Computer Supported Collaborative Knowledge building : P2P Semantic Wikis Approach

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Agenda

- General Introduction to CSCW
- Collaborative knowledge building process
- Collaborative knowledge building tools
  - Wikis
  - Semantic Wikis
  - P2P Semantic Wikis
- Conclusion

Wikis

- Wikis are the most popular **collaborative knowledge building editors**
- Web-based content management systems
- Ward Cunningham et al. The Wiki Way: Quick Collaboration on the Web
- Wikis are Social software
  - Everyone can participate in building global knowledge
  - Quality is the result of social filtering, discussion, negotiation…

Wikis

- Wiki are simple to use
  - No technical skills
- Wikipedia:
  - 10 million articles
  - 6.8 million of registered users
  - In the Top 10 of Web sites…

EDITING WIKI PAGE

- Simplified markup language, sometimes known as "wikitext »
- "WYSIWYG" ("What You See Is What You Get")

MediaWiki syntax	Equivalent HTML	Rendered output
"Take some more [[tea]]," the March Hare said to Alice, very earnestly. "I've had nothing yet," Alice replied in an offended tone: "so I can't take more." "You mean you can't take ''less'',," said the Hatter: "it's very easy to take ''more'' than nothing."	"Take some more tea ," the March Hare said to Alice, very earnestly. "I've had nothing yet," Alice replied in an offended tone: "so I can't take more." "You mean you can't take less," said the Hatter: "it's very easy to take more than nothing."	"Take some more tea," the March Hare said to Alice, very earnestly. "I've had nothing yet," Alice replied in an offended tone: "so I can't take more." "You mean you can't take *less*," said the Hatter: "it's very easy to take *more* than nothing."

Source:
http://en.wikipedia.org/wiki/Wiki

Linking and creating pages

- Links are created using a specific syntax, the so-called "link pattern »
- Link pattern : CURIE
- Page name and link
  - CamelCase : pretty rendering
- "free linking" using brackets, and some disable CamelCase by default.

EDITING CONFLICT

Detection and resolution of conflicts

8 With no coordination, multiple users may update the same object at the same time. A solution to this problem is to detect operations that are in conflict and resolve them, for instance, by letting users negotiate.

9 Conflicts happen when operations fail to satisfy their preconditions. Preconditions can be built implicitly in the replication algorithm, such flagging conflict between all concurrent operations as in Palm Pilot. Other systems let users write preconditions explicitly.

10 Resolution of conflicts can be done manually or automatically. Most systems simply flag a conflict and let users to fix it manually.

Comparison of Optimistic Approaches to Collaborative Editing of Wiki Pages. Claudia Ignat, Gérald Oster, Pascal Molli, et al. CollaborateCom2007

EDITING CONFLICT

User 3's delete

Detection and resolution of conflicts

With no coordination, multiple users may update the same object at the same time. A solution to this problem is to detect operations that are in conflict and resolve th

User 2's update

Conflicts happen when operations fail to satisfy their preconditions. Preconditions can be buil implicitly in the replication algorithm, such flagging conflict between all concurrent operations as in Palm Pilo and Coda mobile file system. Other systems let users write preconditions explicitly.

Usually, detection of conflicts is done by using the happens-before relationship in order to flag conflicts.

Resolution of conflicts can be done manually or automatically. Most systems simply flag a conflict and let users to fix it manually.

User 1's insert

SCENARIO WITH MEDIA WIKI

Step	Actions of User 1	Actions of User 2	Actions of User 3
1	inserts a new line as the 10th line	updates the 9th line	deletes the lines 8–10
2	SAVE	SAVE	SAVE
3	→ save is aborted → conflict is detected (changes of User 1 and User 3 conflict) → both versions are presented	→ save is aborted → conflict is detected (changes of User 2 and User 3 conflict) → both versions are presented	→ save succeeded → new version is published
4	reinserts his content	reinserts his content	
5	SAVE	SAVE	
6	→ save is aborted → conflict is detected (changes of User 1 and User 2 conflict) → both versions are presented	→ save succeeded → new version is published	
7	manually merges both changes		
8	SAVE		
9	→ save succeeded → new version is published		
10		RELOAD	RELOAD

