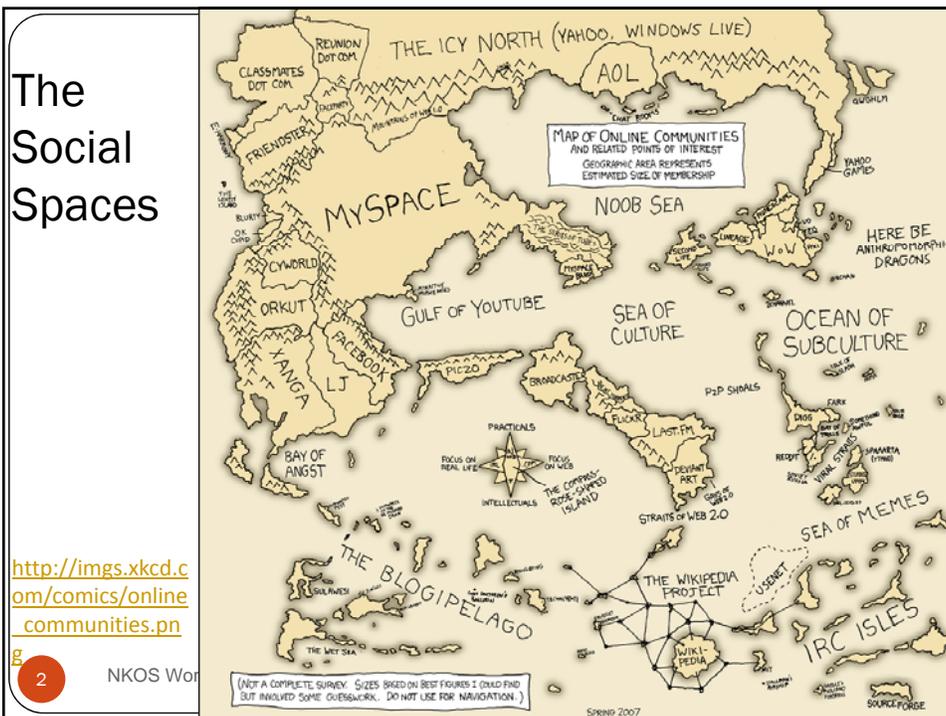


Folksonomies and Taxonomies: Where the Two Can Meet

Jian Qin
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Syracuse University

NKOSWorkshop
September 11, 2008, Washington, DC



Semantics defined

Linguistics:

Study of meaning at the level of words, phrases, sentences, and even larger units of discourse.

Computer science:

An application of mathematical logic; the meaning of programs or functions

Psychology:

Relationship between memory and meaning. Semantic memory is memory for meaning.

Philosophy:

Study of symbolic logic: meaning and truth, meaning and thought, and the relation between signs and what they mean.

Sources: The Columbia Encyclopedia, Sixth Edition. 2008. <http://www.encyclopedia.com/doc/1E1-semantic.html>; Wikipedia. <http://en.wikipedia.org/wiki/Semantics>

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Semantics in social spaces

- Study of meanings and relationships between the meanings of expressions in social spaces
 - Tags as the agents for semantics in social spaces can be studied
 - as words (linguistics)
 - as programmatic symbols (computer science)
 - as memory for meaning (psychology)
 - as symbolic logic (philosophy)
 - as metadata (library and information science)

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Semantics in social spaces

- Community-based
 - Focus on a group of relevant topics/ concepts
 - Sharing common interest among members
 - Dynamic, evolving scopes of semantics
- Randomly generated by independent users
 - Personal view and perception of the world
 - Varying quality of information
 - High volume of information noise

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Semantics in social spaces

- Valuable source for knowledge organization systems.
However, there are challenges:
 - How will social semantics contribute to controlled semantics or vice versa?
 - What methods and techniques will be useful for utilizing the social semantic sources?

