312, click from main win, time Tue Aug 12 09:25:35 1997

0:42 U: *OK, so my first article is about a ferry that sank and 900 people died.*

71 s, Reading doc 177935:FT943-312, click from main win, time Tue Aug 12 09:26:08 1997

Doc number 177935 added to aspect 0

Aspect # 0, auto terms are estonia "estonia sink" forsberg "estonia disaster" "bow section"

No user supplied text

1:18 U: *This article describes six incidents.*

1:30 F: *Six incidents of ferry sinkings?*

U: *Right.*

1:48 U: *Oh, talks about six near accidents and it describes one that actually happened.*

148 s, Reading doc 205199:FT944-15661, click from main win, time Tue Aug 12 09:27:25 1997
Doc number 205199 added to aspect 1

2:30 U: *This is a brief article about 400 people that dies in Bangladesh so we'll save that, and the name ... we'll name that one Bangladesh.*

Aspect # 1, auto terms are "ferry sink" "ferry disaster" "wedding party" "high sea" bangladesh

U: drags "bangladesh" into label area

197 s, Reading doc 174281:FT943-178, click from main win, time Tue Aug 12 09:28:14 1997

3:18 U: *Here's another article about the Estonia incident. It's a repeat so I don't need to save that, or should I save that also under*
F: *No, there's no need, there's no point to saving additional ones.*

224 s, Reading doc 204595:FT944-15057, click from main win, time Tue Aug 12 09:28:41 1997

3:45 U: *This one just talks about the Estonia again, so we don't need that.*

232 s, Reading doc 194241:FT944-5773, click from main win, time Tue Aug 12 09:28:49 1997

3:53 U: *And the fifth one is in Manila, 480 people were on it, 275 were rescued, and they're still picking up survivors, so you can probably assume 100 people died, so go ahead and save it.*

Doc number 194241 added to aspect 2

Aspect # 2, auto terms are "ferry sink" "cargo ship" manila sink survivor

U: drags "manila" into label area

267 s, Reading doc 200503:FT944-11367, click from main win, time Tue Aug 12 09:29:24 1997

272 s, Reading doc 199238:FT944-10102, click from main win, time Tue Aug 12 09:29:29 1997

4:34 U: *A lot of these keep talking about tighter regulations due to the sinking of the Estonia.*

288 s, Reading doc 200184:FT944-11048, click from main win, time Tue Aug 12 09:29:45 1997
Doc number 200184 added to aspect 3

Aspect # 3, auto terms are "bow door" "marine safety agent" ferry "safety agent" "dr mawhinney"

4:57 U: *Here's one that briefly mentions a ship...*

5:09 U: *This one again is more about safety regulations, but it briefly mentions a ship that had 193 casualties, so I guess I'll type in my own word since the one I want isn't in there.*

U: types "Herald of Free Enterprise" in label area.

5:38 U: *I'm trying to name all these either by the name of the ship or where it happened.*

U: moves controls on 3-D window and alters view several times.

5:54 U: *I'm trying to see if I can use the 3-D to help me out*

F: *I'm sorry, you couldn't couldn't what...You're trying to see if*

U: *I'm trying to see if I can use this to give me ... I'm assuming that these are supposed to show articles in the connecting blocks that are more relevant*

F: *That are more similar to each other*

U: *More similar.*

407 s, Reading doc 208769:FT944-18875, click from main win, time Tue Aug 12 09:31:44 1997

421 s, Reading doc 178166:FT943-543, click from main win, time Tue Aug 12 09:31:59 1997

448 s, Reading doc 193552:FT944-5084, click from main win, time Tue Aug 12 09:32:25 1997

454 s, Reading doc 75524:FT931-8485, click from main win, time Tue Aug 12 09:32:31 1997

Doc number 75524 added to aspect 4

Aspect # 4, auto terms are "ferry sink" port-au-prince neptune haiti "product centre"

U: drags "neptune" into label area

485 s, Reading doc 199245:FT944-10109, click from main win, time Tue Aug 12 09:33:02 1997

491 s, Reading doc 193716:FT944-5248, click from main win, time Tue Aug 12 09:33:08 1997

493 s, Reading doc 177939:FT943-316, click from main win, time Tue Aug 12 09:33:10 1997

500 s, Reading doc 199989:FT944-10853, click from main win, time Tue Aug 12 09:33:17 1997

505 s, Reading doc 39232:FT923-4546, click from main win, time Tue Aug 12 09:33:22 1997