Version

- Version
  - Changes are logged
  - Every version of a page is stored
  - Revert:
    - mistake or vandalisme

Vitamin C

From Wikipedia, the free encyclopedia
(Difference between revisions)

Revision as of 17:48, 23 February 2007 (edit)	Current revision (04:17, 24 February 2007) (edit) (undo)
Lumos3 (Talk | contribs)	Jrockley (Talk | contribs)
(→Plant sources - *Remove special mention of Amla, its already in the table*)	*(remove vandalism and cleanup scurvy section)*
← Older edit	

Line 73:

```
=== Deficiency disease ===
[[Scurvy]] (a form of [[avitaminosis]]) results from lack of vitamin C, which is required for correct [[collagen]] synthesis in humans. Scurvy leads to the formation of liver spots on the skin, spongy gums, and bleeding
- from all [[mucous membrane]]s. The spots are most abundant on the thighs and legs, and a person with the ailment looks pale, feels depressed, and is partially immobilized. In advanced scurvy there are open, [[suppuration|suppurating]] wounds and loss of [[teeth]].

Scurvy was at one time common among [[sailor]]s, [[pirate]]s and others who were on [[ship]]s that were out to sea longer than perishable [[fruit]]s and [[vegetable]]s could be stored and by [[soldier]]s who were similarly separated from these foods for extended periods. It was described by [[Hippocrates]] (c. 460 BC–c. 380 BC). Its cause and cure has been known in many native cultures since prehistory. For example, in 1536, the French explorer [[Jacques Cartier]], exploring the [[Saint Lawrence
- River|St. Lawrence River]], used the local natives' knowledge to save his men who were dying of scurvy. He boiled the needles of the [[Thuja|arbor vitae]] tree (Eastern White Cedar) to make a tea that was later shown to contain 50 mg of vitamin C per 100 grams.<ref name=martini>{{cite journal |id=PMID 12422875 |title=Jacques Cartier witnesses a treatment for scurvy |accessdate=2007-02-19 |date=June 2002 |author=Martini E |journal=Vesalius: acta internationales historiae medicinae }}</ref>
```

Line 73:

```
=== Deficiency disease ===
[[Scurvy]] (a form of [[avitaminosis]]) results from lack of vitamin C, as an effect of its requirement for correct [[collagen]] synthesis. Scurvy leads to the formation of liver spots on the skin, spongy gums, and
+ bleeding from all [[mucous membrane]]s. The spots are most abundant on the thighs and legs, and a person with the ailment looks pale, feels depressed, and is partially immobilized. In advanced scurvy there are open, [[suppuration|suppurating]] wounds and loss of [[teeth]], and eventually, death.

Historically, scurvy was common among those with poor access to fresh fruit and vegetables, such as [[sailor]]s, [[pirate]]s and others who were on [[ship]]s that were out to sea longer than perishable [[fruit]]s and [[vegetable]]s could be stored, as well as isolated [[soldier]]s. The earliest documented case was described by [[Hippocrates]] around the year 400 BC.
+
+ The first attempt to give scientific basis for the cause of scurvy was by a ship's surgeon in the British [[Royal Navy]], [[James Lind]]. While at sea in May 1747, Lind provided some crew members with two oranges and one lemon per day, in addition to normal rations, while others continued on [[cider]], [[vinegar]], [[sulphuric acid]]
```

Navigation

- Hypertext links to other pages
- Non-linear navigation
- Facilate navigation
  - Category and tags
  - Backlink (incoming link) : dispaly all pages that link to a given page
- In wikipedia Page Category:
  - as a directory to structure articles
  - organize and structure the content of the wiki
  - update automatic with bot
  - In the article page: [[Category:Wiki]]

You can support Wikipedia by making a tax-deductible donation.

WIKIPEDIA
The Free Encyclopedia

Category:Education

From Wikipedia, the free encyclopedia

Articles in this category should be moved to subcategories when appropriate.
This category may require frequent maintenance to avoid becoming too large. It should list very few, if any, article pages directly and should mainly contain subcategories.

Education is the teaching or learning of knowledge, especially to develop the reasoning, judgement and skill required in adult life and professional occupations.

Education portal

Wikimedia Commons has media related to: *Education*

Subcategories

This category has the following 43 subcategories, out of 43 total.