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Semantics in social spaces

- Names for semantics in social spaces:
 - Folksonomies
 - Tags
- Three components:
 - Agents communicate with their beliefs and intentions
 - Such beliefs and intentions are public
 - Each communication implies three aspects of meaning:
 - Objective
 - Subjective
 - Practical

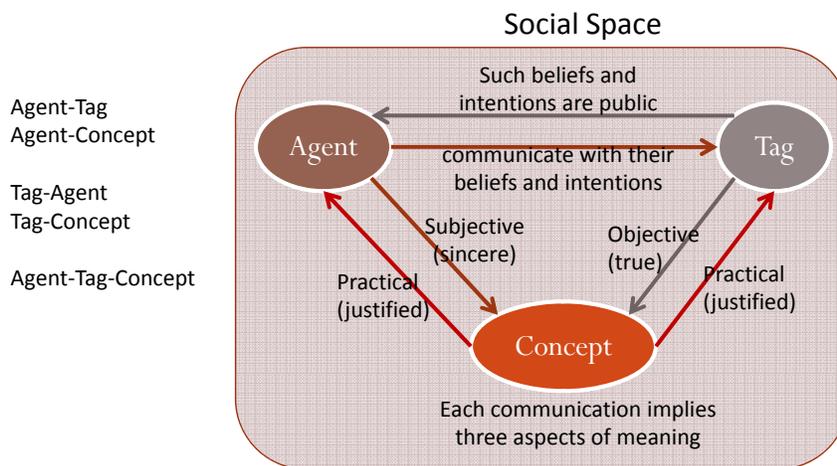
Singh, Munindar P. (2000). A social semantics for Agent Communication Languages. In F. Dignum & M. Greaves (Eds.), *Issues in agent communication (Lecture notes in computer science; vol. 1916)* (pp. 31-45). London: Springer.

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Modeling semantics in social spaces



Based on: Mika, Peter. (2005). Ontologies are us: A unified model of social networks and semantics. In Y. Gil et al. (Eds.): *Proceedings of the 4th International Semantic Web Conference (ISWC 2005)*, Galway, Ireland, November 6-10, 2005 (pp. 522-536). Berlin: Springer-Verlag.

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The agent-tag model

The screenshot shows a Flickr search result for the tag 'olympic'. The search bar contains 'olympic' and the results are sorted by 'Most relevant'. A specific photo is highlighted with a red circle around its title: 'For the countdown anniversary of 2008 Beijing Olympics' by user 'risemeagain'. The photo itself is a pink flower. Annotations with red arrows point to the photo (labeled 'Object'), the user name (labeled 'Agent'), and the tags 'with china, fab, beautiful, bravo' (labeled 'Semantics represented by tags'). A quote on the right says 'Agents communicate with their beliefs and intentions.'

Agents communicate with their beliefs and intentions.

Object

Agent

Semantics represented by tags

The tag-concept model

The screenshot shows a del.icio.us search result for the tag 'olympic'. The search bar contains 'olympic' and the results are sorted by 'popular'. A list of related tags is circled in red: 'olympics china olympic sports design beijing travel politics fitness 2008'. Below this, several search results are listed, with the first one circled in red: 'The Official Website of the Beijing 2008 Olympic Games'. Annotations with red arrows point to the 'del.icio.us' logo (labeled 'Agent'), the search bar (labeled 'Object'), and the list of related tags (labeled 'Semantics represented by tags'). A quote on the right says 'Shared tags on resources (high occurrences of tags can represent trends and patterns in semantics)' and 'Such beliefs and intentions are public, ...'

Shared tags on resources (high occurrences of tags can represent trends and patterns in semantics)

Such beliefs and intentions are public, ...

The agent-tag-concept model

Search results for: olympics [56 articles]
 All articles on CiteSpace from 2008-02-10 09:14:59 as of 2008-03-27 21:22:44

Users interested in: olympics
 smcc emiliofernandezpena DavidDMuir jasonhanson isadora jannon route145 aalibes RolandKappe thanasis stefanheering hyndman salkkk akober dmajka turiel bigbossman brian

Groups interested in: olympics
 • ACS-Basel
 • Subgrup4

Articles discussing: olympics

- The Living Room Celebration of the Olympic Games**
Journal of Communication, Vol. 38, No. 4. (1988), pp. 771-81.
 by Eric R. Isenhardt
 posted to **olympics** by emiliofernandezpena on 2008-02-10 09:14:59 as ★★
- The Olympics at the Millennium: Power Politics and the Games**
 (31 August 2000)
 by Ken Coates, Sidonie Smith
 posted to **athletic body branding competition consumption culture drugs gender identity masculinity media nation olympics race spectacle sport transnational** by smcc on 2008-03-27 21:22:44

1.