512 s, Reading doc 39203:FT923-4517, click from main win, time Tue Aug 12 09:33:29 1997

8:32 U: *So I went through all 20 of the articles. For the most part I'd say all but probably 3 or 4 talked about accidents with over 100 casualties, so should I try a new search?*

F: *It's up to you. You have plenty of time.*

U: *You mean try a different wording of it?*

F: *It's up to you.*

9:20 F: *You could also try raising the max docs.*

U: *OK.*

query is ferry sinking casualties

Query is: ferry sinking casualties

bl->term_freq = 0, default_belief = 0.400000, totalhits = 2932

bl->doc_cnt = 40

574 s Tue Aug 12 09:34:31 1997

Number of docs found is 40

1: 177935: FT943-312: FT 30 SEP 94 / Ferries in six 'near accidents': Finland and Sweden order checks after Estonia sinking

2: 205199: FT944-15661: FT 17 OCT 94 / World News in Brief: Bangladesh ferry sinks

3: 174281: FT943-178: FT 30 SEP 94 / Leading Article: Defying the cruel sea

4: 204595: FT944-15057: FT 20 OCT 94 / Improved ferry safety urged

5: 194241: FT944-5773: FT 02 DEC 94 / World News in Brief: Manila ferry sinks
 6: 200503: FT944-11367: FT 07 NOV 94 / Pounds 45m car-ferry research planned
 7: 199238: FT944-10102: FT 12 NOV 94 / Tighter ferry rules proposed
 8: 208111: FT944-18217: FT 05 OCT 94 / World News in Brief: Check on ferries ordered
 9: 200184: FT944-11048: FT 08 NOV 94 / Bow doors faulty on 33% of ferries using UK ports: Government to increase safety checks on vessels
 10: 208769: FT944-18875: FT 01 OCT 94 / What future for the ferry?: Questions raised by the Baltic tragedy
 11: 178166: FT943-543: FT 29 SEP 94 / Bow doors leak reported after 800 die in Baltic ferry sinking
 12: 193552: FT944-5084: FT 06 DEC 94 / Ro-ro ferry study agreed
 13: 75524: FT931-8485: FT 19 FEB 93 / Crowded ferry sinks off Haiti
 14: 199245: FT944-10109: FT 12 NOV 94 / Tighter ferry rules proposed
 15: 193716: FT944-5248: FT 05 DEC 94 / Sea safety review focuses on ferries
 16: 178159: FT943-536: FT 29 SEP 94 / Safety rules that failed the Estonia: It was a modern ship, well maintained and partly Swedish owned. But are even the best ro-ro ferries vulnerable?
 17: 177939: FT943-316: FT 30 SEP 94 / Ferries face calls for safety curbs: Estonia disaster brings reports of other 'near accidents'
 18: 199989: FT944-10853: FT 09 NOV 94 / Eurotunnel hits at government on ferry safety
 19: 39232: FT923-4546: FT 05 SEP 92 / Swan wins order for Tyne ferry
 20: 39203: FT923-4517: FT 05 SEP 92 / Ferry order for Tyne yard
 21: 207852: FT944-17958: FT 05 OCT 94 / Finns order ro-ro bow doors welded shut
 22: 169325: FT942-14757: FT 19 APR 94 / Letters to the Editor: Channel control overdue
 23: 207851: FT944-17957: FT 05 OCT 94 / UN maritime agency panel to review safety: A look at action prompted by the Baltic ferry disaster
 24: 208393: FT944-18499: FT 04 OCT 94 / Baltic ferry operators to weld bow doors shut: Safety move follows confirmation of cause of Estonia disaster
 25: 208098: FT944-18204: FT 05 OCT 94 / Maritime agency in safety plan
 26: 208402: FT944-18508: FT 04 OCT 94 / Estonia's bow doors were torn off in heavy storm: Video of sunken ferry shows how water flooded car deck
 27: 204681: FT944-15143: FT 19 OCT 94 / Estonia's missing bow door located
 28: 200149: FT944-11013: FT 08 NOV 94 / International Company News: Heavy loss in US pushes Trygg-Hansa into the red - Swedish insurer posts SKr813m deficit at nine months
 29: 141158: FT941-5434: FT 07 MAR 94 / Freight companies to shun Channel tunnel
 30: 208832: FT944-18938: FT 01 OCT 94 / UN agency orders ferry probe: Estonia's bow doors may have been torn off in storm, Swedish authorities say
 31: 178158: FT943-535: FT 29 SEP 94 / Tragedy leaves Swedes in shock
 32: 171243: FT942-16675: FT 08 APR 94 / Survey of East Kent (7): Pain amid the gain - The ferries fight back
 33: 195783: FT944-6974: FT 26 NOV 94 / Thinking the unsinkable: The modern parallels exposed by an exhibition about the Titanic, which sank in 1912
 34: 205276: FT944-15738: FT 17 OCT 94 / Company News This Week: Departure delays leave investors counting the cost - Eurotunnel
 35: 137406: FT934-1954: FT 16 DEC 93 / Technology: Ships bridge the danger gap - Andrew Fisher concludes a series on transport safety with an investigation into innovations that may help prevent sea disasters and give clues to their causes
 36: 127095: FT934-8445: FT 16 NOV 93 / Corporate bankruptcies increase as demand sinks
 37: 1655: FT911-4602: FT 18 APR 91 / MMC to investigate Isle of Wight ferries
 38: 206611: FT944-1600: FT 19 DEC 94 / Survey of Sweden (14): A remarkable comeback - Profile: Stena Line
 39: 26988: FT922-7334: FT 19 MAY 92 / World Trade News: Denmark-Sweden ferry link-up is agreed
 40: 119826: FT933-1606: FT 23 SEP 93 / Ferry operator in link with Belgium