- [+] Education by subject (39)
- [+] Education by location (7)
- [+] Educational stages (5)

*

- [+] Education lists (5)
- [+] Education portals (1)

A

- [+] Academia (27)
- [+] Educational administration (0)
- [+] Alternative education (14)
- [+] Educational assessment and evaluation (11)
- [+] Education awards (3)

E cont.

- [+] Experiential learning (0)

F

- [+] Educational facilities (0)
- [+] Education finance (4)

H

- [+] History of education (6)

I

- [+] Education issues (4)

L

P cont.

- [+] Educational projects (0)
- [+] Educational psychology (15)

Q

- [+] Qualifications (9)

R

- [+] Education reform (4)
- [+] Religion and education (4)
- [+] Educational research (1)

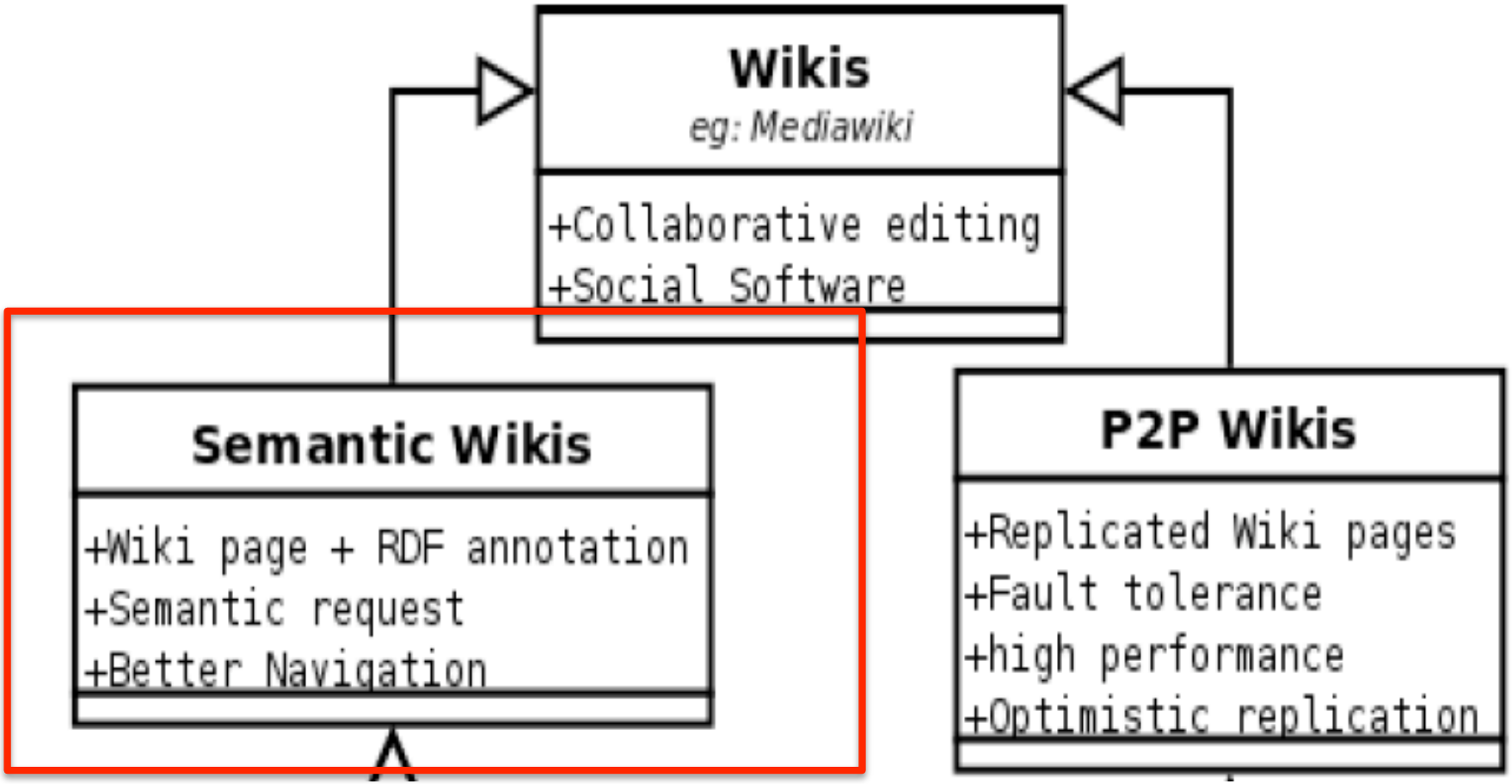
S

- [+] Students (9)