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The agent-tag-concept model

del.icio.us history for <http://www.ariadne.ac.uk/issue46/ide> check url del.icio.us search

Main Articles: 'The (Digital) Library Environment: Ten Years After', Ariadne Issue 46
<http://www.ariadne.ac.uk/issue46/dempsey/>
 this url has been saved by 55 people.
[save this to your favorites](#)

user notes

Good articles for Poznan Presentation
 majanko May '08

focus on the UK, given Ariadne's scope, but will draw in other examples as appropriate. The Ariadne story, and the UK digital library story, mesh with the JISC story in various ways. -- appears MUCH INTERESTING STUFF HERE
 mh Dec '07

discovery is happening elsewhere
 pamilo Jul '07

reflections by Lorcan Dempsey on how libraries have changed
 jum_cha_cha Jun '07

processes
 javany Dec '07

An article from Feb 06 Ariadne, looking back at 10 years of a digital library environment. Includes some complex diagrams of elearning/ rscvales.
 rscvales Sep '07

common tags cloud | list

615 Academic Ariadne Google LongTail LorcanDempsey Metadata OPAC article articles behavior business digital digital_libraries digital_libraries information interoperability libraries library library2.0 search sh-verde technology users web

posting history

» first posted by PeterJ to library digitallibraries interoperability web2.0 library2.0 framework services dtagged dc:creator=dempseylorcan ariadne dc:publisher=ukoln dcterms:issued=2006-02 Jul '08

by sallyanderson to libraries library technology 1840 May '08

by majanko to digital_libraries, e-resources Mar '08

by zainnie to articles lorcan personal learning information management behavior digital_libraries interoperability libraries library2.0 search users Jun '07

by dm415 to digitallibraries opac library2.0 lis2570 by mh to library2.0 determinants jsc-dpie jsc-tle Dec '07

by Lettiab to lorcandempsey exhibit primo d2d by pamilo to opac Sep '07

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- Three aspects of meaning:
- objective – communication is true
- subjective – communication is sincere
- practical – communication is justified

KOS: subject headings

- Structures that organize knowledge rather than information objects

MeSH Tree Structures - 2008

[Return to Entry Page](#)

- [Anatomy \[A\]](#)
- [Organisms \[B\]](#)
- [Diseases \[C\]](#)
- [Chemicals and Drugs \[D\]](#)
- [Analytical, Diagnostic and Therapeutic Techniques and Equipment \[E\]](#)
- [Psychiatry and Psychology \[F\]](#)
- [Biological Sciences \[G\]](#)
- [Natural Sciences \[H\]](#)
- [Anthropology, Education, Sociology and Social Phenomena \[I\]](#)
- [Technology, Industry, Agriculture \[J\]](#)
- [Humanities \[K\]](#)
- [Information Science \[L\]](#)
- [Named Groups \[M\]](#)
- [Health Care \[N\]](#)
- [Publication Characteristics \[V\]](#)
- [Geographical \[Z\]](#)

1

MeSH Tree Structures

Information Science [L01]

- [Book Collecting \[L01.040\]](#)
- [Chronology as Topic \[L01.080\]](#)
- [Classification \[L01.100\] +](#)
- [Communication \[L01.143\] +](#)
- [Communications Media \[L01.178\] +](#)
- [Computer Security \[L01.209\]](#)
- [Computing Methodologies \[L01.224\] +](#)
- [Copying Processes \[L01.240\] +](#)
- [Data Collection \[L01.280\] +](#)
- [Data Display \[L01.296\] +](#)
- [Informatics \[L01.313\]](#)**
 - [Dental Informatics \[L01.313.249\]](#)
 - [Medical Informatics \[L01.313.500\]](#)
 - [Nursing Informatics \[L01.313.650\]](#)
 - [Public Health Informatics \[L01.313.750\]](#)
- [Information Centers \[L01.346\] +](#)
- [Information Management \[L01.399\]](#)
- [Information Services \[L01.453\] +](#)