U: Several 3-D interactions

Reading doc 200503: FT944-11367, click from 3-D window

642 s, Reading doc 207852:FT944-17958, click from main win, time Tue Aug 12 09:35:39 1997

652 s, Reading doc 169325:FT942-14757, click from main win, time Tue Aug 12 09:35:49 1997

661 s, Reading doc 207851:FT944-17957, click from main win, time Tue Aug 12 09:35:58 1997

11:11 U: *So I increased the maxdocs from 20 to 40, and most of the later articles don't seem to really have much relevant information. Either they're talking about the Estonia or they're just talking about general safety regulations.*

678 s, Reading doc 208393:FT944-18499, click from main win, time Tue Aug 12 09:36:15 1997

701 s, Reading doc 208098:FT944-18204, click from main win, time Tue Aug 12 09:36:38 1997

11:45 U: *I'm guessing that's why there's this big network here. (Points to large cluster of documents in 3-D viewer.) A lot of them are talking about the Estonia so I think they're all related in that sense.*

723 s, Reading doc 208402:FT944-18508, click from main win, time Tue Aug 12 09:37:00 1997

734 s, Reading doc 204681:FT944-15143, click from main win, time Tue Aug 12 09:37:11 1997

737 s, Reading doc 200149:FT944-11013, click from main win, time Tue Aug 12 09:37:14 1997

744 s, Reading doc 141158:FT941-5434, click from main win, time Tue Aug 12 09:37:21 1997

12:32 U: *Yeah this is really starting to get ... My query is "ferry sinking", and in this article the word "sink" only appears once, and it doesn't have anything to do with ferries, and there's nothing about casualties so it looks like we're getting farther and farther away from anything relevant. You can see that over here, we're moving further away from this point. (Points to several documents in 3-D view)*

775 s, Reading doc 208832:FT944-18938, click from main win, time Tue Aug 12 09:37:52 1997

800 s, Reading doc 171243:FT942-16675, click from main win, time Tue Aug 12 09:38:17 1997

813 s, Reading doc 195783:FT944-6974, click from main win, time Tue Aug 12 09:38:30 1997

822 s, Reading doc 205276:FT944-15738, click from main win, time Tue Aug 12 09:38:39 1997

827 s, Reading doc 137406:FT934-1954, click from main win, time Tue Aug 12 09:38:44 1997

13:49 U: *OK, I've found a new one.*

Doc number 137406 added to aspect 5

Aspect # 5, auto terms are moby imo vessel livorno ship

U: drags "livorno" into label area

14:06 U: *This is the first new article I've found in the last 20 I've looked at.*

868 s, Reading doc 127095:FT934-8445, click from main win, time Tue Aug 12 09:39:25 1997

872 s, Reading doc 1655:FT911-4602, click from main win, time Tue Aug 12 09:39:29 1997

876 s, Reading doc 206611:FT944-1600, click from main win, time Tue Aug 12 09:39:33 1997

884 s, Reading doc 26988:FT922-7334, click from main win, time Tue Aug 12 09:39:41 1997

892 s, Reading doc 119826:FT933-1606, click from main win, time Tue Aug 12 09:39:49 1997