Wikis Drawbacks

- Search and reuse:
  - Not easy to find information
  - Not reusable by machine
  - Many pages are maintained by humans but it can be generated by computers (matrix pages, lists pages)…
- Centralized architecture:
  - Content is unavailable in case of failure
  - Scalability
  - Performances…
- Collaborative editing
  - No Off-line work, mobile editing…
  - No transactional changes: no atomic changes across multiple pages

Wikis Evolutions



Semantic Wikis

- Objective
  - Structure the Wikis for better search and navigation
  - Machine accessible
    - Efficient data search
    - Reusable knowledge
- How ?
  - Adding formal structures to wikis
  - By using Semantic Web technologies : RDF, SPARQL
  - Integrate RDF requests in wiki pages to generate content.

WHAT IS RDF ?

- RDF (Resource Description Framework) is a general 'data model' to represent knowledge in a distributed world
- It allows to represent any type of knowledge
- By decomposing it into small pieces (triple), with some rules about the semantics, or meaning, of those pieces.
- A fact is expressed as a triple (statment) of the form (Subject, Predicate, Object)
  - I own my_appartment

More detail: rdfabout.com

URI

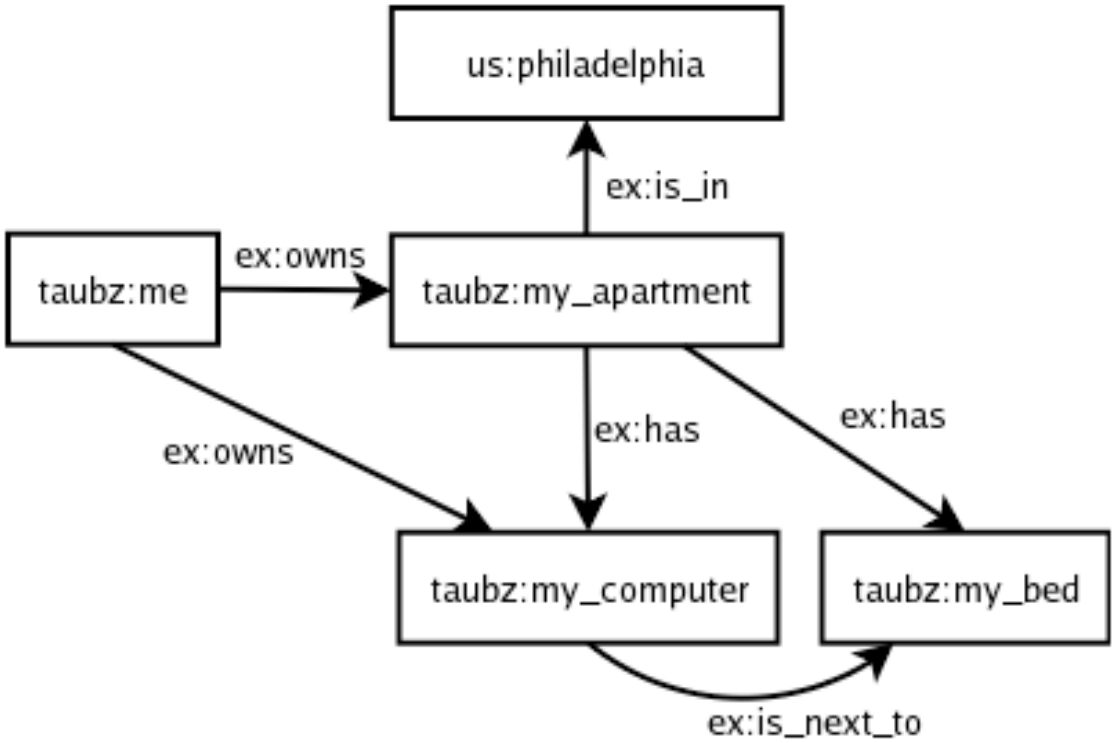
- Names for subjects, predicates, and objects must be Uniform Resource Identifiers (URIs)