KOS: thesauri

- Relationships that connect concepts and indicate how concepts are related to one another

Data Processing

Descriptor Details

Start an ERIC Search using **Data Processing** as a search criterion

Record Type: Main
Scope Note: Systematic handling, manipulation, and computation of information by machines
Category: Information/Communications Systems
Broader Terms: [Information Processing](#);
Narrower Terms: [Natural Language Processing](#);
Related Terms: [Automation](#); [Calculators](#); [CD ROMs \(2004\)](#); [Computer Centers](#); [Computer Interfaces](#); [Computer Networks](#); [Computer Peripherals](#); [Computer Science](#); [Computer Software](#); [Computer System Design](#); [Computers](#); [Data](#); [Data Analysis](#); [Data Collection](#); [Data Conversion \(2004\)](#); [Data Processing Occupations](#); [Database Design](#); [Database Management Systems](#); [Databases](#); [Electromechanical Technology](#); [Electronic Equipment](#); [Hypermedia](#); [Information Systems](#); [Information Technology](#); [Instrumentation](#); [Management Information Systems](#); [Online Systems](#); [Programming](#); [Programming Languages](#); [Workheats](#); [Workstations](#);
Used For: [Automatic Data Processing](#); [Data Processing Centers](#); [Data Tabulation](#); [Electronic Data Processing \(1967-1980\)](#); [Input Output \(2004\)](#); [Shared Time \(Computers\)](#); [Time Sharing \(2004\)](#);
Use Term: n/a
Add Date: 07/01/1966
Postings: 3397

Counseling	Mathematics
Curriculum Organization	Measurement
Disabilities	Mental Health
Economics and Finance	Occupations
Educational Levels, Degrees, and Organizations	People and Cultures
Educational Process: Classroom Perspectives	Physical Education and Recreation

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KOS: authority file

- Pre-coordinated terms to reflect a wide variety of combinations of concepts:
 - Topic-form
 - Topic-subtopic
 - Topic-geographic location
 - Person-form
 - ...

Authorized Refs & Notes	67	314	Olympics.
	68	63	Olympics.
	69	1	Olympics.
Authorized Headings	70	0	Olympics (2003)
References	71	0	Olympics (7th : 1920 : Antwerp, Belgium)
	72	1	Olympics--Abstracts.
	73	1	Olympics--Aerial views.
References	74	0	Olympics and Mega Events Research Observatory
	75	3	Olympics--Anecdotes.
References	76	0	Olympics art competitions
	77	4	Olympics--Bibliography.
	78	1	Olympics--Bibliography--Catalogs.
	79	1	Olympics--Biography.
	80	3	Olympics--Buildings.
	81	1	Olympics--Buildings--Bibliography.
	82	2	Olympics--Buildings--Design and construction.
	83	1	Olympics--Catalogs.
	84	1	Olympics--Centennial celebrations, etc.
Authorized Headings	85	0	Olympics (Choreographic work : Arpino)
	86	1	Olympics--Citizen participation.
	87	8	Olympics--Collectibles.

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Where differences lie...

- Semantics in social spaces (empirical knowledge)
 - Empirical representation of information objects
 - *A posteriori* knowledge dependent upon sense experience
 - Contextually sophisticated
 - Covert, unorganized concepts hiding in the vast tag mines
- KOS (rational knowledge)
 - Rational representation of knowledge in information objects
 - Top-down, controlled approach
 - Formal expressions of concepts
 - Intellectual and deductive relationships among concepts

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Describing "weddings" in two types of semantics

Clusters of tags from Del.icio.us

▼ related tags

- flowers
- honeymoon
- jewelry
- places
- our_ceremony
- wedding-pla
- reception
- bio
- caribbean
- travel
- vacation

Clusters of tags from Flickr

[bride](#), [groom](#), [love](#), [marriage](#), [dress](#), [portrait](#), [white](#), [couple](#), [happy](#), [woman](#)

→ See more in this cluster...

[flowers](#), [bouquet](#), [roses](#), [red](#), [pink](#)

→ See more in this cluster...

[cake](#), [reception](#), [weddingcake](#), [dance](#), [dancing](#), [food](#)

→ See more in this cluster...

