



Emergent Semantics in BibSonomy

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- **Introduction**
 - Folksonomies
 - BibSonomy
 - Formal Model
- Mining Association Rules
- Search and Ranking: FolkRank
- Outlook+References



- Folksonomies allow *users*

to assign *tags*

to *resources*

in order to manage
bookmarks, photos,
...

- Lightweight knowledge management
 - Less overhead
 - Integrated into daily routine

Firefox Help Firefox Support Plug-in FAQ showAll

Disable CSS Forms Images Information Miscellaneous Outline Resize Validation

BibSonomy

tags :: popular
myBibSonomy :: post bookmark :: post bibtex

bookmarks

previous | next

my_backup.cmd
to mysql backup differential as public by schmitz on
2006-01-25 09:25:03.0 [edit](#) [delete](#)

Parameter für über 200 Kartenbezugssysteme
to transformation datum gps geo map coordinate as
public by jaeschke on 2006-01-25 08:00:46.0 [copy](#)

BibTeX

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Providing \$\$\$-Mining
Arik Friedman and Ass
to imported as public b
09:23:07.0 [pick](#) [copy](#)

Local L2-Thres Mining in Peer
R. Wolff and K. Bhadu



- Folksonomy: lightweight structure
- Emergent semantics e.g. in users tag vocabulary
- Our goals:
 - Develop algorithms to support emergent semantics in Folksonomies
 - Improve our own system BibSonomy
- This talk:
 - Gives overview on our work
 - For details see papers (last slide)



<http://www.bibsonomy.org>

BibSonomy :: tag ::

A blue social bookmark and publication sharing system.

[tags](#) · [groups](#) · [popular](#)
[myBibSonomy](#) · [post bookmark](#) · [post bibtex](#)

logged in as [rja](#) · [help](#) · [faq](#) · [blog](#)
0 picked to [download](#) · [friends](#) · [settings](#) · [logout](#)

bookmarks

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<http://www.bibsonomy.org>

BibSonomy::tag::web - Mozilla Firefox

Datei Bearbeiten Ansicht Gehe Lesezeichen Extras Hilfe

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BibSonomy :: tag ::

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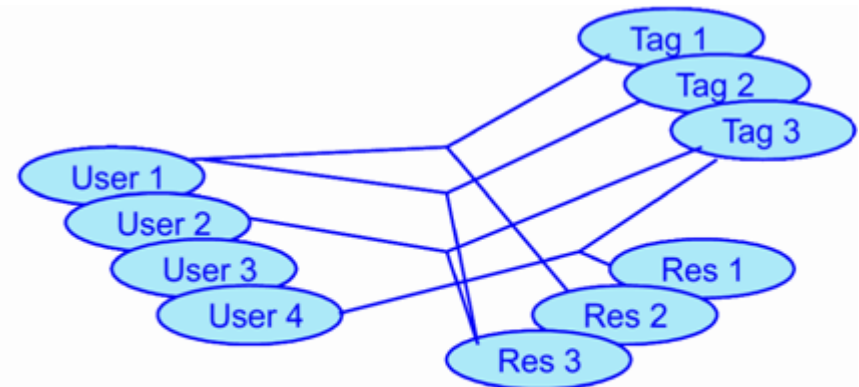
Semantic Network Analysis of Ontologies
Bettina Hoser and Andreas Hotho and Robert Jäschke and Christoph Schmitz and Gerd Stumme. *Proceedings of the 3rd European Semantic Web Conference (accepted for publication)* (2006)
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- Formal semantic for URL schema
- Fast tag editing + tag editor, tag recommendations
- Tag relations
- Import: XML (del.icio.us), Firefox, BibTeX, ACM/Citeseer
- Export: RSS, BibTeX, Endnote, XML, OWL, HTML
- RESTful API (work in progress)
- Groups of users, private posts, friend network
- Duplicate detection, DBLP, „shopping cart“, private PDFs/notes
- Work in progress: information extraction, WebDAV, GeoTagging



- A Folksonomy $F = (U, T, R, Y, <)$ consists of
 - Users U
 - Tags T
 - Resources R
 - Assignments $Y \subseteq U \times T \times R$
 - A user-specific binary relation $<$ on T
- A Personomy P_u of a user $u \in U$ is the restriction of F to assignments (u, t, r)
- Folksonomy can be seen as
 - Tripartite Hypergraph
 - Triadic Formal Context





- Data from the del.icio.us folksonomy site
- Consists of
 - $|U| = 75,242$ users
 - $|T| = 533,191$ tags
 - $|R| = 3,158,297$ resources
 - $|Y| = 17,362,212$ triples
- Up to July 2005



