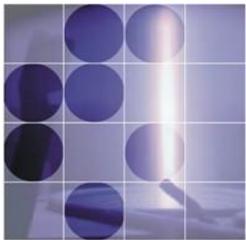


Context Computing

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QUINTELLIGENCE



cYcorp



Aachen, Oct 18th 2010

Outline

- ▶ ...en example of contextual understanding
- ▶ Definitions of context
- ▶ Gartner on Context computing
- ▶ Examples of context modeling

Berliner is a doughnut



Berliner is famous inventor



Emile Berliner (May 20, 1851 - August 3, 1929) was an inventor, best known for developing the disc record gramophone.

Berliner is a newspaper

Berliner Zeitung

Hör das Bild, sieh den Ton

Kein Trick, kein doppelter Boden: „VinylVideo“ zeigt Filme auf Schallplatten

VON TILMAN BAUMGÄRTEL

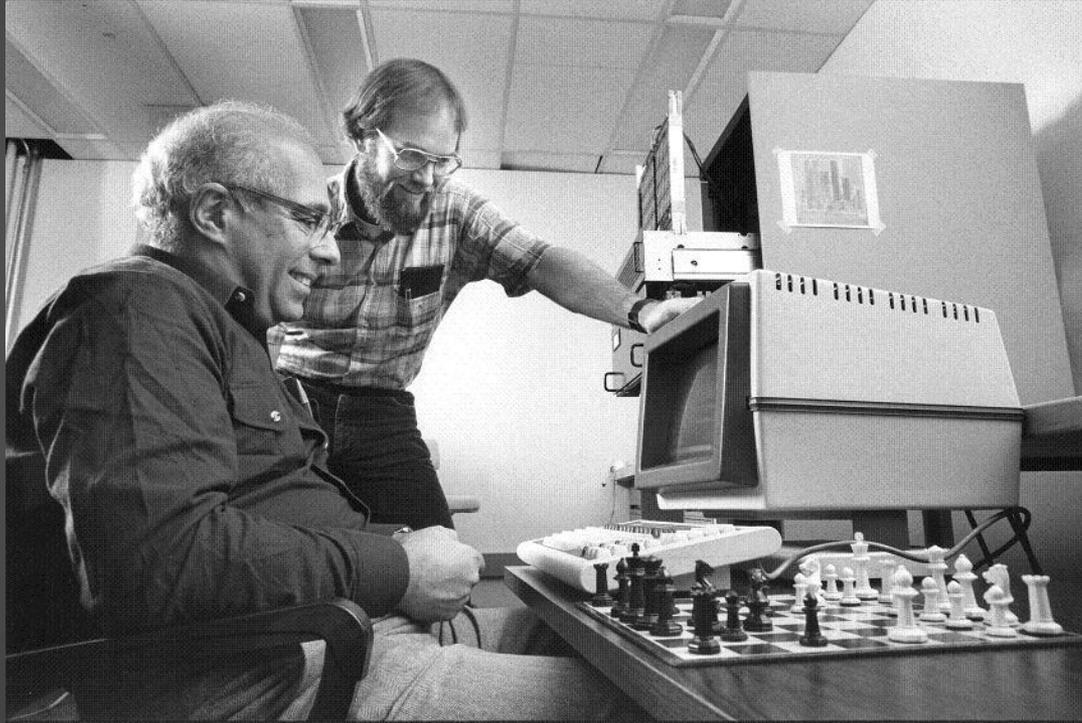
Das 20. Jahrhundert ist in der Rückschau auch ein veritabler Club der toten Medien: die Rohrpost, der Telegraph, die mechanische Schreibmaschine, die Schellackplatte, der Super-8-Film, Video 2000, BTX, die 5-Zoll-Diskette – alles Medien, die mal wichtig waren; alle lange tot und vergessen.

Gleichzeitig wird die Lebensdauer der neuen Medien immer kürzer. Wer wird in ein paar Jahren noch Datenträger wie VHS-Kassetten, MiniDiscs, CD-Roms, DVDs oder Hi-8-Kassetten benutzen? Oder sich an flüchtige digitale Datenformate mit so seltsamen Namen wie Quicktime, Shockwave, RealVideo, Liquid Audio oder MP-3 erinnern?

Langspielplatten aus Vinyl dagegen, die halten! Der Wiener Künstler Gebhard Sengmüller hat für die schwarzen Plastikscheiben, die inzwischen selbst eine Medienhistorie



Berliner is famous professor at CMU



Hans Jack Berliner (born January 27, 1929)
Professor of Carnegie Mellon University,
is a former World Correspondence Chess Champion.