[friends](#), [family](#), [party](#)

→ See more in this cluster...

Terms related to weddings in Art & Architecture Thesaurus

☒ **weddings** (rites of passage, <cultural ceremonies>, ... Events)

Terms:
weddings (preferred, C,U,D,American English-P)
wedding (C,U,AD,American English)

Facet/Hierarchy Code: K,KM

Hierarchical Position:

- ☒ Activities Facet
- ☒ ... Events
- ☒ ... events
- ☒ ... ceremonies
- ☒ ... cultural ceremon...
- ☒ ... rites of passage
- ☒ ... weddings

Related concepts:
distinguished from ... **marriage**
... (social structure, <sociological concepts>)

1. ☒ **black letter**
(Typefaces (type forms), <script and type forms>, ... Components) [3002000]
texts, wedding
wedding types
wedding typefaces
types, wedding
typefaces, wedding
wedding texts
2. ☒ **dower chests**
(Chests, case furniture, ... Furnishings and Equipment) [300039125]
wedding chests
chests, wedding
3. ☒ **wedding dresses**
(<dresses by function>, dresses (garments), ... Furnishings and Equipment)
wedding gowns
wedding gowns
gowns, wedding
gowns, wedding
dresses, wedding
wedding dress
4. ☒ **wedding lamps**
(Cerical wick lamps, clamps by form), ... Furnishings and Equipment) [3001...]
lamps, wedding
wedding lamp
5. ☒ **weddings**
(rites of passage, <cultural ceremonies>, ... Events) [300069138]
wedding

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Describing "weddings" in two types of semantics

Clusters of tags from Del.icio.us

▼ related tags

- flowers
- honeymoon
- jewelry
- places
- our_ceremony
- wedding-planner
- reception
- bio
- caribbean
- travel
- vacation

Clusters of tags from Flickr

[bride](#), [groom](#), [love](#), [marriage](#), [dress](#), [portrait](#), [white](#), [couple](#), [happy](#), [woman](#)

→ See more in this cluster...

[flowers](#), [bouquet](#), [roses](#), [red](#), [pink](#)

→ See more in this cluster...

[cake](#), [reception](#), [weddingcake](#), [dance](#), [dancing](#), [food](#)

→ See more in this cluster...

[friends](#), [family](#), [party](#)

→ See more in this cluster...

Terms related to weddings in LCSH

SOURCE OF HEADINGS: Library of Congress Online Catalog
INFORMATION FOR: Weddings.

Please note: Broader Terms are not currently available

Select a Link Below to Continue...

Authority Record

Narrower Term: [Celebrity weddings](#)

Narrower Term: [Color in weddings](#)

Narrower Term: [Destination weddings](#)

Narrower Term: [Marriage customs and rites](#)