15:00 F: *You have five minutes.*

15:23 U: *We'll try searching for ferry and accidents.*

query is ferry accident

Query is: ferry accident

bl->term_freq = 0, default_belief = 0.400000, totalhits = 1978

bl->doc_cnt = 40

932 s Tue Aug 12 09:40:29 1997

Number of docs found is 40

- 1: 174533: FT943-3295: FT 15 SEP 94 / Inquiry starts after six die in ferry walkway collapse
- 2: 42744: FT923-7671: FT 15 AUG 92 / Deaths ferry to be withdrawn
- 3: 149044: FT941-12581: FT 29 JAN 94 / Accident halts ferry services
- 4: 72637: FT931-5947: FT 03 MAR 93 / World News in Brief: Congo ferry toll rises to 146
- 5: 177935: FT943-312: FT 30 SEP 94 / Ferries in six 'near accidents': Finland and Sweden order checks after Estonia sinking
- 6: 186187: FT943-1246: FT 26 SEP 94 / World News in Brief: 16 injured in lifeboat accident
- 7: 208393: FT944-18499: FT 04 OCT 94 / Baltic ferry operators to weld bow doors shut: Safety move follows confirmation of cause of Estonia disaster
- 8: 208402: FT944-18508: FT 04 OCT 94 / Estonia's bow doors were torn off in heavy storm: Video of sunken ferry shows how water flooded car deck
- 9: 9804: FT921-686: FT 27 MAR 92 / Crash probe finds 'no abnormality'
- 10: 174478: FT943-3240: FT 15 SEP 94 / Investigators widen probe on ferry walkway collapse
- 11: 186180: FT943-1239: FT 26 SEP 94 / World News in Brief: 16 injured in lifeboat accident
- 12: 207852: FT944-17958: FT 05 OCT 94 / Finns order ro-ro bow doors welded shut
- 13: 177939: FT943-316: FT 30 SEP 94 / Ferries face calls for safety curbs: Estonia disaster brings reports of other 'near accidents'
- 14: 201958: FT944-12822: FT 31 OCT 94 / Business Travel: In S Korea, it is better to arrive ..
- 15: 208769: FT944-18875: FT 01 OCT 94 / What future for the ferry?: Questions raised by the Baltic tragedy
- 16: 14222: FT921-11074: FT 03 FEB 92 / UK Company News: Eurotunnel to seek damages for cost of extra safety
- 17: 178552: FT943-6917: FT 26 AUG 94 / Cross-Channel ferry blaze to be investigated
- 18: 1655: FT911-4602: FT 18 APR 91 / MMC to investigate Isle of Wight ferries
- 19: 5733: FT921-365: FT 30 MAR 92 / Hopes for ship data recorder
- 20: 26988: FT922-7334: FT 19 MAY 92 / World Trade News: Denmark-Sweden ferry link-up is agreed
- 21: 119826: FT933-1606: FT 23 SEP 93 / Ferry operator in link with Belgium
- 22: 150782: FT941-1125: FT 26 MAR 94 / International Company News: Vard plans to spin off ferry division
- 23: 118260: FT933-15867: FT 07 JUL 93 / New high-speed Stena ferry in service by 1995
- 24: 119845: FT933-1625: FT 23 SEP 93 / Sally Line agrees Belgian link-up
- 25: 32757: FT922-12800: FT 15 APR 92 / Freight ferry
- 26: 199245: FT944-10109: FT 12 NOV 94 / Tighter ferry rules proposed
- 27: 114042: FT933-11894: FT 27 JUL 93 / International Company News: Vard set to spin off ferry unit

28: 200184: FT944-11048: FT 08 NOV 94 / Bow doors faulty on 33% of ferries using UK ports: Government to increase safety checks on vessels
 29: 62351: FT924-11264: FT 27 OCT 92 / Ferry operators accused of pricing collusion
 30: 199989: FT944-10853: FT 09 NOV 94 / Eurotunnel hits at government on ferry safety
 31: 143053: FT941-732: FT 29 MAR 94 / Netherlands ferry route may restart
 32: 199238: FT944-10102: FT 12 NOV 94 / Tighter ferry rules proposed
 33: 84325: FT931-16573: FT 06 JAN 93 / Cross-Channel ferries hint
 34: 125074: FT934-497: FT 24 DEC 93 / International Company News: Greek ferry operator in cash call
 35: 64622: FT924-13535: FT 15 OCT 92 / New ferry service
 36: 28865: FT922-9211: FT 08 MAY 92 / New ferry is largest in Channel
 37: 137406: FT934-1954: FT 16 DEC 93 / Technology: Ships bridge the danger gap - Andrew Fisher concludes a series on transport safety with an investigation into innovations that may help prevent sea disasters and give clues to their causes
 38: 2421: FT911-5368: FT 15 APR 91 / World News in Brief: Ferries disrupted
 39: 26728: FT922-7074: FT 20 MAY 92 / Boulogne freight link
 40: 44107: FT923-9034: FT 07 AUG 92 / Ferry row settled

