Future Research Challenges and Needed Resources for

The Web, Semantics and Data Mining

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http://ebiquity.umbc.edu/resource/html/id/243

Overview

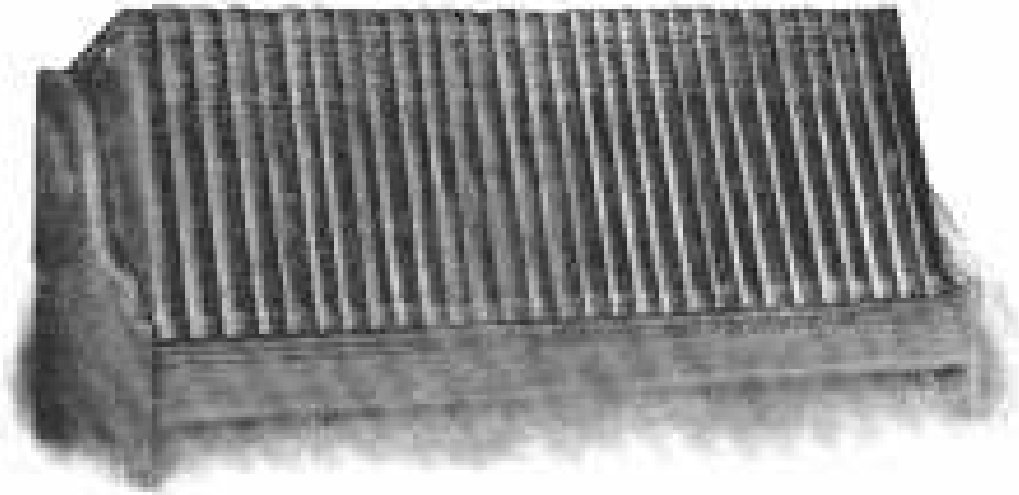
- Motivation
- The web's new research challenges
- Needed resources

The Sum of Human Knowledge, 1907

WHEN IN DOUBT—"LOOK IT UP" IN

The

Encyclopaedia Britannica



(New 11th Edition) issued 1910-11 by the
CAMBRIDGE UNIVERSITY PRESS (England)