Berliner is a beer



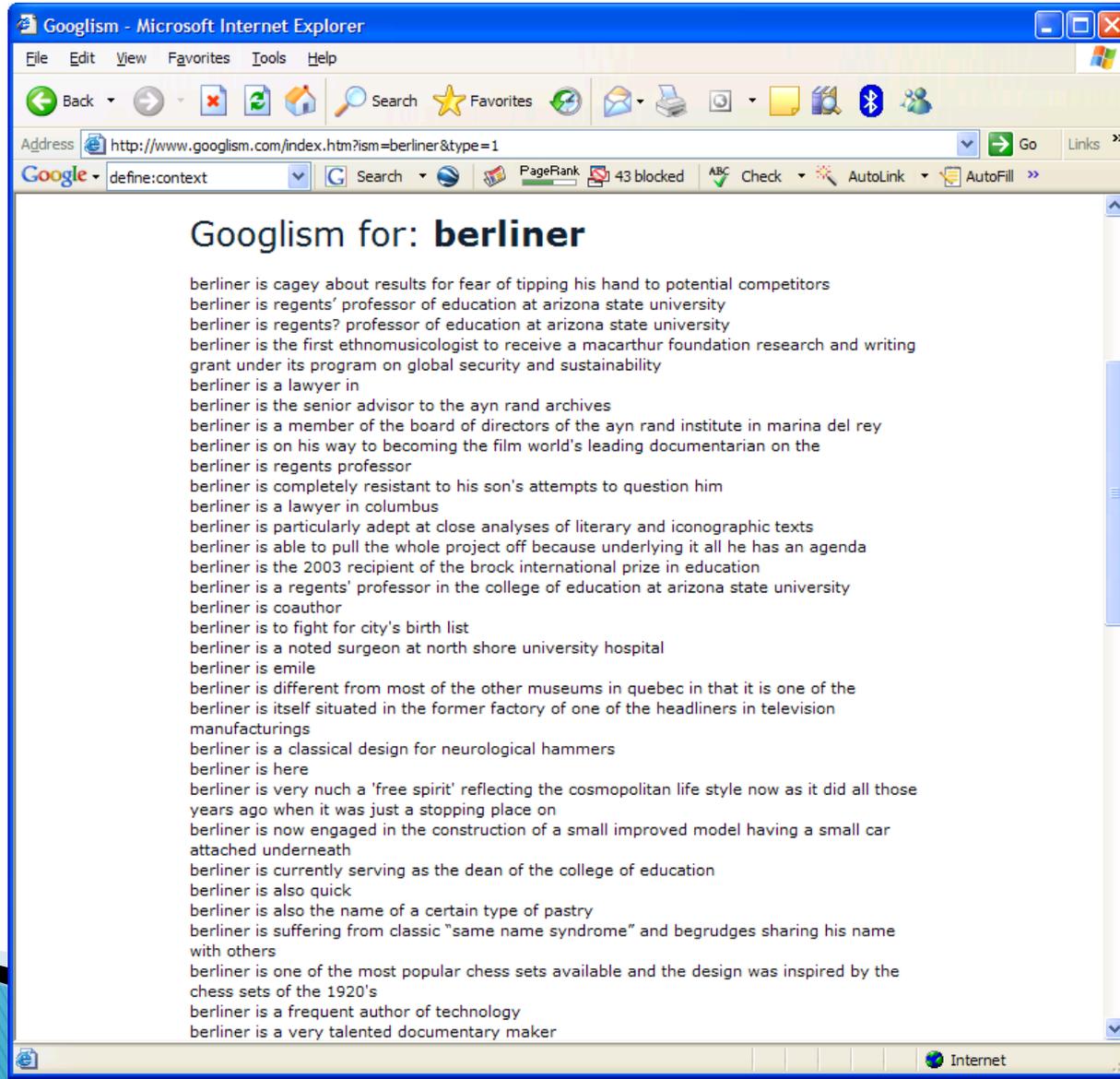
JFK is Berliner



[.....] Today, in the world of freedom, the proudest boast is "**Ich bin ein Berliner.**" [.....]

What the Web says about “who is Berliner”?

http://www.googlism.com/index.htm?ism=berliner



The screenshot shows a Microsoft Internet Explorer browser window with the title "Googlism - Microsoft Internet Explorer". The address bar contains the URL "http://www.googlism.com/index.htm?ism=berliner&type=1". The search bar shows the query "define:context". The main content area displays the heading "Googlism for: **berliner**" followed by a list of 30 search results. The results are as follows:

- berliner is cagey about results for fear of tipping his hand to potential competitors
- berliner is regents' professor of education at arizona state university
- berliner is regents? professor of education at arizona state university
- berliner is the first ethnomusicologist to receive a macarthur foundation research and writing grant under its program on global security and sustainability
- berliner is a lawyer in
- berliner is the senior advisor to the ayn rand archives
- berliner is a member of the board of directors of the ayn rand institute in marina del rey
- berliner is on his way to becoming the film world's leading documentarian on the
- berliner is regents professor
- berliner is completely resistant to his son's attempts to question him
- berliner is a lawyer in columbus
- berliner is particularly adept at close analyses of literary and iconographic texts
- berliner is able to pull the whole project off because underlying it all he has an agenda
- berliner is the 2003 recipient of the brock international prize in education
- berliner is a regents' professor in the college of education at arizona state university
- berliner is coauthor
- berliner is to fight for city's birth list
- berliner is a noted surgeon at north shore university hospital
- berliner is emile
- berliner is different from most of the other museums in quebec in that it is one of the
- berliner is itself situated in the former factory of one of the headliners in television manufacturings
- berliner is a classical design for neurological hammers
- berliner is here
- berliner is very nuch a 'free spirit' reflecting the cosmopolitan life style now as it did all those years ago when it was just a stopping place on
- berliner is now engaged in the construction of a small improved model having a small car attached underneath
- berliner is currently serving as the dean of the college of education
- berliner is also quick
- berliner is also the name of a certain type of pastry
- berliner is suffering from classic "same name syndrome" and begrudges sharing his name with others
- berliner is one of the most popular chess sets available and the design was inspired by the chess sets of the 1920's
- berliner is a frequent author of technology
- berliner is a very talented documentary maker