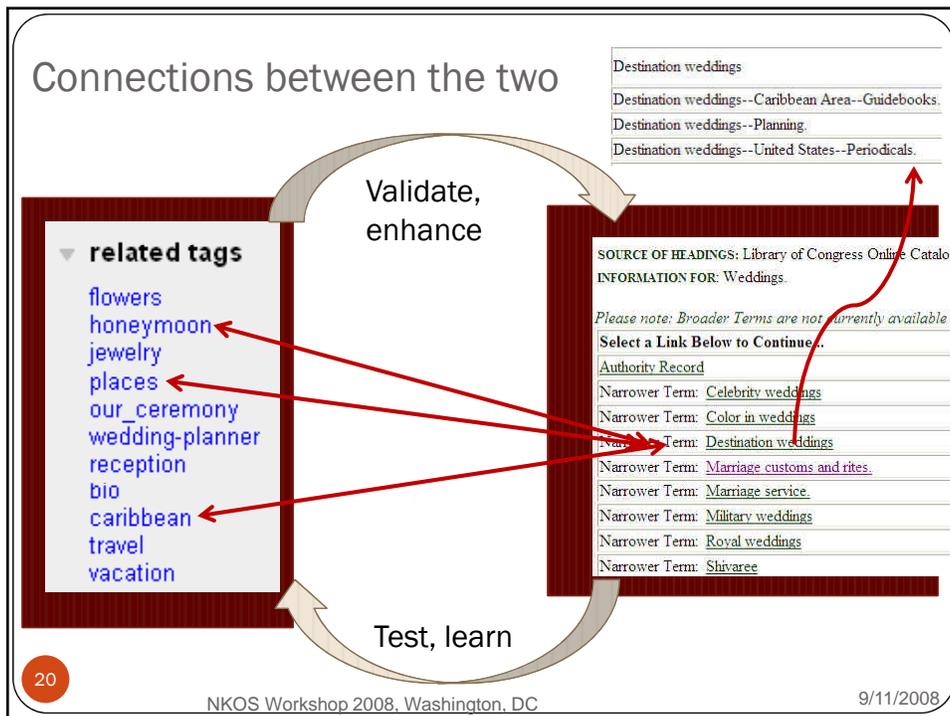
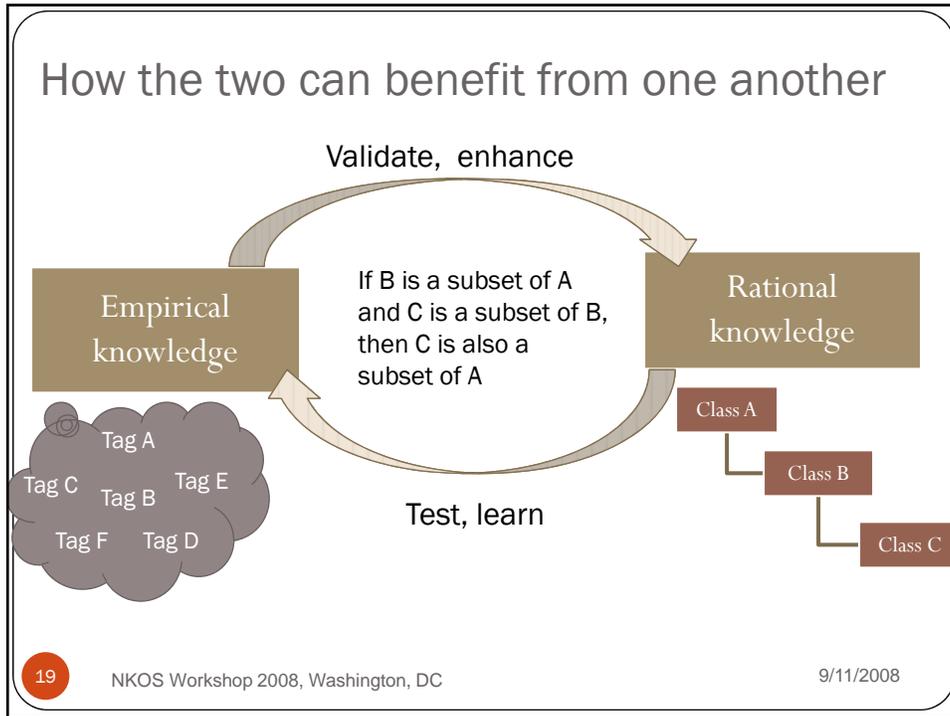
Narrower Term: [Marriage service](#)

Narrower Term: [Military weddings](#)

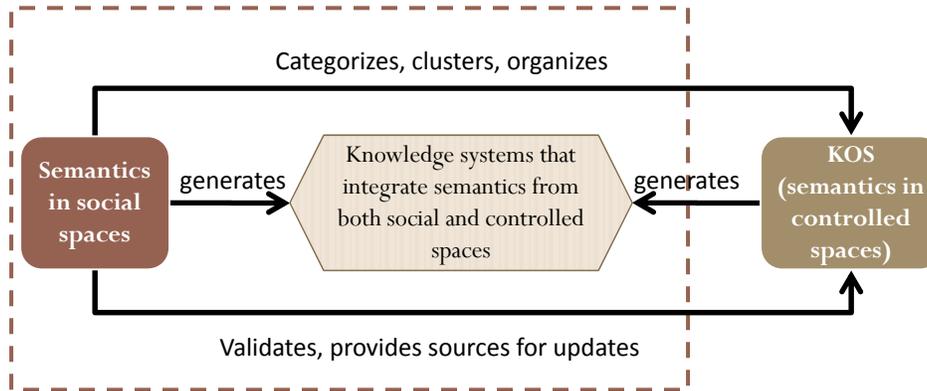
Narrower Term: [Royal weddings](#)

Narrower Term: [Shivaree](#)

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Where the two types of semantics meet



Some examples...

