Probabilistic Question Answering on the Web

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http://perun.si.umich.edu/clair

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People ask questions

- Excite corpus of 2,477,283 queries (one day’s worth)
- 8.4% of them are questions
  - 43.9% factual (what is the country code for Belgium)
  - 56.1% procedural (how do I set up TCP/IP) or other
- In other words, 100 K questions per day
People ask questions

In what year did baseball become an official sport?
Who is the largest man in the world?
Where can I get information on Raphael?
Where can I find information on puritan religion?
Where can I find how much my house is worth?
How do I get out of debt?
Where can I find out how to pass a drug test?
When is the Super Bowl?
Who is California's District State Senator?
Where can I buy extra nibs for a fountain pen?
How do I set up TCP/IP?
What time is it in West Samoa?
Where can I buy a little kitty cat?
What are the symptoms of attention deficit disorder?
Where can I get some information on Michael Jordan?
How does the character Seyavash in Ferdowsi's Shahnameh exhibit characteristics of a hero?
When did the Neanderthal man live?
Which Frenchman declined the Nobel Prize for Literature for ideological reasons?
What is the largest city in Northern Afghanistan?
WAR AGAINST TERROR

Taliban: Key city has fallen

- The Taliban confirm Mazar-e-Sharif has been taken by the Northern Alliance.
- Pakistan newspaper: Al Qaeda has nuclear and chemical weapons
- President Bush to address U.N. today
- French authorities detain five people suspected of planning terrorist attacks

FULL STORY »

Why is Mazar-e-Sharif significant?

TIME.com: Rebels: Mazar-e-Sharif is ours

Military Desk Briefing | War Room
Afghanistan: Info | Strikes map
Voices: Massage board and chats

ON THE SCENE

Kamal Hyder: 'Very rough night'
Kelly Wallace: Anti-terrorism strategy

OTHER TOP NEWS

- China set to join WTO
- Russian market blast kills four
- Howard wins third term after tight race
- Climate treaty set to be ratified
- Rome rain dampens war tensions

BUSINESS at CNNMoney

- Big IPO week on tap
- Dynergy to buy Enron for $1.7B
- GM recalls 86,000 SUVs
- Personal Finance

MARKETS

- Dow: +20.60
- NASDAQ: +0.71
- S&P: +1.77

FOLLOW THE NEWS
What is the largest city in Northern Afghanistan?
Possible approaches

• Map?
• Knowledge base
  Find $x$: city ($x$) ∧ located ($x$,”Northern Afghanistan”) ∧
  ∧ ¬exists ($y$): city ($y$) ∧ located ($y$,”Northern Afghanistan”) ∧
  ∧ greaterthan (population ($y$), population ($x$))
• Database?
• World factbook?
• Search engine?
User interfaces to the Web

- Command-line search interfaces
- speech/natural language
- Procedural vs. exact answers
- Ask Jeeves?
... Afghanistan, Kabul, 2,450 ... Administrative capital and largest city (1997 est ... Undetermined. Panama, Panama City, 450,668. ... of the Gauteng, Northern Province, Mpumalanga ...
www.infoplease.com/cgi-bin/id/A0855603

... died in Kano, northern Nigeria's largest city, during two days of anti-American riots led by Muslims protesting the US-led bombing of Afghanistan, according to ...
www.washingtonpost.com/wp-dyn/print/world/

... air strikes on the city. ... the Taliban militia in northern Afghanistan in a significant blow ... defection would be the largest since the United States ...
www.afgha.com/index.php - 60k

... Kabul is the capital and largest city of Afghanistan. ... met. area pop. 2,029,889), is the largest city in Uttar Pradesh, a state in northern India. ...
school.discovery.com/homeworkhelp/worldbook/atozgeography/ k/k1menu.html

... Gudermes, Chechnya's second largest town. The attack ... location in Afghanistan's outlying regions ... in the city of Mazar-i-Sharif, a Northern Alliance-affiliated ...
english.pravda.ru/hotspots/2001/09/17/

... Get Worse By RICK BRAGG Pakistan's largest city is getting a jump on the ... Region: Education Offers Women in Northern Afghanistan a Ray of Hope. ...
www.nytimes.com/pages/world/asia/

... within three miles of the airport at Mazar-e-Sharif, the largest city in northern Afghanistan, held since 1998 by the Taliban. There was no immediate comment ...
uk.fc.yahoo.com/photos/a/afghanistan.html
What is the largest city in Northern Afghanistan?