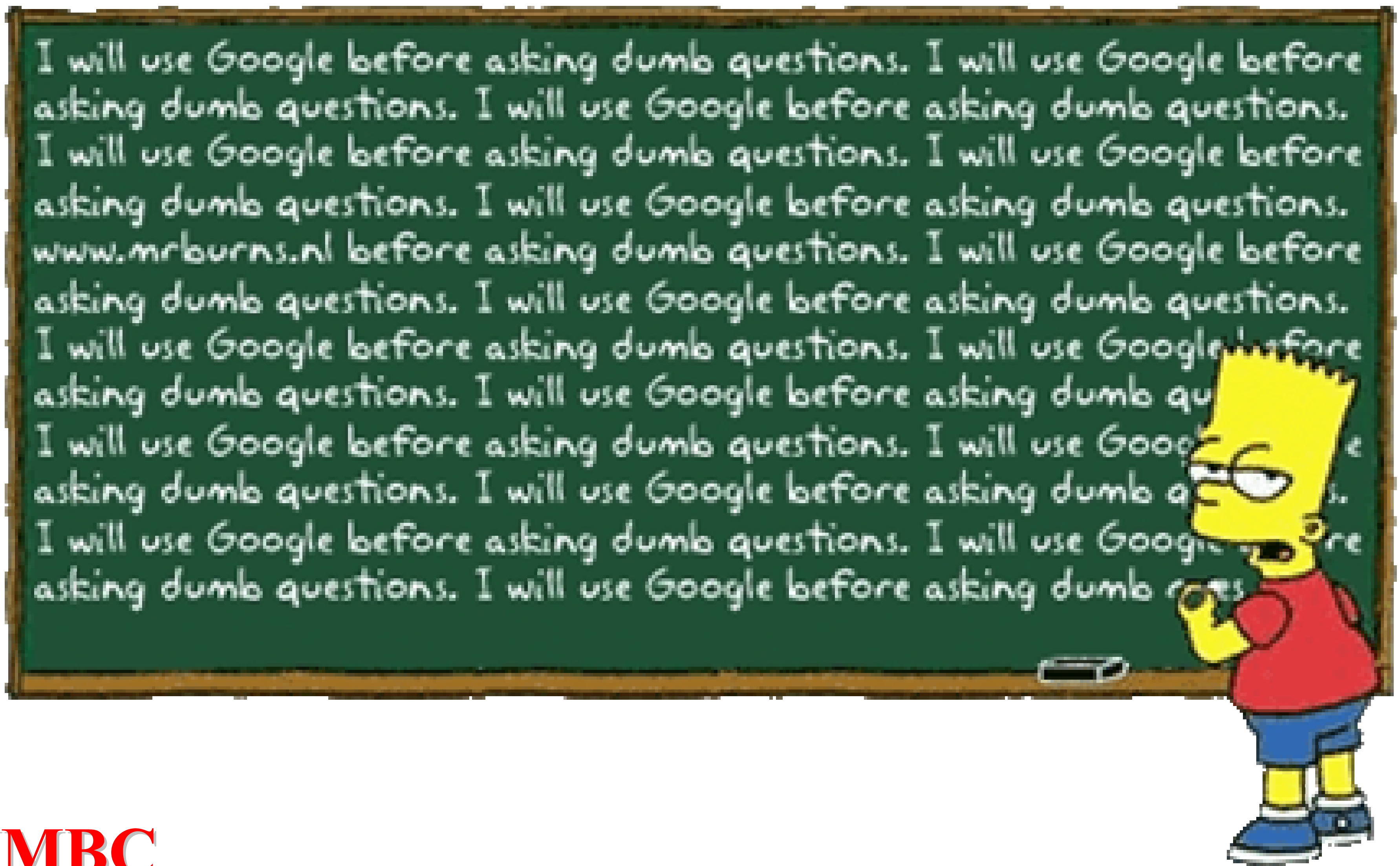
The Sum of Human Knowledge

29 volumes, 28,150 pages, 44,000,000 words of text. Printed on thin, but strong opaque India paper, each volume but one inch in thickness.

THE BOOK TO ASK QUESTIONS OF

FOR READING OR FOR STUDY

The Sum of Human Knowledge, 2007



The Web

- The Web
- The 2.0 Web
- The social Web
- The semantic Web
- The game theoretic Web
- The next Web

The Web

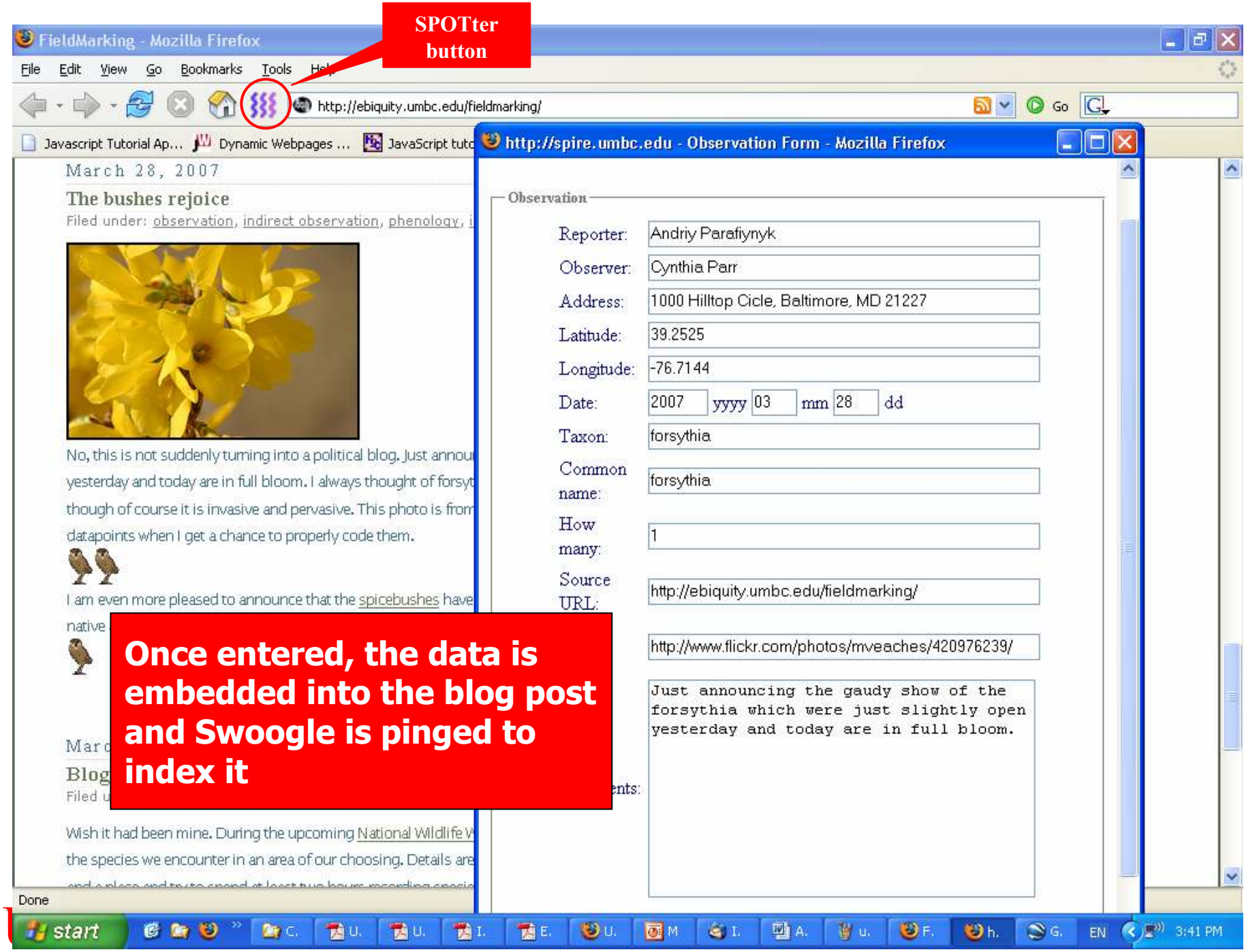
- The Web is the most important new source of data and knowledge in our generation
- The Web is fundamentally unlike other information sources that preceded it
  - Today's Web is not your father's Internet
- We've been mining the Web since the beginning
- But it's still evolving rapidly and unpredictably
  - Today's Web won't be your children's Internet