Next slide

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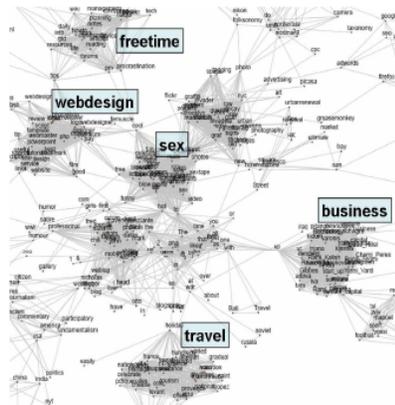
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Example: Ontology emergence in del.icio.us

The del.icio.us tags are associated through co-occurrence on items and the clusters emerging

The five main clusters of interest are based on the Concept-Object network



travel	cote, provence, villa, azur, mas, holiday, vacation, tourism, france, heritage
business	venture_capital, enterprise, up, start, venture, newspaper, capital, Segev, pi-tango, vc
free time	procrastination, info, advice, gtd, life, notes, planning, daily, reading, forums
sex	hot, to, street, pictures, on, photos, free, celeb, adult, lesbian
web design	design, designer, webdesign, premium, logo, logos, dreamweaver, templates, best, good

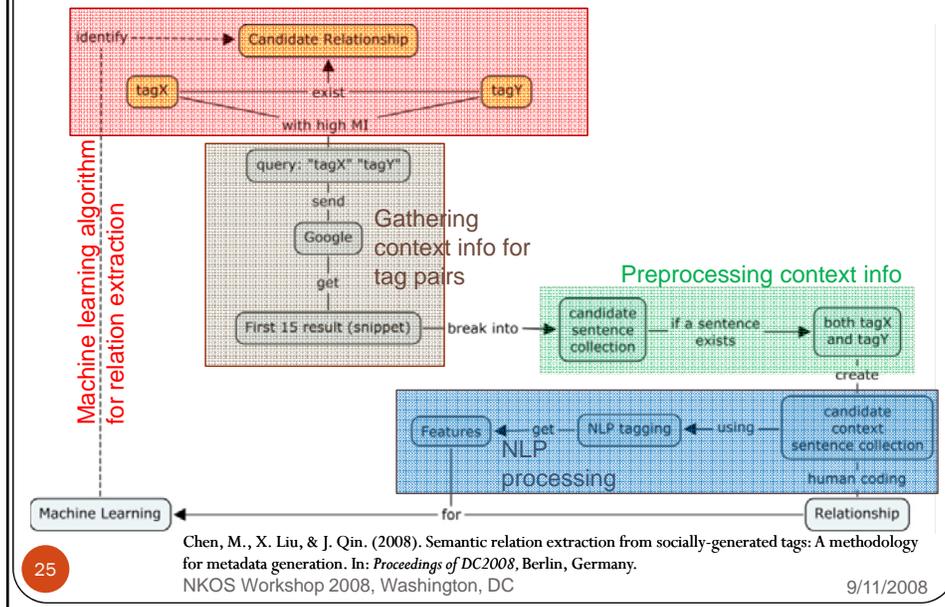
22

Mika, Peter. (2005). Ontologies are us: A unified model of social networks and semantics. ISWC 2005, Galway, Ireland, Nov. 6-10, 2005. <http://www.cs.vu.nl/~pmika/research/papers/ISWC-folksonomy.pdf>

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Example: relation extraction from Flickr tags (cont'd)



Semantics in social spaces: Implications for future KOS

- Evolving with a more dynamic, faster fashion in
 - Vocabularies
 - Structures
 - Relationships
- Automatic extraction of lightweight ontologies becomes more common
 - NLP, machine learning, statistical methods
 - Utilization of combined lexical sources, community-based semantic sources, controlled vocabulary sources

Slide download:

http://www.metadataetc.org/presentations/Qin_NKOS2008.pdf

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