RDF about My Apartment

```
Let taubz: abbreviate http://razor.occams.info/index.html#

taubz:me            http://example.org/own    taubz:my_apartment
taubz:my_apartment  http://example.org/has    taubz:my_computer
taubz:my_apartment  http://example.org/has    taubz:my_bed
taubz:my_apartment  http://example.org/is_in  http://example.org/Philadelphia
```

RDF Graph


us:philadelphia
ex:is_in
taubz:me
ex:owns
taubz:my_apartment
ex:owns
ex:has
ex:has
taubz:my_computer
taubz:my_bed
ex:is_next_to

SPARQL

- SPARQL is a query language for RDF
- Four types of queries:
  - SELECT, ASK, DESCRIBE, and CONSTRUCT.

QUESTION

Pseudocode for Question-Answering

```
question = (my_apartment, has, what)
knowledge = (
                (I, own, my_apartment),
                (my_apartment, has, my_computer),
                (my_apartment, has, my_bed),
                (my_apartment, is_in, Philadelphia)
        )
for each statement in knowledge {
        if ((statement.subject == question.subject
                        or question.subject == what) {
                  and (statement.predicate == question.predicate
                        or question.predicate == what)
                  and (statement.object == question.object
                    or question.object == what))
                call FoundAnswer(statement)
        }
}

Output:
        Answer: my_apartment has my_computer
        Answer: my_apartment has my_bed
```

RDF about My Apartment

```
@prefix ex: <http://example.org/> .
@prefix taubz: <http://razor.occams.info/index.html#> .
taubz:me            ex:own       taubz:my_apartment .
taubz:me            ex:own       taubz:my_computer .
taubz:my_apartment  ex:contains  taubz:my_computer .
taubz:my_apartment  ex:contains  taubz:friends_junk .
taubz:my_apartment  ex:location  <http://example.org/Philadelphia> .
taubz:me            ex:own       taubz:my_desk .
taubz:my_desk       ex:contains  taubz:my_pens_and_pencils .
```

SPARQL Query Example 1

```
PREFIX ex: <http://example.org/>
PREFIX taubz: <http://razor.occams.info/index.html#>
SELECT ?what
WHERE {
        taubz:my_apartment ex:contains ?what .
}
```

SPARQL Query Example 1 Results

```
     ?what
-----------------
taubz:my_computer
taubz:friends_junk
```