Query modulation
(largest OR biggest) city “Northern Afghanistan”

Document retrieval
www.infoplease.com/cgi-bin/id/A0855603
www.washingtonpost.com/wp-dyn/print/world/

Sentence retrieval
Gudermes, Chechnya's second largest town … location in Afghanistan's outlying regions within three miles of the airport at Mazar-e-Sharif, the largest city in northern Afghanistan

Answer extraction
Gudermes
Mazer-e-Sharif

Answer ranking
Mazer-e-Sharif
Gudermes
About 5,037,040 found in Web Sites for: when did the Neanderthal man live?

Top 10 Displayed: Full Description | Show Titles Only | View by URL

- **Wikipedia on Neanderthal**
  URL: http://en.wikipedia.org/wiki/Neanderthal
  Detailed information on Neanderthal history and characteristics.

- **Wikipedia on the Neanderthal Mousterian**
  URL: http://en.wikipedia.org/wiki/Neanderthal_Mousterian
  Description of the Neanderthal Mousterian culture and artifacts.

- **Wikipedia on the Neanderthal Man and the Origin of Humans**
  URL: http://en.wikipedia.org/wiki/Neanderthal_Men_and_the_Origin_of_Humans
  Historical and scientific discussions on the origins of Neanderthal man.

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  URL: http://en.wikipedia.org/wiki/Neanderthal_Men_and_the_Origin_of_Humans
  Historical and scientific discussions on the origins of Neanderthal man.
The extinction of Neanderthal man 18-9-95
About 40,000 years ago, Cro-Magnon man ("modern" man) lived in Africa and the Middle East, while Europe was the home of Neanderthals. Both were more sapiens (meaning they could probably...)

DNA tests show humans not Neanderthal's descendants - December 17
Neanderthal man From Correspondent Sobban Darrow LONDON, CNN - For more than a century, scientists believed that Neanderthal man, a hulking ape-like creature who lived in Europe and the Middle East...

Humans not Neanderthal's descendents
URL: http://cyberjot.gatrad.ac.uk/kabooc/mail-archives/Everyday/-/97/...
DNA tests show humans not Neanderthal's descendants December 17, 1997 Web posted at: 1:11 p.m. EST (1611 GMT) From Correspondent Sobban Darrow LONDON, CNN - For more than a...

sci.anthropology.paleo: Sep 95: DISCOVERY/Neanderthal/Amero Sap.
URL: http://www.anatomy.usyd.edu.au/darwin/anthropology/sci.anthro...
Peggy Hall (pghall@primenet.com) 1 Sep 1995 85:13:34 GMT I just picked up the new Discover Magazine. There is a question posed on the cover regarding Neanderthals and Homo Sapiens living side by side...

URL: http://www.anatomy.usyd.edu.au/darwin/anthropology/sci.anthro...
In article <427hj@panthera.bitece.com, annakilron@netcom.com (Ann Miller) writes> >Funny, I live side by side with "lots" of species I don't have sex with. > > end

URL: http://www.anatomy.usyd.edu.au/darwin/anthropology/sci.anthro...
Peggy Hall writes: I just picked up the new Discover Magazine. There is a question posed on the cover regarding Neanderthals and Homo Sapiens living side by side for so long. How could we live sid...

Rep: Hubbies/Bears and No Sleep
URL: http://brazil.spartaklist.com/9910/msg07560.html
Subject: Re: Hubbies/Bears and No Sleep from: Linda Coco <lccoco@cybersport.net> I live in Bedrock with Neanderthal man. We're a modern stone age family.