Googlisms on “Berliner” (1 / 2)

- ▶ berliner is regents' professor of education at arizona state university
- ▶ berliner is the first ethnomusicologist to receive a macarthur foundation research
- ▶ berliner is a member of the board of directors of the ayn rand institute in marina del rey
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- ▶ berliner is engaged in the construction of a small improved model having a small car attached underneath
- ▶ berliner is currently serving as the dean of the college of education
- ▶ berliner is also the name of a certain type of pastry
- ▶ berliner is one of the most popular chess sets available and the design was inspired by the chess sets of the 1920's
- ▶ berliner is the president and chief financial officer of berliner photography
- ▶ berliner is associate professor and chair of the program in health services management

Googlisms on “Berliner” (2/2)

- ▶ berliner is an aviation writer who was a full time employee of the national committee on aerial phenomena
- ▶ berliner is a member of radio club of america and is a graduate of rutgers university
- ▶ berliner is a 1978 graduate of the university of california hastings college of the law
- ▶ berliner is an ethnomusicologist at northwestern
- ▶ berliner is a partner for the firm fulbright & jaworski llp in los angeles
- ▶ berliner is a renowned authority on computers and chess
- ▶ berliner is general counsel and executive vice president of forest city ratner companies
- ▶ berliner is hofstra university's provost and senior vice president for academic affairs
- ▶ berliner is currently a faculty member at the new school for social research
- ▶ berliner is a new montreal museum dedicated to the sound industry
- ▶ berliner is a practitioner of tibetan buddhism
- ▶ berliner is the director of research for the harborview hospital program for traumatic stress in seattle
- ▶ berliner is a former professor of anatomy at the university of utah and from 1970 to 1973
- ▶ berliner is one of the most successful correspondence chess players of all time
- ▶ berliner is the founder and publisher of sweat magazine
- ▶ berliner is a recipient of the rockefeller
- ▶ berliner is one of the new breed of storytellers
- ▶ **berliner is suffering from classic “same name syndrome” and denies sharing his name with others**

...and, the answer to the initial question?

Most of the claims about
Berliner were true –
depending on the **context**.

...but what is “context”?

We have many definitions:

<http://en.wikipedia.org/wiki/Context>

<http://www.answers.com/context>

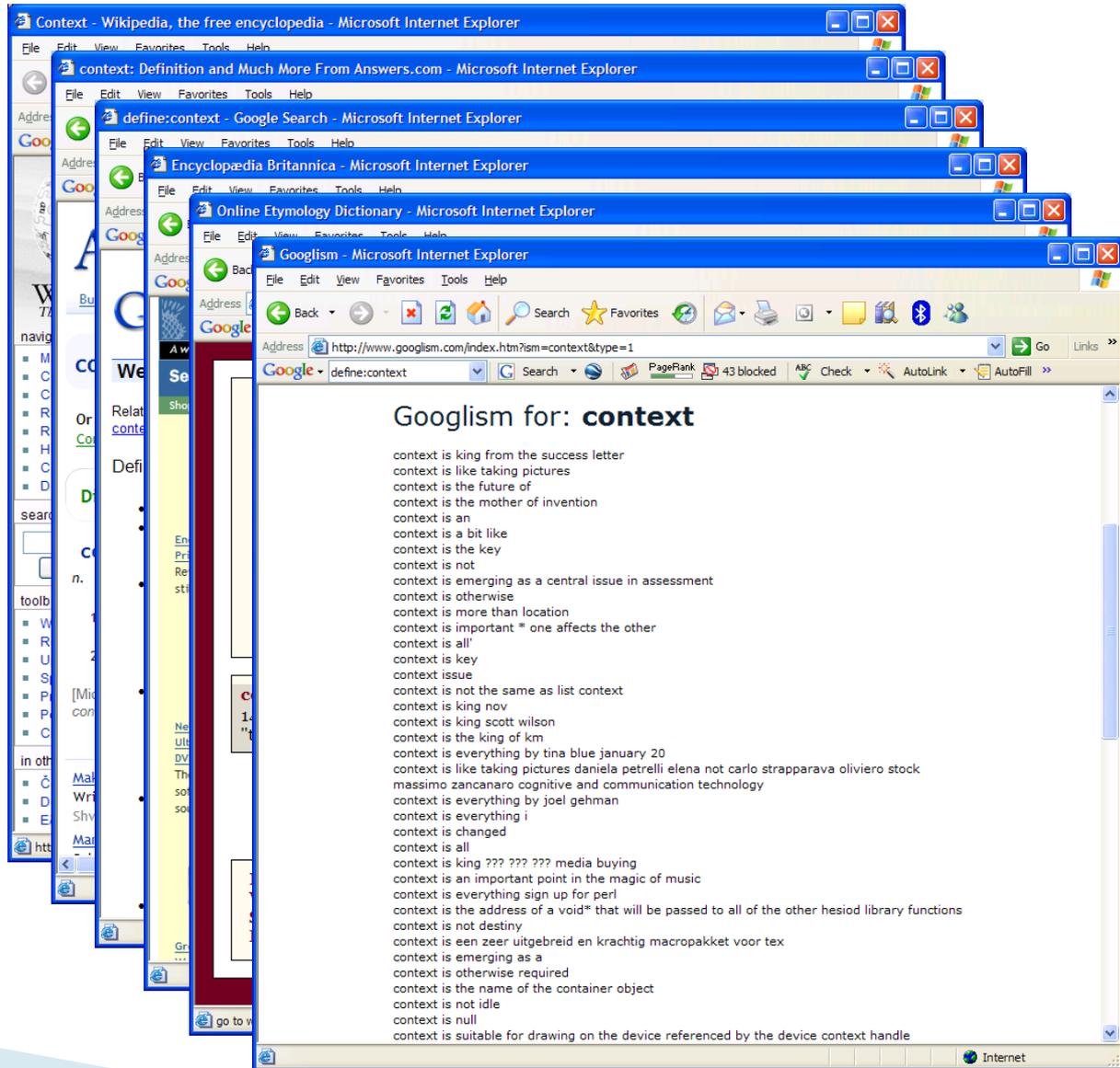
<http://www.google.com/search?num=100&hl=en&lr=&oi=defmore&defl=en&q=define:context>