The 2.0 Web

- The "current web" is characterized by
  - Mashups, dynamic data, tags, folksonomies
  - Sophisticated server-side programs
  - Sophisticated client-side programs (javascript)
- **Challenges:**
  - more of the information is bound up in client-side scripts -- how much should be evaluated?
  - More metadata and relational data
  - Taking advantage of new infrastructure like ping servers, feeds, rich APIs, etc.

The Social Web

- Estimates are that more than half of new Web content is being generated by users
  - Blogs, YouTube, wikis, forums, reviews, photo sharing sites, microblogging, public mailing lists
- Underlying social networks are of keen interest
- **Challenges:**
  - Very dynamic, subject to fads
  - Integrating and understanding the SNs
  - Modeling and recognizing communities, influence, sentiment
  - Serious privacy concerns


SPOTter button
FieldMarking - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://ebiquity.umbc.edu/fieldmarking/
Go
Javascript Tutorial Ap...
Dynamic Webpages ...
JavaScript tuto
March 28, 2007
The bushes rejoice
Filed under: observation, indirect observation, phenology,
No, this is not suddenly turning into a political blog. Just annou
yesterday and today are in full bloom. I always thought of forsyt
though of course it is invasive and pervasive. This photo is from
datapoints when I get a chance to properly code them.
I am even more pleased to announce that the spicebushes have
native
Mar
Blog
Filed u
Wish it had been mine. During the upcoming National Wildlife W
the species we encounter in an area of our choosing. Details are
Done
http://spire.umbc.edu - Observation Form - Mozilla Firefox
Observation
Reporter: Andriy Parafiynyk
Observer: Cynthia Parr
Address: 1000 Hilltop Cicle, Baltimore, MD 21227
Latitude: 39.2525
Longitude: -76.7144
Date: 2007 yyyy 03 mm 28 dd
Taxon: forsythia
Common name: forsythia
How many: 1
Source URL: http://ebiquity.umbc.edu/fieldmarking/
http://www.flickr.com/photos/mveaches/420976239/
Just announcing the gaudy show of the forsythia which were just slightly open yesterday and today are in full bloom.
ents:
Once entered, the data is embedded into the blog post and Swoogle is pinged to index it
start
3:41 PM

Tags

Flickr tags: european starling

- (•) text search (title, description and tags)
- ( ) tag search (please supply comma delimited list of tags)

- (•) AND (all of the words in tag)
- ( ) OR (any of the words in tag)