Rep: Hubbies/Bears and No Sleep
URL: http://brazil.spartaklist.com/9910/msg07754.html
Subject: Re: Hubbies/Bears and No Sleep from: Melissa (mcelhane_27@yahoo.com) Linda, I'll bet it is beautiful there! Do you like it? Well, stay safe! melissa=) --Linda Coco <lccoco@cybersport.net>
Research problems

• Source identification:
  – semi-structured vs. text sources

• Query modulation:
  – best paraphrase of a NL question given the syntax of a search engine?
  – Compare two approaches: noisy channel model and rule-based

• Sentence ranking
  – n-gram matching, Okapi, co-reference?

• Answer extraction
  – question type identification
  – phrase chunking
  – no general-purpose named entity tagger available

• Answer ranking
  – what are the best predictors of a phrase being the answer to a given question: question type, proximity to query words, frequency

• Evaluation (MRDR)
  – accuracy, reliability, timeliness
Document retrieval

• Use existing search engines: Google, AlltheWeb, NorthernLight
• No modifications to question
• CF: work on QASM (ACM CIKM 2001)
Sentence ranking

- Weighted N-gram matching:

\[
S_i = \frac{w_1 \sum_{i=1}^{N_1} tf_i \cdot idf_i + w_2 \sum_{j=1}^{N_2} tf_j + w_3 \sum_{k=1}^{N_3} tf_k}{F}
\]

- Weights are determined empirically, e.g., 0.6, 0.3, and 0.1
Probabilistic phrase reranking

• Answer extraction: probabilistic phrase reranking. What is:
  \[ p(ph \text{ is answer to } q \mid q, ph) \]

• Evaluation: TRDR
  – Example: (2,8,10) gives .725
  \[ \frac{1}{n} \left( \sum_{i=1}^{n} \frac{1}{r_i} \right) \]
  – Document, sentence, or phrase level

• Criterion: presence of answer(s)

• High correlation with manual assessment
Phrase types

PERSON PLACE DATE NUMBER DEFINITION
ORGANIZATION DESCRIPTION ABBREVIATION
KNOWNFOR RATE LENGTH MONEY REASON
DURATION PURPOSE NOMINAL OTHER
Question Type Identification

• Wh-type not sufficient:
  • Who: PERSON 77, DESCRIPTION 19, ORG 6
  • What: NOMINAL 78, PLACE 27, DEF26, PERSON 18, ORG 16, NUMBER 14, etc.
  • How: NUMBER 33, LENGTH 6, RATE 2, etc.

• Ripper:
  – Top 2 question types

• Heuristic algorithm:
  – About 100 regular expressions based on words and parts of speech
Ripper performance

<table>
<thead>
<tr>
<th>Training</th>
<th>Test</th>
<th>Train Error Rate</th>
<th>Test Error Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>TREC9</td>
<td>TREC8</td>
<td>22.4%</td>
<td>24%</td>
</tr>
<tr>
<td>TREC8,9</td>
<td>TREC10</td>
<td>17.03%</td>
<td>30%</td>
</tr>
<tr>
<td>TREC8,9,10</td>
<td>-</td>
<td>20.69%</td>
<td>-</td>
</tr>
</tbody>
</table>
### Regex performance

<table>
<thead>
<tr>
<th>Training</th>
<th>Test on TREC9</th>
<th>Test on TREC8</th>
<th>Test on TREC10</th>
</tr>
</thead>
<tbody>
<tr>
<td>TREC9</td>
<td>7.8%</td>
<td>15%</td>
<td>18%</td>
</tr>
<tr>
<td>TREC8,9</td>
<td>7.4%</td>
<td>6%</td>
<td>18.2%</td>
</tr>
<tr>
<td>TREC8,9,10</td>
<td>4.6%</td>
<td>5.5%</td>
<td>7.6%</td>
</tr>
</tbody>
</table>
Phrase ranking

- Phrases are identified by a shallow parser (Itchunk from Edinburgh)
- Four features:
  - Proximity
  - POS (part-of-speech) signature (qtype)
  - Query overlap
  - Frequency
Proximity