<http://www.britannica.com/search?q=define:context&ct=>

<http://www.etymonline.com/index.php?term=context>

<http://www.googlism.com/index.htm?ism=berliner>

<http://www.googlism.com/index.htm?ism=context>



Definition of “context” from “Merriam–Webster's Online Dictionary”

Main Entry: **con·text**

Pronunciation: 'kän-"tekst

Function: *noun*

Etymology: Middle English, weaving together of words, from Latin *contextus* connection of words, coherence, from *contexere* to weave together, from *com-* + *texere* to weave -- more at TECHNICAL

1 : the parts of a discourse that surround a word or passage and can throw light on its meaning

2 : the interrelated conditions in which something exists or occurs : ENVIRONMENT, SETTING

- **con·text·less** /-"tekst-l&s/ *adjective*

- **con·tex·tu·al** /kän-'teks-ch&-w&l, k&n-, -ch&l/ *adjective*

- **con·tex·tu·al·ly** *adverb*

Context – general informal definition

- ▶ Context is always used as a term for **packaging information** for a particular need
 - ...packaging can appear in various forms
- ▶ A criterion for **selecting or prioritization** information from a broader pool of information could be called **contextual model**
- ▶ Good contextual model is the one which selects a **right information for a particular need**

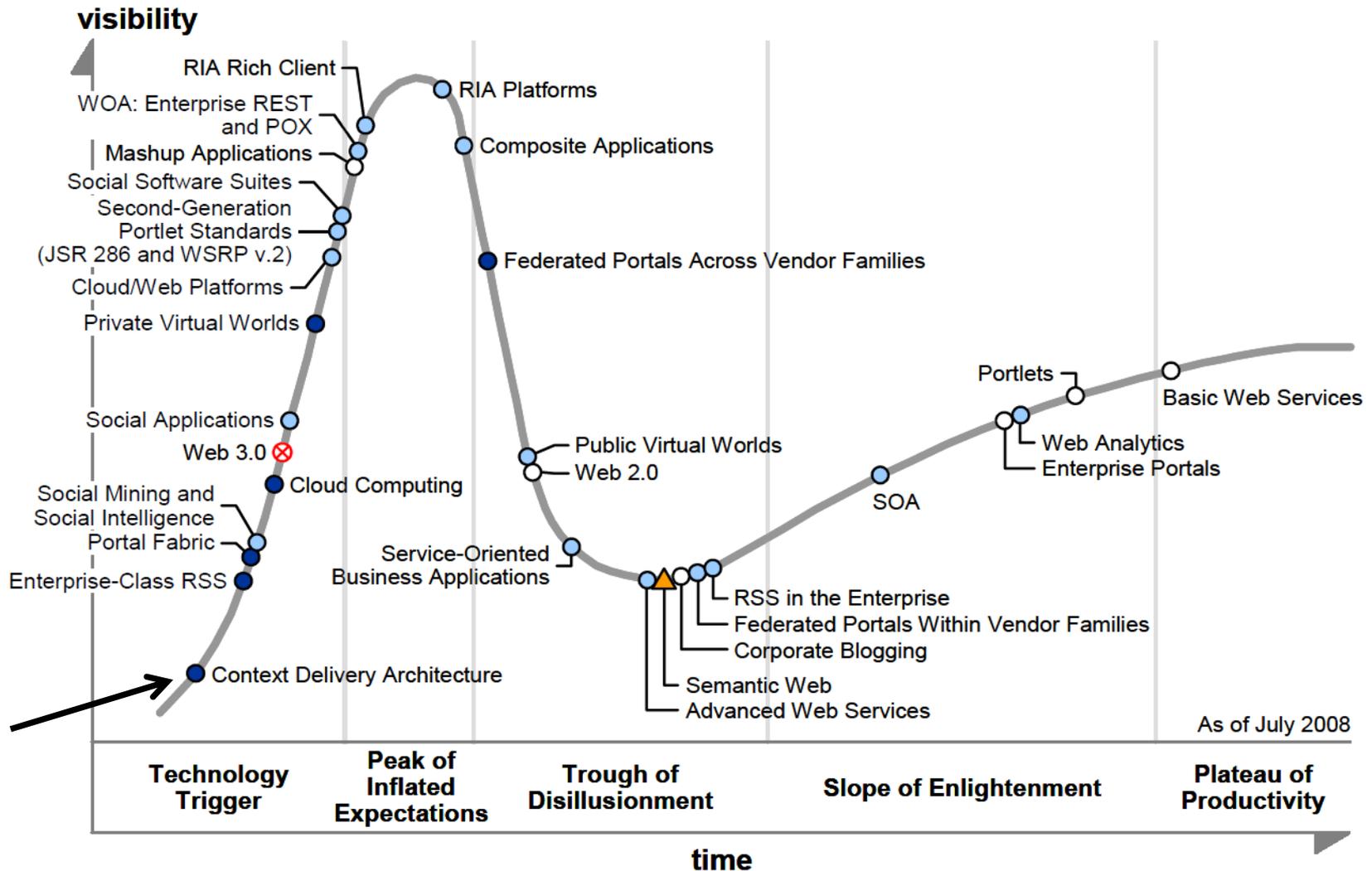
Context broader view (as addressed in literature)