SPARQL Query Example 2

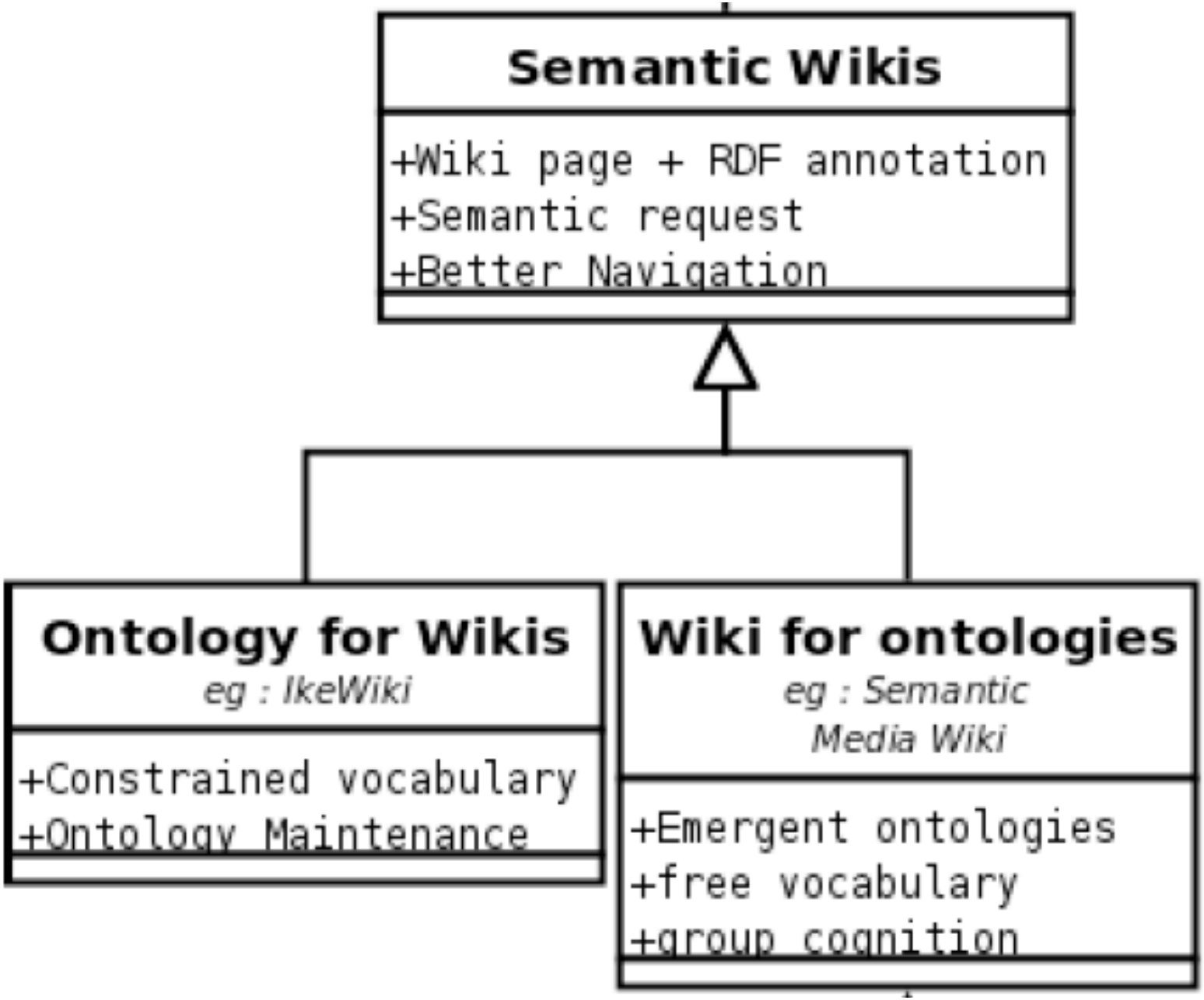
```
PREFIX ex: <http://example.org/>
PREFIX taubz: <http://razor.occams.info/index.html#>
SELECT ?what
WHERE {
        taubz:my_apartment ex:contains ?what .
        taubz:me ex:own ?what .
}
```

SPARQL Query Example 2 Results

```
     ?what
-----------------
taubz:my_computer
```

Graph Pattern with Resource Substituted

```
taubz:my_apartment ex:contains taubz:friends_junk .
taubz:me ex:own taubz:friends_junk .
```



Buffa et al. SweetWiki: A Semantic Wiki. Journal of Web Semantic, 6(1), 2008.

The use of Ontologies for wikis

- Require existing ontology to be loaded
- Each page has a type
- Special interface to edit and visualize semantic data
- Examples:
  - IkeWiki, SweetWiki

Schaffert. IkeWiki: A Semantic Wiki for Collaborative Knowledge Management. WETICE, 2006. IEEE.
Buffa et Al. SweetWiki: A Semantic Wiki. *Journal of Web Semantic,6(1)*,2008.

IkeWiki - Bilberry

http://192.168.243.129:8080/index.jsp?uri=http%3A%2F%2Fwww.example.com%2FFrontPage

Article | Discuss | Metadata | Context | Hierarchy | Edit | Annotate | History

Languages: [en] [de]

Bilberry

Identifier: Bilberry

Types: skos:Concept - rdfs:Resource

Bilberry is a name given to several species of low-growing shrub s in the genus *Vaccinium* (family Ericaceae) that bear tasty fruit s. The species most often referred to is *Vaccinium myrtillus* L., also known as blaeberry, whortleberry, whinberry, myrtle blueberry, fraughan, and probably other names regionally. They were called black-hearts in 19th century southern England, according to Thomas Hardy 's 1878 novel, *The Return of the Native* , (pg. 311, *Oxford World's Classics* edition).