951 s, Reading doc 174533:FT943-3295, click from main win, time Tue Aug 12 09:40:48 1997

956 s, Reading doc 42744:FT923-7671, click from main win, time Tue Aug 12 09:40:53 1997

965 s, Reading doc 149044:FT941-12581, click from main win, time Tue Aug 12 09:41:02 1997

970 s, Reading doc 72637:FT931-5947, click from main win, time Tue Aug 12 09:41:07 1997

Doc number 72637 added to aspect 6

Aspect # 6, auto terms are congo brazzaville zairean "illegal immigrant" "death toll"

U: drags "congo" into label area

992 s, Reading doc 208393:FT944-18499, click from main win, time Tue Aug 12 09:41:29 1997

1006 s, Reading doc 208402:FT944-18508, click from main win, time Tue Aug 12 09:41:43 1997

1008 s, Reading doc 9804:FT921-686, click from main win, time Tue Aug 12 09:41:45 1997

1012 s, Reading doc 186180:FT943-1239, click from main win, time Tue Aug 12 09:41:49 1997

1016 s, Reading doc 207852:FT944-17958, click from main win, time Tue Aug 12 09:41:53 1997

1020 s, Reading doc 177939:FT943-316, click from main win, time Tue Aug 12 09:41:57 1997

1022 s, Reading doc 201958:FT944-12822, click from main win, time Tue Aug 12 09:41:59 1997

1031 s, Reading doc 208769:FT944-18875, click from main win, time Tue Aug 12 09:42:08 1997

1034 s, Reading doc 14222:FT921-11074, click from main win, time Tue Aug 12 09:42:11 1997

1041 s, Reading doc 178552:FT943-6917, click from main win, time Tue Aug 12 09:42:18 1997

1048 s, Reading doc 1655:FT911-4602, click from main win, time Tue Aug 12 09:42:25 1997

1054 s, Reading doc 5733:FT921-365, click from main win, time Tue Aug 12 09:42:31 1997

1064 s, Reading doc 26988:FT922-7334, click from main win, time Tue Aug 12 09:42:41 1997

1070 s, Reading doc 119826:FT933-1606, click from main win, time Tue Aug 12 09:42:47 1997

1079 s, Reading doc 118260:FT933-15867, click from main win, time Tue Aug 12 09:42:56 1997

1082 s, Reading doc 119845:FT933-1625, click from main win, time Tue Aug 12 09:42:59 1997

1089 s, Reading doc 32757:FT922-12800, click from main win, time Tue Aug 12 09:43:06 1997

1092 s, Reading doc 199245:FT944-10109, click from main win, time Tue Aug 12 09:43:09 1997

1096 s, Reading doc 114042:FT933-11894, click from main win, time Tue Aug 12 09:43:13 1997

1105 s, Reading doc 125074:FT934-497, click from main win, time Tue Aug 12 09:43:22 1997

U: does extensive interactions with 3-D window

19:06 F: *Could you say what you're doing there? With the 3-D window?*

U: *I'm just looking at it and trying to see how the articles I've picked lay out in this 3-D network. I'm just trying to figure out how I could make it more useful for my searching purposes. I'm really thinking about things how if I'm searching for things on the Internet and I had something like this how would I be able to use it. It's an interesting idea.*

20:00 F: *Time's up.*

7 documents saved in 7 aspects, with 0 miscellaneous docs

Aspect 0, 1 docs saved

Auto Terms: estonia estonia_sink forsberg estonia_disaster bow_section

User supplied text = estonia

FT943-312: 177935 FT 30 SEP 94 / Ferries in six 'near accidents': Finland and Sweden order checks after Estonia sinking

Aspect 1, 1 docs saved

Auto Terms: ferry_sink ferry_disaster wedding_party high_sea bangladesh

User supplied text = bangladesh

FT944-15661: 205199 FT 17 OCT 94 / World News in Brief: Bangladesh ferry sinks

Aspect 2, 1 docs saved

Auto Terms: ferry_sink cargo_ship manila sink survivor

User supplied text = manila

FT944-5773: 194241 FT 02 DEC 94 / World News in Brief: Manila ferry sinks

Aspect 3, 1 docs saved

Auto Terms: bow_door marine_safety_agent ferry_safety_agent dr_mawhinney

User supplied text = Herald of Free Enterprise

FT944-11048: 200184 FT 08 NOV 94 / Bow doors faulty on 33% of ferries using UK ports: Government to increase safety checks on vessels