- ▶ **Formalism:** logic based vs. probabilistic descriptions
- ▶ **Dynamics:** static vs. temporal/dynamic contexts
- ▶ **Scenarios:** global model vs. multiple local models
- ▶ **Cross modal:** modeling contexts across different data modalities (text, multilinguality, social networks, audio, images, video, sensors)
- ▶ **User aspects:** context for single user vs. user communities vs. contexts for machine processing
- ▶ **Efficiency:** expressivity vs. scalability
- ▶ **Acquisition:** manual vs. semi automatic vs. automatic approaches
- ▶ **Best practices:** economy of different application scenarios
- ▶ **Evaluation:** information compression (not really addressed yet)

Gartner on Context

Context delivery in Gartner's Hype Cycle

Figure 1. Hype Cycle for Web and User Interaction Technologies, 2008



Years to mainstream adoption:

○ less than 2 years

● 2 to 5 years

● 5 to 10 years

▲ more than 10 years

○ obsolete

⊗ before plateau

Source: Gartner (July 2008)

Gartner report on Context computing (1 / 2)

Gartner

Research

Publication Date: 23 July 2008

ID Number: G00158775

Key Issues for Context-Aware Computing, 2008

William Clark, Anne Lapkin

Context-aware computing is poised to have a significant impact on mainstream enterprises. CIOs and their staff must recognize that the underlying communication and software technologies are scalable and must be aware of the new opportunities and risks.

Gartner report on Context computing (2 / 2)

- ▶ Context-aware computing centers around the concept of leveraging information about the end user —
 - the environment, processes, communities and various persona employed when interacting with computing technologies.
 - In economic terms, context-aware computing is about lowering context-switching costs to increase efficiencies and effectiveness for businesses.
- ▶ The opportunities and challenges posed by context-aware computing are wide-ranging:
 - **For networking service providers:** Mobility, combined with location services and the presence information available in unified communications – context-enriched services (also known as "what you need is what you get [WYNIWYG]).
 - **In CRM:** This is where context-enriched services can be used to anticipate the requirements of end users at the moment of need across a variety of channels, such as e-commerce, m-commerce and voice interactions.
 - **In the development of software** that can react quickly enough to be relevant as context switches occur: This includes extending Web services, customer-facing applications and portals to include context-enriched services.
 - **In collaboration:** Where systems can correlate not only information sources but also communication and community resources in real time to enhance productivity and innovation.
 - **In search:** Where implementations that use location and social graphs can be extended and opened up.
 - **In information management:** Where increased understanding of context information will enable independent software vendors (ISVs) and software developers to leverage information sources and to create sophisticated rules that can be used by intelligent agents.
 - **In security:** Where model-driven rules can enable users to switch easily among personas in a private and secure way.