The word bilberry is also sometimes used in the common names of other species of the genus, including *Vaccinium uliginosum* L. (bog bilberry, bog blueberry, bog whortleberry, bog huckleberry, northern bilberry), *Vaccinium caespitosum* Michx. (dwarf bilberry), *Vaccinium deliciosum* Piper (Cascade bilberry), *Vaccinium membranaceum* (mountain bilberry, black mountain huckleberry, black huckleberry, twin-leaved huckleberry), and *Vaccinium ovalifolium* (oval-leafed blueberry, oval-leaved bilberry, mountain blueberry, high-bush blueberry).

Bilberries are found in damp, acid ic soil s throughout the temperate and subarctic regions of the world. They are closely related to North America n wild and cultivated blueberries and huckleberries in the genus *Vaccinium*. The easiest way to distinguish the bilberry is that it produces single or pairs of berries on the bush instead of clusters like the blueberry. Bilberry is used as a food plant by the larva e of some Lepidoptera species - see list of Lepidoptera which feed on Vaccinium .

Bilberries are rarely cultivated but fruits are sometimes collected from wild plants growing on publicly accessible lands, notably in Fennoscandia , Ireland and Poland . Notice that in Fennoscandia, it is an everyman's right to collect bilberries, irrespective of land ownership. In Ireland the fruit is known as "fraughan" in English, from the Irish *fraoch?n*, and is traditionally gathered on the last Sunday in July, known as *Fraughan Sunday*.

The fruits can be eaten fresh, but are more usually made into jam s, fool s, juice s or pie s. In France they are used as a base for liqueur s and are a popular flavouring for sorbet s and other desserts. In Brittany they are often used as a flavouring for cr?pe s, and in the Vosges and the Massif Central bilberry tart (*tarte aux myrtilles*) is the most traditional dessert.

=== Medicinal Uses ===

User
- User Page (Administrator)
- Preferences
- Logout

Navigation
- Main Page
- Help Contents
- Recent Changes

Edit
- Create Resource
- Create Class
- Create Property
- Create Multimedia
- Create Template
- Delete Resource
- Add Relation
- Remove Relation

System
- Manage Action Sets
- Manage Users
- Manage Roles
- Manage Namespaces
- Flush Caches
- Rebuild Index
- Restart System