Aspect 4, 1 docs saved

Auto Terms: ferry_sink port-au-prince neptune haiti product_centre

User supplied text = neptune

FT931-8485: 75524 FT 19 FEB 93 / Crowded ferry sinks off Haiti

Aspect 5, 1 docs saved

Auto Terms: moby imo vessel livorno ship

User supplied text = livorno

FT934-1954: 137406 FT 16 DEC 93 / Technology: Ships bridge the danger gap - Andrew Fisher concludes a series on transport safety with an investigation into innovations that may help prevent sea disasters and give clues to their causes

Aspect 6, 1 docs saved

Auto Terms: congo brazzaville zairean illegal_immigrant death_toll

User supplied text = congo

FT931-5947: 72637 FT 03 MAR 93 / World News in Brief: Congo ferry toll rises to 146

1200 s Tue Aug 12 09:45:21 1997

Stats from this run: 3 queries run

100 docs returned, 66 unique, 52 viewed

7 docs saved (including misc), 7 saved

saved docs:

FT931-5947: 72637 979

FT931-8485: 75524 466

FT934-1954: 137406 843

FT943-312: 177935 75

FT944-5773: 194241 255

FT944-11048: 200184 311

FT944-15661: 205199 162

saved good docs

FT931-5947: 72637 979

FT931-8485: 75524 466

FT934-1954: 137406 843

FT943-312: 177935 75

FT944-5773: 194241 255

FT944-11048: 200184 311

FT944-15661: 205199 162

Sparse Trec Data Starts HERE

1 FT943-312

2 FT944-15661

3 FT944-5773

4 FT944-11048

5 FT931-8485

6 FT934-1954

7 FT931-5947

Appendix 5. Experimental Materials

The following materials were used with participants.

Form 1. Informed Consent Form

Reprinted below.

Form 2. Entry (“PRE-SEARCH”) questionnaire

Reprinted below.

Controlled Association test

This is test FA-1 in [4]; to obtain a copy, contact ETS.

Paper Folding test

This is test VZ-2 in [4]; to obtain a copy, contact ETS.

Form 3. Interview form

Reprinted below.

Form 4. Searcher (aspect) worksheet

Reprinted below.

Form 5. Post-search questionnaire

Reprinted below.

Form 6. Exit questionnaire

There were two versions, one for participants who used AI and ZPRISE, and one for participants who used AIP and ZPRISE. The AIP version is reprinted below; the AI version was identical except that it omits the page of questions about the 3-D window.

UMASS TREC-6 INTERACTIVE SEARCHING STUDY INFORMED CONSENT FORM

The University's Human Studies Research Committee has approved this study and the recruitment of participants. The study is sponsored by the National Science Foundation.

PURPOSE OF STUDY AND DURATION

The purpose of this study is to determine the value and usability of several computer/user interfaces for tasks that require browsing or retrieving information. We will not be evaluating you, but how well the interfaces help you perform a task. Once you begin the study, it will take approximately from three and a half to four hours of your time.

PROCEDURE

Before the experiment starts, you will be asked to fill out a questionnaire concerning demographic and educational factors as well as experience and attitudes that might affect your performance. You may also be asked to take a short test of your visual perception.

In the experiment, you will be seated in front of a computer. You will first work through a tutorial on the type of problem you will be solving and on the interface you will be using. You will then be presented with text describing an information request. After you have read the description, you will be asked to browse an on-line collection of documents to find documents relevant to as many "aspects" of the information request as you can in 20 minutes. ("Aspects" will be explained in the tutorial.) At the end of 20 minutes, you will be asked to start another problem, and at the end of the second 20-minute period, you will be asked to start a third problem. After you have finished the third problem, you will be trained on a new interface and will then try three additional problems. Thus, you will work on six problems overall.

Your use of the computer will require reading text and graphics on the computer monitor, as well as using the keyboard and the mouse to manipulate the display. The computer will record your judgements on documents as well as any changes in those judgements. The experiment will also be videotaped.

After you have completed the experiment, you will participate in a short debriefing session.

RISKS AND BENEFITS

If you complete the study, you will be compensated \$35. If you withdraw from the study for any reason, you will not be compensated.