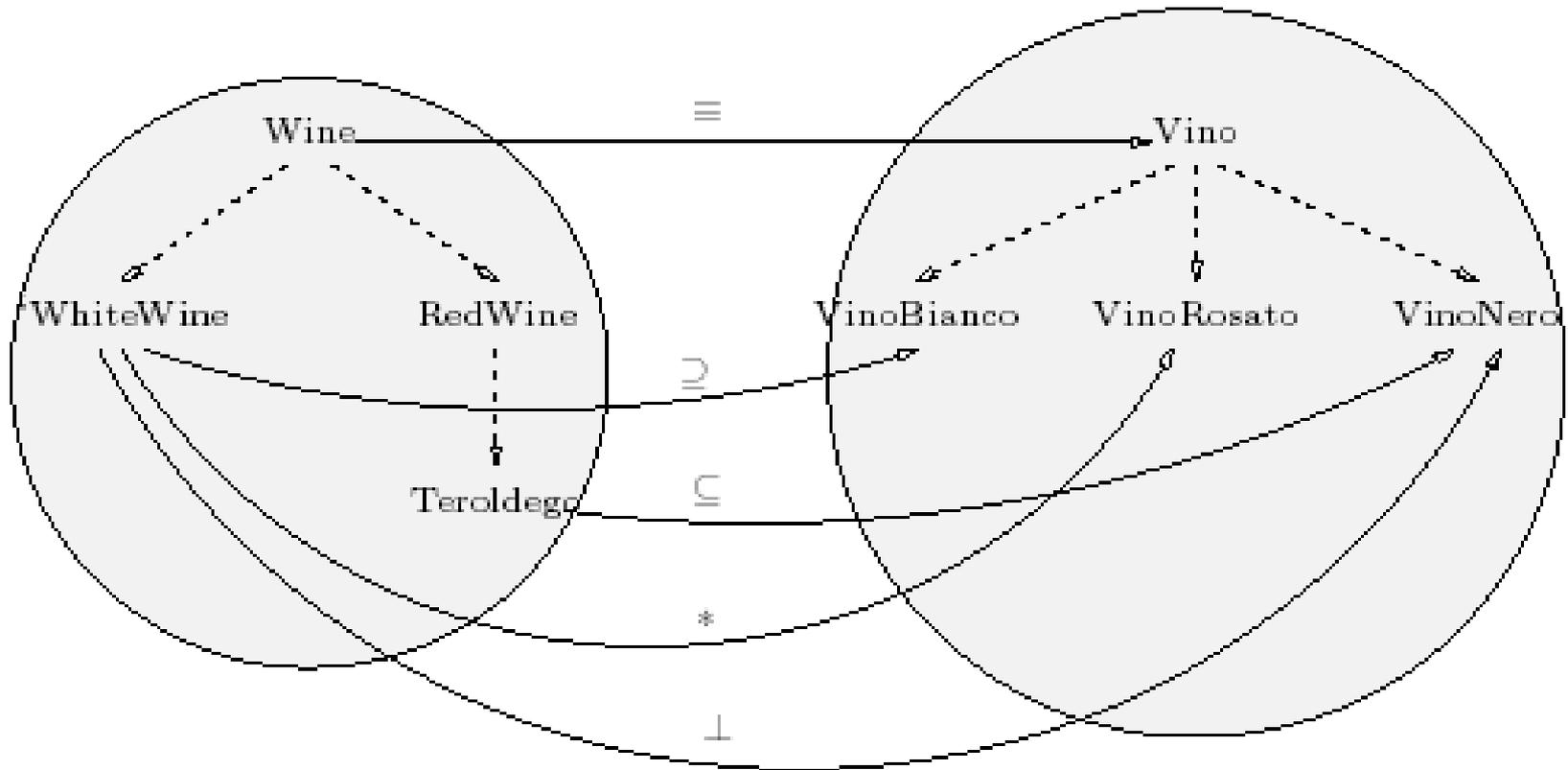
Examples of context modeling

Contextualizing Ontologies

Context OWL (C-OWL)

A **contextual ontology** is a pair:

- OWL ontology
- a set of context mappings

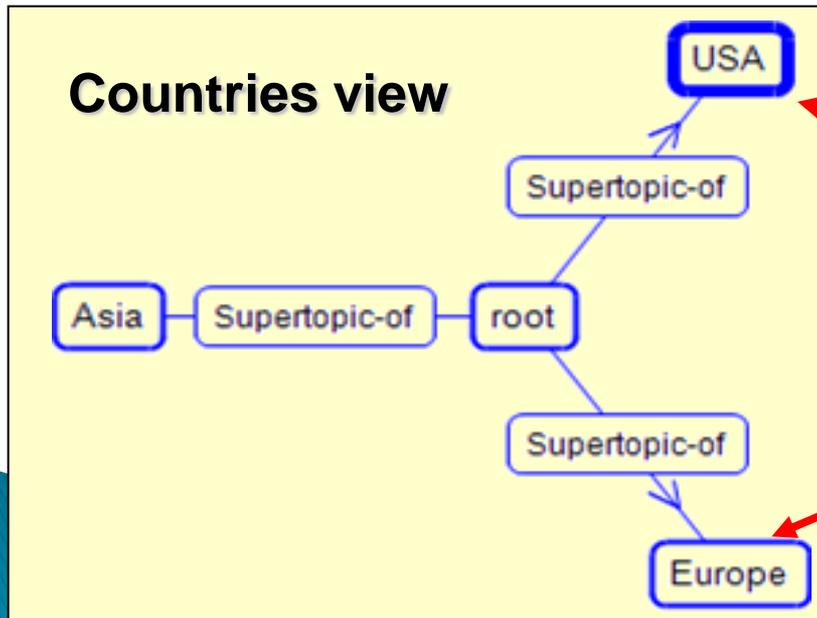
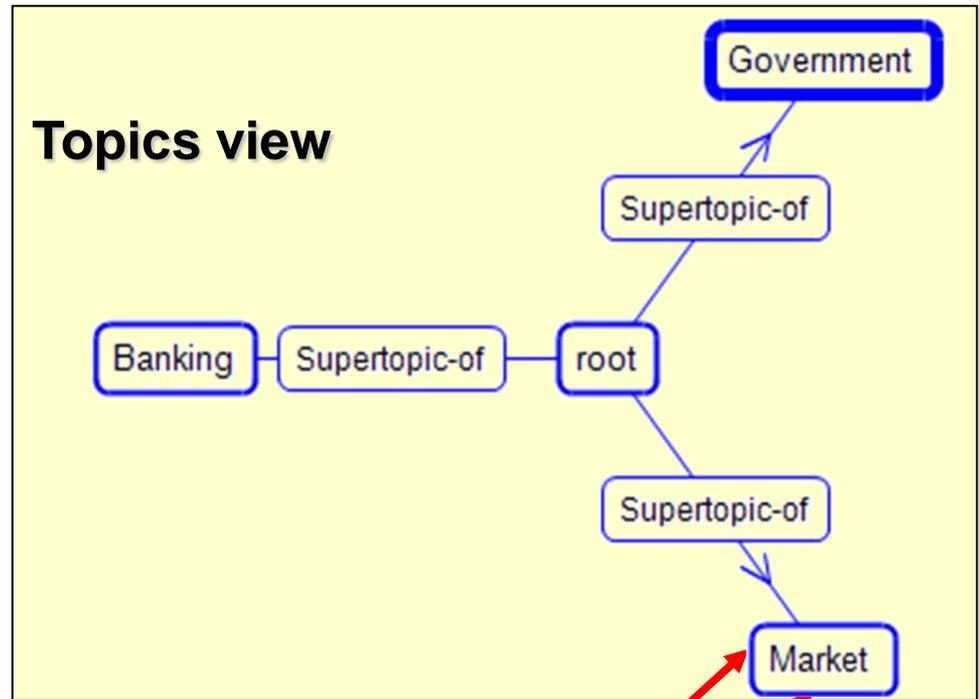