Geographical Coordinates of the Bounding Box

Bottom Left Corner

Latitude: 41.994201560315695

Longitude: -71.6363525390625

Top Right Corner

Latitude: 42.80547682786028

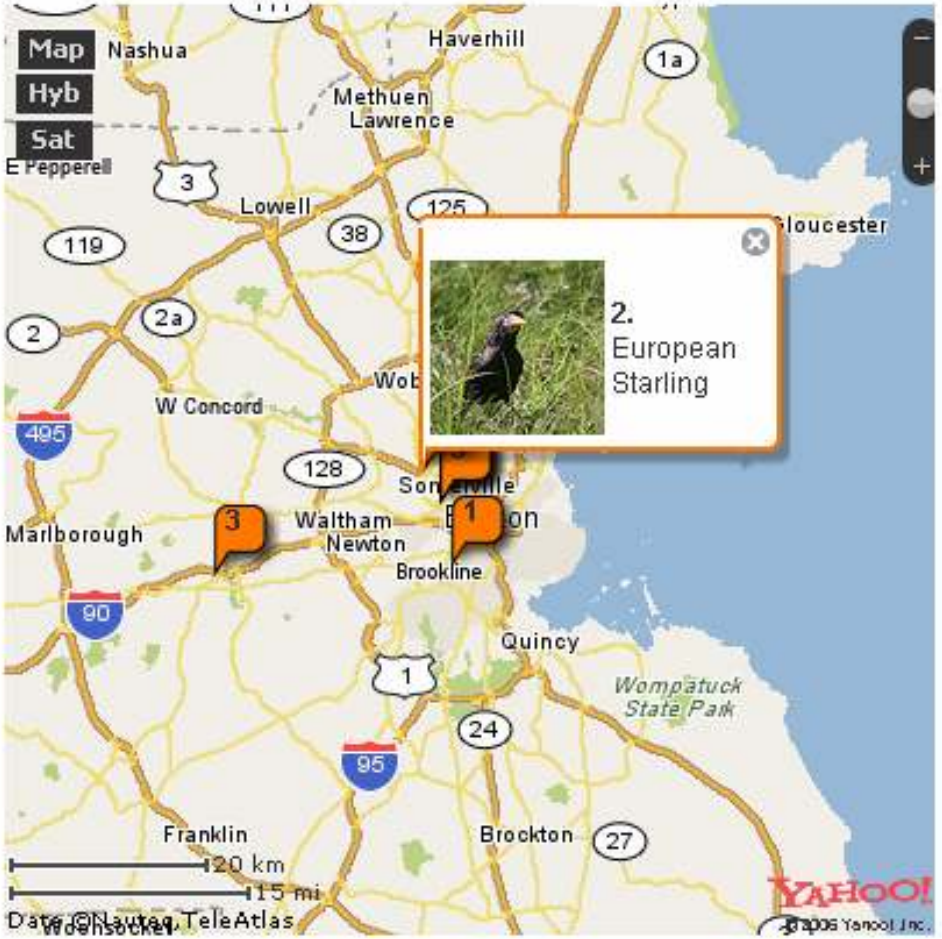
Longitude: -70.5377197265625

Sort results:

- (•) date-posted-desc
- ( ) date-posted-asc
- ( ) date-taken-desc
- ( ) date-taken-asc
- ( ) interestingness-desc
- ( ) interestingness-asc
- ( ) relevance