This study involves no risk on your part and you will receive no direct benefit other than the cash compensation.

CONFIDENTIALITY

The information which is recorded in the computer during the running of the experiment will not contain any indication of your name or other personal data. In addition, data we collect from you during this study will not be associated with your name in any analysis or report.

Your social security number will be needed for processing the cash compensation but will not be used for any other purpose and will not be kept except in records required for accounting purposes. It will not be reported anywhere other than the accounting office.

The videotape of the experiment will be used solely to help in evaluating and improving the system; it will not be distributed or shown to anyone not associated with the evaluation process.

SAFEGUARDS

At any time during the experiment, you are free to leave for whatever reason. Your participation in this study is purely voluntary. Additionally, you are under no requirement to complete all sessions. If you experience any discomfort, you should report it immediately to the experimenter and/or to the Human Subject Review Committee (see below for phone and address).

If you are a student, whether or not you complete this study will not affect your course work or grade in any class.

OTHER INFORMATION

We would appreciate it if you would not discuss this session with anyone who you know or believe will be participating but who has not yet done so.

After all participants have been run in the experiment, the data will be summarized. At that point, you may decide you would like to see how individuals performed overall; if so, a copy of the summary data can easily be made available to you. You should contact the experimenter approximately 6 - 8 weeks after you have run in the study should you desire more information.

After reading the above form, please sign below if you choose to continue in the experiment. Your signature simply indicates that you have read and understood the above information and that you wish to continue in the experiment.

Signature: _____

Print Name: _____

Experimenter:
Dr. James Allan
Department of Computer Science
Lederle Graduate Research Center
University of Massachusetts
Amherst, MA 01003
413/545-0463

Additional Point of Contact:
Human Subjects Review Committee
Room 512
Goodell Building
University of Massachusetts
Amherst, MA 01003
413/545-0668

UMASS TREC-6 INTERACTIVE SEARCHING STUDY
ENTRY (PRE-SEARCH) QUESTIONNAIRE

Searcher _____

Condition _____

Please list all the college/university degrees that you have (or expect to have):

_____	_____	_____
Degree	Major	Date
_____	_____	_____
Degree	Major	Date
_____	_____	_____
Degree	Major	Date
_____	_____	_____
Degree	Major	Date

What is your age?

- | | | |
|-----------------------------------|--------------------------------|----------------------------------|
| ☐ Under 21 | ☐ 31-40 | ☐ 51-60 |
| ☐ 21-30 | ☐ 41-50 | ☐ Over 60 |

What is your gender?

- ☐ Female
☐ Male

Have you participated in previous TREC Searching Studies?

- ☐ Yes
☐ No

Overall, for how many years have you been doing on-line searching? _____ years

Who have you performed searches for?

- ☐ Yourself
☐ Others
☐ Others and yourself

Have you ever had any experience using any of the following information retrieval systems?

- ☐ ZPRISE
- ☐ INQUERY

Please circle the appropriate number...

How much experience have you had...	None Some A lot				
using computers	1	2	3	4	5
searching on computerized library catalogs	1	2	3	4	5
searching on CD-ROM systems, e.g. Infotrac, Grolier	1	2	3	4	5
searching on commercial on-line systems, e.g., Dialog, Lexis, BRS Afterdark	1	2	3	4	5
searching on World Wide Web, e.g. Lycos, Alta Vista, Infoseek, Excite	1	2	3	4	5
searching on other systems (please specify the system): _____	1	2	3	4	5
searching full-text databases	1	2	3	4	5
searching in ranked-output information retrieval systems	1	2	3	4	5
searching in information retrieval systems that provide automatic relevance feedback	1	2	3	4	5
using a mouse-based interface	1	2	3	4	5
using 3D interfaces (e.g. 3D on-line chat rooms, 3D first-person action games)	1	2	3	4	5

**UMASS TREC-6 INTERACTIVE SEARCHING STUDY
SEARCHER INTERVIEW**

Searcher _____

Condition _____

In order to understand the different searching experiences of our participants, we would like you to answer a couple of questions about the methods that you typically use when you do on-line searching. When you answer these questions, please try to give us as much detail as you can. Please use this worksheet for any notes that you wish to make.

Imagine that you are interested in learning about the different alternative sources of energy for automobiles. You decide to investigate the literature by using a computerized database of newspaper articles that is available for your use. Since you are interested in identifying as many "aspects" of this topic as possible, you want to identify each one of the different alternative sources of energy for automobiles, including gasoline additives that decrease pollution or reduce oil consumption.