Slide taken from "C-OWL: contextualizing ontologies" Fausto Giunchiglia October 22, 2003

Contextual Categorization

Example: Simultaneous Ontologies from SEKT

- ▶ Data: Reuters news dataset (830,000 articles)
- ▶ Each news article is assigned into two categorization schemas:
 - Topics
 - Geography
- ▶ Each categorization schema offers a different view on the data
 - ...both optics were calculated automatically with KCCA method



Documents

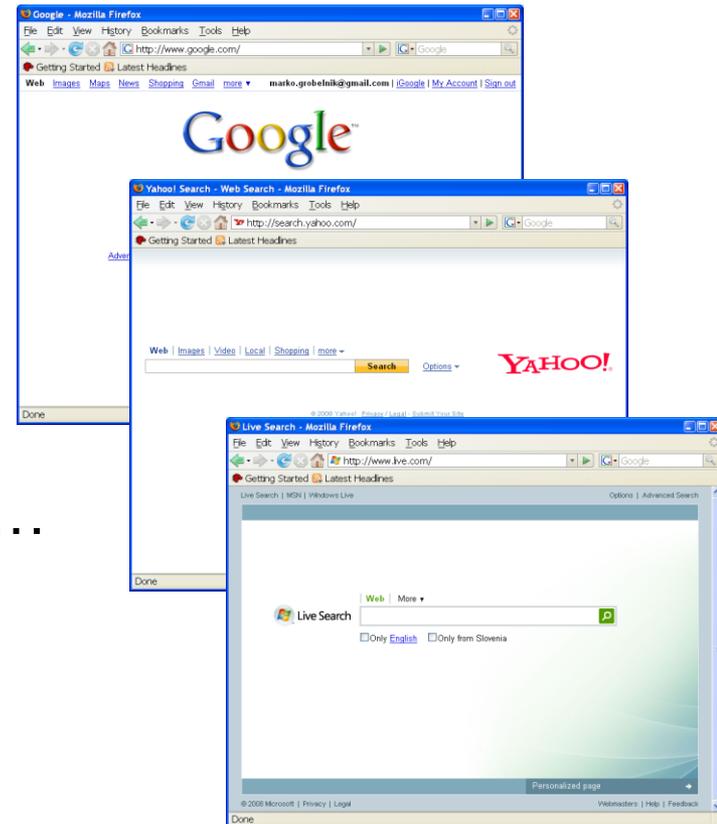
Two overlapping document snippets are shown. The top snippet, titled 'USA: Lloyd's CEO questioned in recovery suit in U.S.', contains text about Ronald Sandler, chief executive of Lloyd's of London, and a second day of interrogation about the world insurance market's dollar recovery plan. The bottom snippet, titled 'UK: UK takeovers and mergers - August 20', contains text about additions and deletions to a takeovers and mergers list for the week beginning August 19, as provided by the Takeover Panel. Red arrows point from the 'USA' node in the Countries view to the top document snippet, and from the 'Market' node in the Topics view to the bottom document snippet.

Visual & Contextual Search

(WWW2008)

Contextualized search

- ▶ What is the most common tasks where we manipulate text in everyday life?
 - “Internet search”!
- ▶ ...but – how smart is search technology today?
 - ...not too smart!
 - It is sophisticated, but not smart...