- Phrasal answers tend to appear near words from the query
- Average distance = 7 words, range = 1 to 50 words
- Use linear rescaling of scores
Part of speech signature

Penn Treebank tagset (DT = determiner, JJ = adjective)

<table>
<thead>
<tr>
<th>Signature</th>
<th>Phrase Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBD</td>
<td>NO (100%)</td>
</tr>
<tr>
<td>DT NN</td>
<td>NO (86.7%) PERSON (3.8%) NUMBER (3.8%) ORG (2.5%)</td>
</tr>
<tr>
<td>NNP</td>
<td>PERSON (37.4%) PLACE (29.6%) DATE (21.7%) NO (7.6%)</td>
</tr>
<tr>
<td>DT JJ NNP</td>
<td>NO (75.6%) NUMBER (11.1%) PLACE (4.4%) ORG (4.4%)</td>
</tr>
<tr>
<td>NNP NNP</td>
<td>PLACE (37.3%) PERSON (35.6%) NO (16.9%) ORG (10.2%)</td>
</tr>
<tr>
<td>DT NNP</td>
<td>ORG (55.6%) NO (33.3%) PLACE (5.6%) DATE (5.6%)</td>
</tr>
</tbody>
</table>

Example: “Hugo/NNP Young/NNP”

\[ P (\text{PERSON} \mid \text{“NNP NNP”}) = 0.458 \]

Example: “the/DN Space/NNP Flight/NNP Operations/NNP contractor/NN”

\[ P (\text{PERSON} \mid \text{“DT NNP NNP NNP NN”}) = 0 \]
Query overlap and frequency

• Query overlap:
  – What is the capital of Zimbabwe?
  – Possible choices:
    Mugabe, Zimbabwe, Luanda, Harare

• Frequency:
  – Not necessarily accurate but rather useful
# Reranking

<table>
<thead>
<tr>
<th>Rank</th>
<th>Probability and phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.599862 the_DT Space_NNP Flight_NNP Operations_NNP contractor_NN . .</td>
</tr>
<tr>
<td>2</td>
<td>0.598564 International_NNP Space_NNP Station_NNP Alpha_NNP</td>
</tr>
<tr>
<td>3</td>
<td>0.598398 International_NNP Space_NNP Station_NNP</td>
</tr>
<tr>
<td>4</td>
<td>0.598125 to_TO become_VB</td>
</tr>
<tr>
<td>5</td>
<td>0.594763 a_DT joint JJ venture_NN United_NNP Space_NNP Alliance_NNP</td>
</tr>
<tr>
<td>6</td>
<td>0.593933 NASA_NNP Johnson_NNP Space_NNP Center_NNP</td>
</tr>
<tr>
<td>7</td>
<td>0.587140 will_MD form_VB</td>
</tr>
<tr>
<td>8</td>
<td>0.585410 The_DT purpose_NN</td>
</tr>
<tr>
<td>9</td>
<td>0.576797 prime JJ contracts_NNS</td>
</tr>
<tr>
<td>10</td>
<td>0.568013 First_NNP American_NNP</td>
</tr>
<tr>
<td>11</td>
<td>0.567361 this_DT bulletin_NN board_NN</td>
</tr>
<tr>
<td>12</td>
<td>0.565757 Space_NNP : :</td>
</tr>
<tr>
<td>13</td>
<td>0.562627 'Spirit_NN ' &quot; of_IN</td>
</tr>
<tr>
<td>14</td>
<td>0.561702 space_NN</td>
</tr>
<tr>
<td>15</td>
<td>0.561064 February_NPN</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>
| 41   | 0.516368 Alan_NNP Shepard_NNP                                                         | **Proximity = .5164**
## Reranking