1. What steps would you take in order to perform a search that would identify as many "aspects" as possible for this topic? Describe your overall approach by listing what would you do first, and then describe each step that you would follow after that.

2. How would you decide that your search is finished?

**UMASS TREC-6 INTERACTIVE SEARCHING STUDY
SEARCH WORKSHEET**

Topic Number _____

Searcher_____

Condition _____

Please use this sheet of paper to write down any notes that you would like to make during your search and to list the aspects as you identify them for this topic.

**UMASS TREC-6 INTERACTIVE SEARCHING STUDY
POST-SEARCH QUESTIONNAIRE**

Topic Number _____

Searcher_____

Condition _____

Please answer the following questions, as they relate to this specific topic.

Please circle the appropriate number...

To what extent...	Not at all	Somewhat	Extremely		
are you familiar with this topic?	1	2	3	4	5
do you think this text collection is suited to find the answer for this topic?	1	2	3	4	5
was it difficult to do this search?	1	2	3	4	5
are you satisfied with your search results?	1	2	3	4	5
are you confident that you identified all the possible aspects for this topic?	1	2	3	4	5
are you satisfied with the aspects you have retrieved for this topic?	1	2	3	4	5
are you satisfied with the amount of relevant material (versus nonrelevant) retrieved by the system?	1	2	3	4	5
did you have enough time to do an effective search?	1	2	3	4	5

UMASS TREC-6 INTERACTIVE SEARCHING STUDY EXIT QUESTIONNAIRE

Searcher _____

So we can have a better understanding of your overall searching experience, we would like to ask you some final questions about your experience today. Please use the scale provided. In this scale a "1" means "not at all", a "3" means "somewhat", and a "5" means "extremely".

Please consider the searching experience that you had with INQUERY's aspect window.

Please circle the appropriate number...

Rate the following...	Not at all		Somewhat		Extremely
How useful is the aspect window?	1	2	3	4	5
How easy was it to use the aspect window?	1	2	3	4	5
How easy was it to learn to use the aspect window?	1	2	3	4	5
How well did you understand how to use the aspect window?	1	2	3	4	5

Please write down any other comments that you have about the aspect window.

Please consider the searching experience that you had with INQUERY's 3D visualization.

Please circle the appropriate number...

Rate the following...	Not at all		Somewhat		Extremely
How useful is the 3D visualization?	1	2	3	4	5
How easy was it to use the 3D visualization?	1	2	3	4	5
How easy was it to learn to use the 3D visualization?	1	2	3	4	5
How well did you understand how to use the 3D visualization?	1	2	3	4	5

Please write down any other comments that you have about the 3D visualization.

Please consider the searching experience that you had with INQUERY.

Please circle the appropriate number...

Rate the following...	Not at all		Somewhat		Extremely
How easy was it to use this information system?	1	2	3	4	5
How easy was it to learn to use this information system?	1	2	3	4	5
How well did you understand how to use this information system?	1	2	3	4	5

Please write down any other comments that you have about your searching experience with INQUERY here. Thank you!

Please consider the searching experience that you had with ZPRISE.

Please circle the appropriate number...

Rate the following...	Not at all		Somewhat		Extremely
How easy was it to use this information system?	1	2	3	4	5
How easy was it to learn to use this information system?	1	2	3	4	5
How well did you understand how to use this information system?	1	2	3	4	5

Please write down any other comments that you have about your searching experience with ZPRISE here. Thank you!

Please consider the entire experience that you just had.

Please circle the appropriate number...

Rate the following...	Not at all		Somewhat		Extremely
To what extent were you able to understand the nature of the task?	1	2	3	4	5
To what extent did you find this task similar to other searching tasks that you typically perform?	1	2	3	4	5
How different did you find INQUERY from ZPRISE?	1	2	3	4	5

Please rank the two systems in order of how **easy they were to use**. Place a "1" next to the easiest system to use and a "2" next to the most difficult system to use.

ZPRISE _____

INQUERY _____

Please rank the two systems in order of how **easy they were to learn to use**. Place a "1" next to the easiest system to learn and a "2" next to the most difficult system to learn to use.

ZPRISE _____

INQUERY _____

Please rank the two systems in order of **which system you liked the best**. Place a "1" next to the system that you liked the best and a "2" next to the system you liked the least.

ZPRISE _____

INQUERY _____

Please write down any other comments that you have about your overall searching experience here. Feel free to use the other page. Thank you!

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