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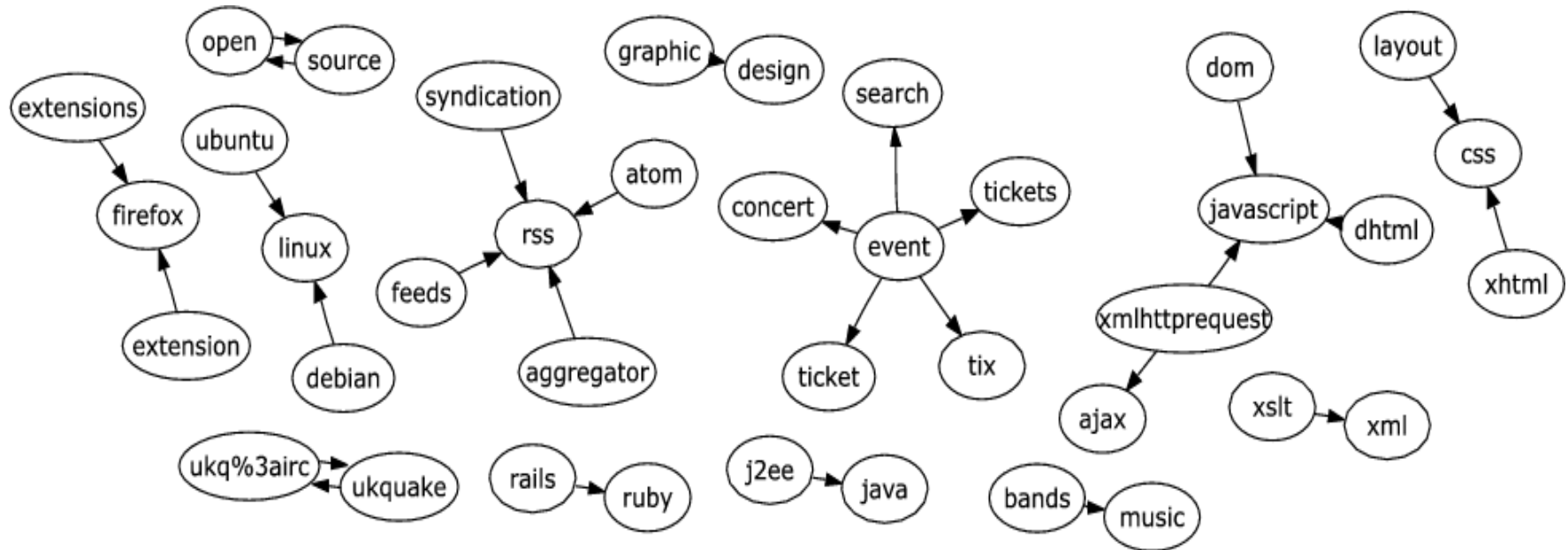
- Apply rule mining techniques to
 - build recommenders
 - suggest tags
 - find communities
 - learn tag relations
- Standard rule mining works on binary relation:
 - e.g. contains(shopping transaction, item)
- Apply rule mining to folksonomies
 - ternary relation
 - use different projections
 - Apriori algorithm

Example Results: Learning the "<" relation



$$K_1 = (U \times R, T, I_1)$$

- If users tag some resource with tags t_i , they also use t_j
- Usage:
 - Tag recommendations
 - Learning implications (subsumption)





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- PageRank in the web: pages are important if a lot of important pages are linking to them
- Authority values in a folksonomy are propagated along the hyperlink structure of the folksonomy
 - Resources are important, if they are tagged by important users with important tags
- Similar for users and tags
- Goals:
 - Rank users, tags, resources by their importance
 - Use rankings for recommendations
 - Trend Detection

Search and Ranking: FolkRank



Results: "boomerang"

PageRank without preference

PageRank with preference

FolkRank with preference

Tag	ad. PageRank	Tag	ad. PRank	Tag	FolkRank
system:unfiled	0,0078404	boomerang	0,4036883	boomerang	0,4036867
web	0,0044031	shop	0,0069058	shop	0,0066477
blog	0,0042003	lang:de	0,0050943	lang:de	0,0050860
design	0,0041828	software	0,0016797	wood	0,0012236
software	0,0038904	java	0,0016389	kassel	0,0011964
music	0,0037273	programming	0,0016296	construction	0,0010828
programming	0,0037100	web	0,0016043	plans	0,0010085
css	0,0030766	reference	0,0014713	injuries	0,0008078
reference	0,0026019	system:unfiled	0,0014199	pitching	0,0007982
linux	0,0024779	wood	0,0012378	rdf	0,0006619
tools	0,0024147	kassel	0,0011969	semantic	0,0006533
news	0,0023611	linux	0,0011442	material	0,0006279
art	0,0023358	construction	0,0011023	trifly	0,0005691
blogs	0,0021035	plans	0,0010226	network	0,0005568
politics	0,0019371	network	0,0009460	webring	0,0005552
java	0,0018757	rdf	0,0008506	sna	0,0005073
javascript	0,0017610	css	0,0008266	socialnetworkanalysis	0,0004822
mac	0,0017252	design	0,0008248	cinema	0,0004726
games	0,0015801	delicious	0,0008097	erie	0,0004525
photography	0,0015469	injuries	0,0008087	riparian	0,0004467
fun	0,0015296	pitching	0,0007999	erosion	0,0004425



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- Include proposed methods in BibSonomy
- Explore and support the usage of the tag relation
 - cycles, (non)-equivalence, transitive closure, learning
- Visualization (e.g. of tag cloud)
- Up to now focus on graph structure of folksonomy
 - explore other properties like date, usage, data sources, ...



<http://www.bibsonomy.org>

<http://www.kde.cs.uni-kassel.de>

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