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<thead>
<tr>
<th>Rank</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.465012 Space_NNP Administration_NNP ._.</td>
</tr>
<tr>
<td>2</td>
<td>0.446466 SPACE_NNP CALENDAR_NNP <em>.</em></td>
</tr>
<tr>
<td>3</td>
<td>0.413976 First_NNP American_NNP</td>
</tr>
<tr>
<td>4</td>
<td>0.399043 International_NNP Space_NNP Station_NNP Alpha_NNP</td>
</tr>
<tr>
<td>5</td>
<td>0.396250 her_PRP$ third_JJ space_NN mission_NN</td>
</tr>
<tr>
<td>6</td>
<td>0.395956 NASA_NNP Johnson_NNP Space_NNP Center_NNP</td>
</tr>
<tr>
<td>7</td>
<td>0.394122 the_DT American_NNP Commercial_NNP Launch_NNP Industry_NNP</td>
</tr>
<tr>
<td>8</td>
<td>0.390163 the_DT Red_NNP Planet_NNP ._.</td>
</tr>
<tr>
<td>9</td>
<td>0.379797 First_NNP American_NNP</td>
</tr>
<tr>
<td>10</td>
<td>0.376336 Alan_NNP Shepard_NNP</td>
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<tr>
<td>11</td>
<td>0.375669 February_NNP</td>
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<tr>
<td>12</td>
<td>0.374813 Space_NNP</td>
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<tr>
<td>13</td>
<td>0.373999 International_NNP Space_NNP Station_NNP</td>
</tr>
<tr>
<td>14</td>
<td>0.372289 Als_NNPS</td>
</tr>
<tr>
<td>15</td>
<td>0.371194 The_NNP Spirit_NNP</td>
</tr>
</tbody>
</table>

Qtype = .7288  
Proximity * qtype = .3763
## Reranking

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<td>0.478857 Neptune_NNP Beach_NNP ._.</td>
</tr>
<tr>
<td>2</td>
<td>0.449232 February_NNP</td>
</tr>
<tr>
<td>3</td>
<td>0.447075 Go_NNP</td>
</tr>
<tr>
<td>4</td>
<td>0.437895 Space_NNP</td>
</tr>
<tr>
<td>5</td>
<td>0.431835 Go_NNP</td>
</tr>
<tr>
<td>6</td>
<td>0.424678 Alan_NNP Shepard_NNP</td>
</tr>
<tr>
<td>7</td>
<td>0.423855 First_NNP American_NNP</td>
</tr>
<tr>
<td>8</td>
<td>0.421133 Space_NNP May_NNP</td>
</tr>
<tr>
<td>9</td>
<td>0.411065 First_NNP American_NNP woman_NN</td>
</tr>
<tr>
<td>10</td>
<td>0.401994 Life_NNP Sciences_NNP</td>
</tr>
<tr>
<td>11</td>
<td>0.385763 Space_NNP Shuttle_NNP Discovery_NNP STS-60_NN</td>
</tr>
<tr>
<td>12</td>
<td>0.381865 the_DT Moon_NNP International_NNP Space_NNP Station_NNP</td>
</tr>
<tr>
<td>13</td>
<td>0.370030 Space_NNP Research_NNP A_NNP Session_NNP</td>
</tr>
<tr>
<td>14</td>
<td>0.366714 First_NNP American_NNP</td>
</tr>
<tr>
<td>15</td>
<td>0.359058 Sally_NNP Ride_NNP Sally_NNP Ride_NNP</td>
</tr>
</tbody>
</table>

All four features
NSIR: A Web-Based Question Answering System

Your question: (TREC-8 TREC-9)
Who was the first American in space?

Engine: Yahoo Return: Exact answers No. of documents: 20
Answer (for evaluation) Tip
alan shepard

Running 'Who was the first American in space?' on Yahoo.