Submit

Spire Splickr



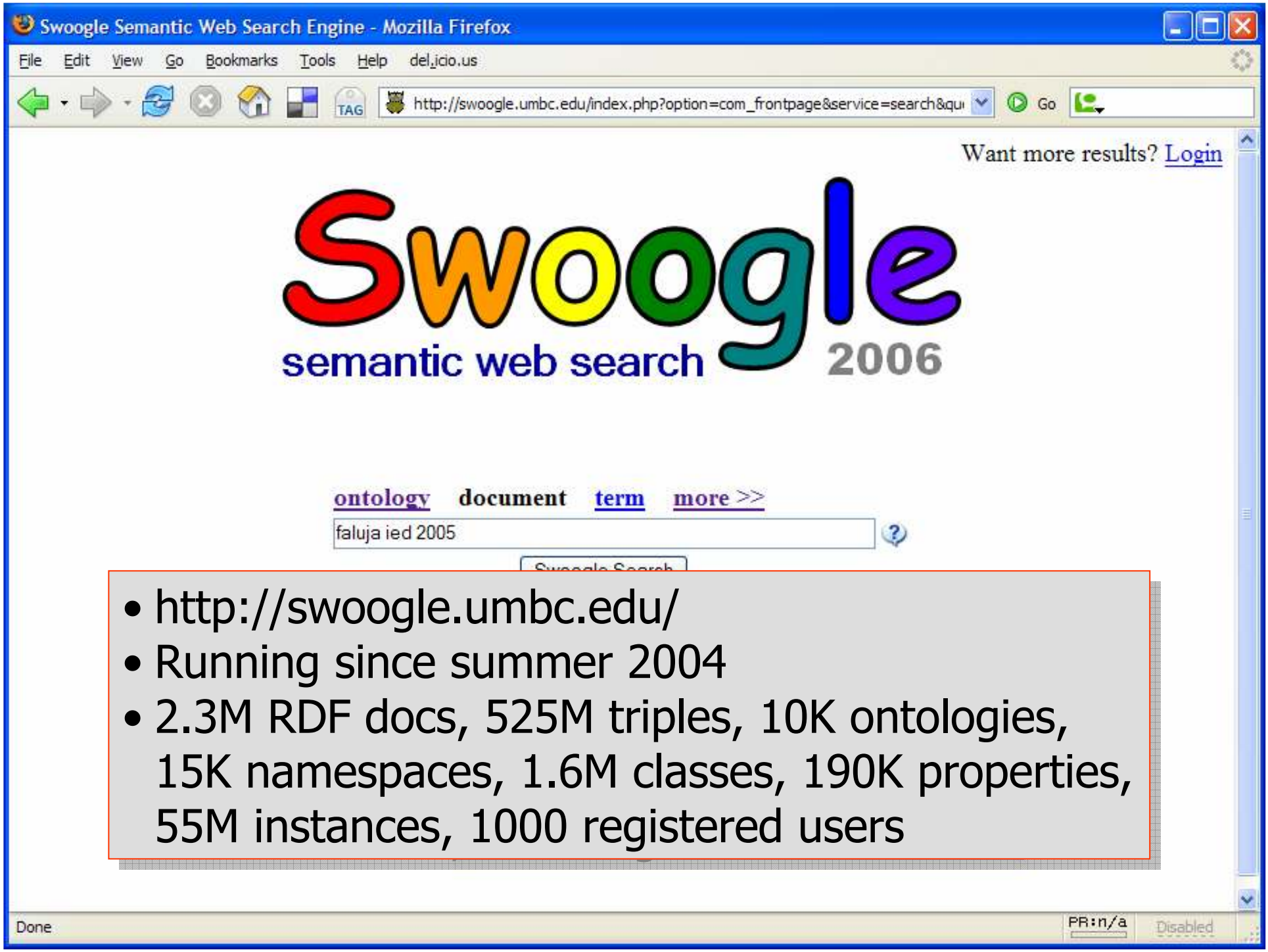
Change map focus to Massachusetts

There are 5 results. Show Results in OWL

#	Icon	Title	Tags	Location	Date taken

The Semantic Web

- The W3C model has been evolving, from "KR on the Web" to a "Web of data"
  - –Addresses data interoperability needs of Web 2.0
  - –Nascent RDFa standard for integration of content & data
  - –Slow but steady uptake industry (MS, Oracle, Adobe, …)
- Competing models like Google Base, Freebase, …
- **Challenges:** When and where and how much to do expensive reasoning, exploring interplay between KR and ML, trust and provenance, what's the "right" paradigm, inventing SW infrastructure



- http://swoogle.umbc.edu/
- Running since summer 2004
- 2.3M RDF docs, 525M triples, 10K ontologies, 15K namespaces, 1.6M classes, 190K properties, 55M instances, 1000 registered users

The Game Theoretic Web

- At the 2007 Singularity Summit, Peter Norvig was asked if Google had been surprised by any emergent behavior on the Web
- His answer was quite interesting…

The Game Theoretic Web

"The other thing that I hadn't really thought about when we started this all is **how game theoretic the whole thing is**. At first we thought of ourselves as this observer of the Web. That the Web was out there and we made a copy of it and indexed it and if people wanted they could come and access that index. But it was just a reflection of the Web out there. And now we understand that **we're co-evolving with the Web and that when we make a move it changes the Web and when the Web changes** we change and going back and forth. And so all the search engine optimizers are watching what we do and we watch what they do and **the Web is the interaction between us**."

Game Theoretic Web Challenges

- How do you do accurate data mining when the data providers are or may be trying to game the system?
- Current culprits: SEOs and spammers
- Increasingly: any web-savvy self promoter
  - E.g., most of us

Splog software

"Honestly, Do you think people who make $10k/month from adsense make blogs manually? Come on, they need to make them as fast as possible. Save Time = More Money! It's Common SENSE! How much money do you think you will save if you can increase your work pace by a hundred times? Think about it…"

"Discover The Amazing Stealth Traffic Secrets Insiders Use To Drive Thousands Of Targeted Visitors To Any Site They Desire!"

"Holy Grail Of Advertising... "

$ 197

"Easily Dominate Any Market, Any Search Engine, Any Keyword."

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(Some) Needed Resources

- Common datasets for Social Media and the Semantic Web
  - ICWSM is establishing a collection for social media
- Better abstract models for Social Media
  - E.g., SecondSpace model for the Blogosphere graph
  - E.g., understanding users' intent in using social media
- Better models for trust and provenance
- Ideas to let us "Do no evil" by respecting privacy