Example: searching for “Jaguar”

- ▶ Query “jaguar” has many meanings...
- ▶ ...but the first page of search engines doesn't provide us with many answers
- ▶ ...there are 84M more results

jaguar - Google Search - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.google.com/search?hl=en&q=jaguar

Getting Started Latest Headlines

Web Images Maps News Shopping Gmail more

marko.grobelnik@gmail.com | Web History | My Account | Sign out

Google jaguar Search Advanced Search Preferences

Web Images Results 1 - 10 of about 84,200,000 for jaguar [definition]. (0.05 seconds)

Jaguar
Official worldwide web site of **Jaguar** Cars. Directs users to pages tailored to country-specific markets and model-specific websites.
www.jaguar.com/ - Similar pages - Note this

Jaguar UK - Jaguar Cars
Jaguar XF. TEST DRIVE. Brochure. Dealer. eNewsletter. SEARCH SITEMAP COMPANY
Privacy Policy Accessibility Statement Contact Us TERMS & CONDITIONS ...
www.jaguar.com/uk/ - 17k - Cached - Similar pages - Note this
More results from www.jaguar.com »

Jaguar US - Home
Jaguar USA official website. ... Build Your **Jaguar**. Request Brochure. Get Email Updates.
Locate a Dealer. Search Your Profile Site Map Contact Us Privacy ...
www.jaguarusa.com/ - 20k - Cached - Similar pages - Note this

Jaguar - Wikipedia, the free encyclopedia
The **jaguar** (*Panthera onca*, pronounced /ˈdʒæɡjuə/ in British English, or /ˈdʒæɡwɑr/ in American English) is a New World mammal of the Felidae family and one ...
en.wikipedia.org/wiki/Jaguar - 153k - Cached - Similar pages - Note this

Jaguar Cars
English · Français.
www.jaguar.ca/ - 4k - Cached - Similar pages - Note this

Done

Context sensitive search with <http://searchpoint.ijs.si>

The screenshot shows a search engine interface for the query 'jaguar'. The search results are ranked dynamically based on the search point. A conceptual map on the right side of the interface shows a network of related terms, with 'jaguar' highlighted in red. The map includes terms such as 'Mammalia', 'Vehicles', 'Shopping', 'Sports', 'Games', 'Console Platforms', 'Aviation', 'Society', 'Recreation', 'Enthusiasts', 'Aircraft', 'Models', 'Makes and Models', 'Top', 'NFL', and 'Parts and Accessories'. The search results list includes:

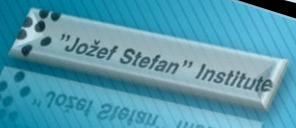
- (9) [Jaguar](#)
General information and facts from Big Cats Online.
<http://www.abf90.dial.pipex.com/jaguar.htm>
- (59) [Jaguar, Jaguar Profile, Facts, Information, Photos, Pictures ...](#)
Get jaguar profile, facts, information, photos, pictures, sounds, habitats, reports, news, and more from National Geographic.
<http://animals.nationalgeographic.com/animals/mammals/jaguar.html>
- (8) [Jaguar - Wikipedia, the free encyclopedia](#)
The jaguar (*Panthera onca*) is a New World mammal of the Felidae family and one of four "big cats" in the Panthera genus, along with the tiger, ...
<http://en.wikipedia.org/wiki/Jaguar>
- (11) [Jaguar](#)
Jaguar Facts, Jaguar Photos and Jaguars in the news at the world's largest big cat rescue and sanctuary.
<http://www.bigcatrescue.org/jaguar.htm>
- (1) [Jaguar](#)
Official worldwide web site of Jaguar Cars. Directs users to pages tailored to country-specific markets.
<http://www.jaguar.com/>
- (32) [Jaguar](#)
Contains extensive information about the Jaguar. Information includes habitat, body size, and life span.
<http://www.abf90.dial.pipex.com/bco/jaguar.htm>
- (2) [Jaguar UK - Jaguar Cars](#)
Jaguar & Ownership. Highlights. Gallery. Models & Pricing. Design Your XK. TEST DRIVE. Brochure. Dealer. eNewsletter ...
<http://www.jaguar.co.uk/>
- (17) [Jaguar Enthusiasts' Club](#)
World's largest audited membership. UK-based, JEC's site has extensive resources available for the enthusiast, including information about their Sections, ...
<http://www.jec.org.uk/>
- (20) [San Diego Zoo's Animal Bytes: Jaguar](#)
Get fun and interesting jaguar facts in an easy-to-read style from the San Diego Zoo's Animal

Query

Conceptual map

Search Point

Dynamic contextual ranking based on the search point



Context in news – reporting bias

Example: News media context

- ▶ We modeled contextual point of view used in two different news sources for describing the same events
- ▶ We compared CNN and Aljazeera reports about the same events
 - ...300 aligned articles describing the same story from both sources
- ▶ The same topics are expressed with two different contextual views:
 - CNN with:
 - **Insurgents, Terrorist, Terrorism, ...**
 - (Insurgents, Troops, Baghdad, Iran, Militant, Police, Suicide, Terrorist, United, National, Sunday, Monday, Ap, Hussein, Called, Alleged, Israeli, Syria, Thursday, Terrorism, ...)
 - Aljazeera with:
 - **Rebels, Fighters, Resistance, ...**
 - (Iraq, Iraqi, Attacks, Adding, Mr, Claims, Rebels, Withdrawing, Report, Fighters, President, Resistance, Occupation, British, Injured, Army, Demanded, Hit, Muslim, Americans, ...)

Conclusion

- ▶ The relevance of “Context” in computing seems to be growing
- ▶ ...many application areas see an opportunity in extending its value by introducing “context sensitivity”
- ▶ More details do to be found in ISWC2006 Tutorial on “context sensitivity”
 - http://videlectures.net/iswc06_athens_ga/
 - ...includes many theoretical and AI approaches