DOCUMENTS

1. http://www2.hincsafe.com/hincsafe/library/96/may/index.html Sally Kristen Role First American Woman in Space
   Sally Kristen Role First American Woman in Space Resources Menu Categorical Index Col Library Call

2. http://www.ha.nes.gov/offc/pao/History/Timeline/100th.html Chronology of Selected Highlights
   in the First 100 American Idocstyle.html public /IETF/ETTD HTML/EN National Aeronautics and Space Administration Chronolo

   Alan Shepard: The First American Astronaut Thurs. May 9 2002 News Missions/Launches Science/Astronono

   NASA Nemolab Web Space Trivia Page People Firsts Women in Space Age Other Firsts Who was the fi

5. http://www.enc.org/thweek/weekday/nt018192-51-00.htm ENC: This Week: Classroom Calendar: First American in Space
   ENC: This Week: Classroom Calendar: First American in Space YOU ARE HERE ENC Home This Week Cl


<table>
<thead>
<tr>
<th>order</th>
<th>phrase (score)</th>
<th>prob</th>
<th>sig prob</th>
<th>q clap</th>
<th>freq</th>
<th>pos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>the first american woman (55.6692)</td>
<td>6.3320</td>
<td>0.500000</td>
<td>1.00</td>
<td>16</td>
<td>DT JJ NNF</td>
</tr>
<tr>
<td>2</td>
<td>science (49.4067)</td>
<td>7.9563</td>
<td>0.364407</td>
<td>1.00</td>
<td>8</td>
<td>NNF</td>
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<tr>
<td>3</td>
<td>the first american woman (47.5415)</td>
<td>8.9810</td>
<td>0.250000</td>
<td>1.00</td>
<td>10</td>
<td>DT JJ NN</td>
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<tr>
<td>4</td>
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<td>7.4897</td>
<td>0.364407</td>
<td>1.00</td>
<td>8</td>
<td>NNF</td>
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<tr>
<td>5</td>
<td>sally ride first american woman (32.3880)</td>
<td>9.1275</td>
<td>1.000000</td>
<td>1.00</td>
<td>1</td>
<td>NNF NNF NNF NNF</td>
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<tr>
<td>6</td>
<td>the 20th century (32.3981)</td>
<td>9.5372</td>
<td>0.500000</td>
<td>1.00</td>
<td>2</td>
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<tr>
<td>7</td>
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<td>7.4083</td>
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<td>1.00</td>
<td>4</td>
<td>NNF</td>
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<tr>
<td>8</td>
<td>shepard (28.898)</td>
<td>6.3812</td>
<td>0.364407</td>
<td>1.00</td>
<td>7</td>
<td>NNF</td>
</tr>
<tr>
<td>9</td>
<td>may (28.798)</td>
<td>6.4932</td>
<td>0.364407</td>
<td>1.00</td>
<td>6</td>
<td>NNF</td>
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</tbody>
</table>
Running "When did French revolutionaries storm the Bastille?" on Yahoo.

**DOCUMENTS**

Baxter's EduNET - Time Machine 250-300 years ago... The more things change the more they are the same.


A The Test Set of 200 Questions 1. Who is the author of the book "The Iron Lady: A Biography of Ma

TeacherWeb Russ Raatz: Chapter 22 - The French Revolution Russ Raatz
Evangelicism in the Age of the ... "True" Christianity. English Evangelicism in the Age of the French Revolution "True" Christianity


Untitled Document ongoing 9 Summer Family Concert Lower Perkiomen Valley Park 5-7 pm
Document level performance

TREC 8 corpus (200 questions)

<table>
<thead>
<tr>
<th>Engine</th>
<th>AlltheWeb</th>
<th>NLight</th>
<th>Google</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg</td>
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<td>1.0495</td>
<td>1.3361</td>
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<td>163</td>
<td>164</td>
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</table>
## Sentence level performance

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<th>Engine</th>
<th>AW U</th>
<th>AW L</th>
<th>AW O</th>
<th>NL U</th>
<th>NL L</th>
<th>NL O</th>
<th>GO U</th>
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<th>GO O</th>
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<td>0.26</td>
<td>2.53</td>
<td>0.48</td>
<td>0.44</td>
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<td>0.54</td>
<td>0.49</td>
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<td>121</td>
<td>119</td>
<td>159</td>
<td>137</td>
<td>135</td>
</tr>
</tbody>
</table>
## Phrase level performance