Search

Go | Search

References

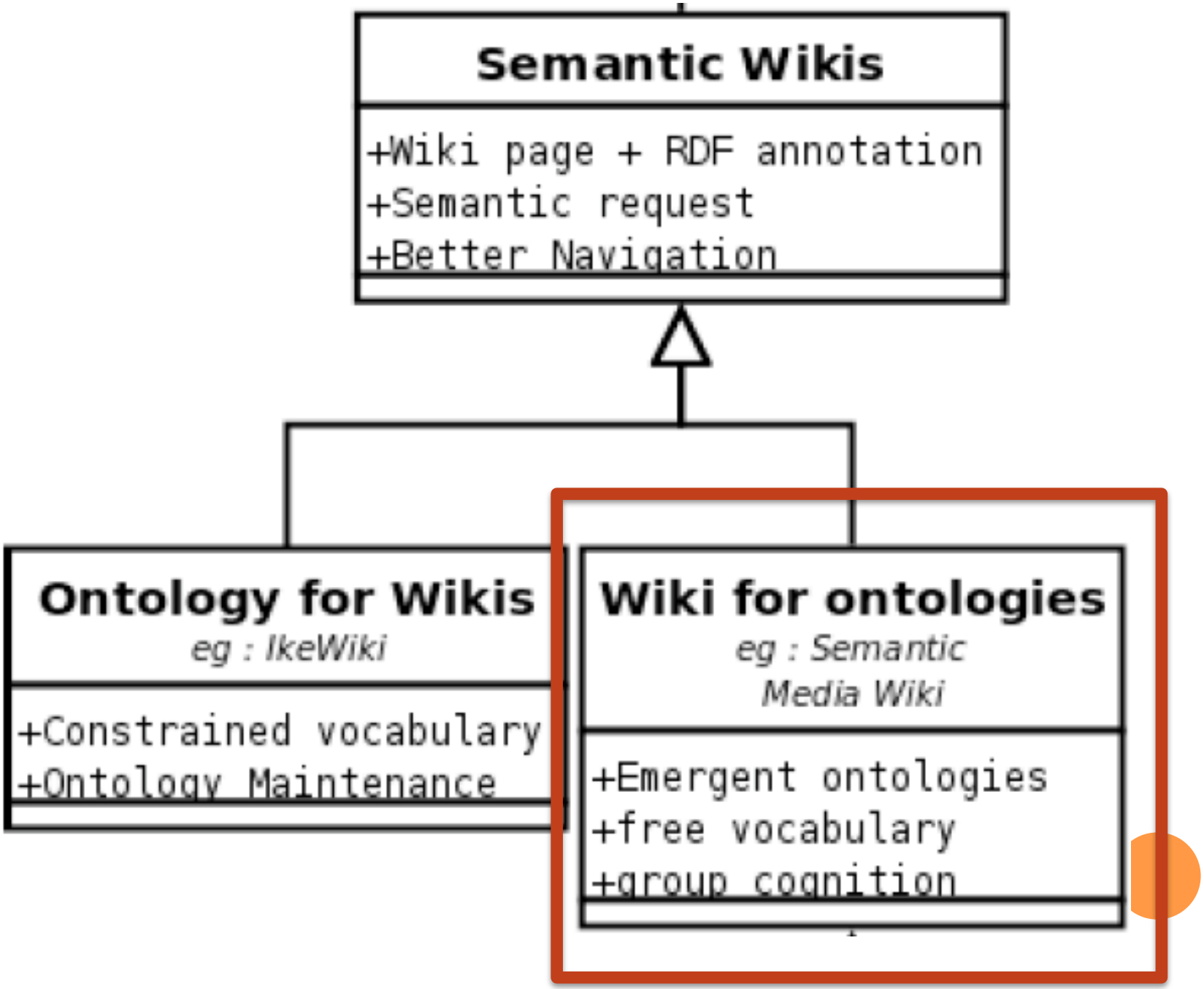
outgoing
- untyped (45)
- ikewiki:hasAuthor (1)
- skos:related (1)
- rdf:type (2)
- rdfs:seeAlso (1)
- skos:semanticRelation (

incoming
- untyped (4)
- skos:related (1)
- rdfs:seeAlso (1)
- skos:semanticRelation (

Fertig

IkeWiki

- Too rigid for emergent domains
  - No established ontologies


Semantic Wikis
+Wiki page + RDF annotation
+Semantic request
+Better Navigation
Ontology for Wikis
eg : IkeWiki
+Constrained vocabulary
+Ontology Maintenance
Wiki for ontologies
eg : Semantic Media Wiki
+Emergent ontologies
+free vocabulary
+group cognition

THE USE OF WIKIS FOR ONTOLOGIES

- No predefined ontology
- Annotations are embedded in wiki text
- One subject for one page
- Semantic Media Wiki (SMW)
  - Extension of MediaWiki
  - [[predicat::objet]]

Vôlkel et al. Semantic Wikipedia. 15th International *Conference on World Wide Web, (WWW), 2006*. ACM.

'''London''' is the capital of **[[capital of::England]]** and of the **[[capital of::United Kingdom|UK]].** As of [[2005]], the total resident population of London was estimated **[[population:=7,421,328]]**. Greater London covers an area of **[[area:=609 square miles]]**. It is in **[[located in::England]]** in the [[situated in::Europe]].

[[Category:City]]

article | discussion | edit | history

London

London is the capital of England and of the UK. As of 2005, the total resident population of London was estimated 7,421,328.

Greater London covers an area of 609 square miles .

It is in England in the Europe.

Facts about London RDF feed

Area	1.5773e+9 m² (1,577.303 km², 157,730.276 ha, 609 miles²)
Capital of	England, and United Kingdom
Located in	England, and Europe
Population	7,421,328

Category: City

Semantic MediaWiki

- Annotations in context
- Human readable annotations
- Machines accessible annotations
- Enable the emergence of “Ontology”

Semantic Wikis

- Better search and navigation
- Machine accessible knowledge
- But still centralized
  - Performance for semantic queries
  - Availability,
  - Scalability
  - No Off-line work
  - No transactional changes : atomic changes across multiple pages.