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<th>AlltheWeb</th>
<th>NorthernLight</th>
<th>Google D+P</th>
<th>Google S+P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upperbound</strong></td>
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<td>2.652</td>
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<td>0.068</td>
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<td><strong>Global proximity</strong></td>
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<td><strong>Combined</strong></td>
<td>0.105</td>
<td>0.117</td>
<td>0.157</td>
<td>0.199</td>
</tr>
</tbody>
</table>

Experiments performed Oct-Nov, 2001
Discussion

- Questions+answers from competitors
- Google’s limitations: number of words, API
- NorthernLight
Future work

- Further develop natural language interfaces to the Web
- Integration with our news summarization system NewsInEssence (http://www.newsinessence.com)
- Use question answering as a common front end for different applications (including access to semi-structured data)
- Semantic Web?
Conclusion

• Let the major search engines do what they are best at.
• Use Natural Language technology but … to the extent feasible
• Deep parsing (e.g., Collins or Charniak parsers) is quite expensive [Kwok et al. 2001]
• Ignoring NLP is a bad idea
The CLAIR group

- The Computational Linguistics And Information Retrieval group at the University of Michigan
- http://perun.si.umich.edu/clair
The TREC Q&A evaluation

- Run by NIST [Voorhees and Tice 2000]
- 2GB of input
- 200 questions
- Essentially fact extraction
  - Who was Lincoln’s secretary of state?
  - What does the Peugeot company manufacture?
- Questions are based on text
- Answers are assumed to be present
- No inference needed
NSIR Demo

Question: Who was the first American in space?

Running "Who was the first American in space?" on NorthernLight.

[1] PhysicsWeb - First American in space dies
PhysicsWeb - First American in space dies (cached)
(http://physicsweb.org/article/news/02/7/12)

BBC News | Sci/Tech | First American in space dies (cached)
(http://news.bbc.co.uk/hi/english/sci_tech/newsid_137000/137462.stm)

Alan Shepard, First American in Space, Dies at 74 (cached)
(http://teachspace.org/news/latimes/shepard.html)
Alan Shepard First American in Space Dies at 74 Back to Story This article appeared in the Los Angeles Times and is reprinted with permission Alan Shepard First American in Space Dies at 74 WASHINGTON -- Astronaut Alan Shepard the first American to fly in space and one of only 12 Americans to walk on the moon died late Tuesday at a hospital in California. He was 74. Alan Shepard

NewsNet5 - First American In Space Dies (cached)
Alan Shepard, First American in Space, Dies at 74 -- 07/23/1998
Alan Shepard, First American in Space, Dies at 74 -- 07/23/1998 (cached)
(http://www.cnnnews.org/indepth/archive/199807/IND19980723f.html)
Alan Shepard First American in Space Dies at 74 -- 07/23/1998 Alan Shepard First American in Space Dies at 74 23 July 1998 By Lawrence Morahan CNS Staff Writer CNS Alan Shepard the first American in space and the fifth to walk on the moon died late Tuesday in a hospital in California. He was 74 and had suffered from leukemia. Those of us who are old enough to remember the early spacelights will

[9]
Spirit of First American In Space Remembered
Spirit of First American In Space Remembered (cached)

[10]
Spirit of First American In Space Remembered
Spirit of First American In Space Remembered (cached)

- 2.959800 Previsions JJ News NNP
- 2.981519 Space NNP Dies NNP
- 2.953504 Money Guarantee NNP Title NNP
- 2.571537 Space NNP Dies NNP
- 2.570354 KOIN NNP
- 2.266679 July NNP
- 2.248877 Waiting NNP
- 2.202086 Space NNP Dies NNP
- 2.202086 MONTEREY NNP Calif NNP
- 2.202086 Alan NNP Shepard NNP
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- 1.888500 First JJ American NNP
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- 1.746002 Reuters NNP
- 1.657088 the DT Soviet NNP Union NNP
- 1.600629 Wednesday NNP July NNP
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- 1.497000 Cosmonaut NNP Yuri NNP Gagarin NNP