bridging formal semantics and social semantics on the web

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Web-Instrumented Man-Machine Interactions, Communities, and Semantics

a joint research team between INRIA Sophia Antipolis – Méditerranée and I3S (CNRS and University Nice Sophia Antipolis).
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11. Nicolas Marie, 3rd year (Bell-ALU, INRIA)
12. Zide Meng, 1st year (INRIA ANR OCTOPUS)
13. Nguyen Thi Hoa Hue, 2nd year (Vietnam-CROUS)
14. Tuan Anh Pham (Vietnam-CampusFrance)
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- Christine Foggia (INRIA)
- Magali Richir (I3S)
research problem

socio-semantic networks: combining formal semantics and social semantics on the web
web landscape and graphs
(meta)data of the relations and the resources of the web

web... = ...sites + ...social + ...of data + ...of services + ...semantics

typed graphs = web (graphs) + networks (graphs) + linked data (graphs) + workflows (graphs) + schemas (graphs)
challenge

typed graphs to analyze, model, formalize and implement social semantic web applications for epistemic communities

1. multidisciplinary approach for analyzing and modeling
   - the many aspects of intertwined information systems
   - communities of users and their interactions

2. formalizing and reasoning on these models using typed graphs
   - new analysis tools and indicators
   - new functionalities and better management
<background_knowledge>
internet

classical web

wiki, (μ)blog, forum, etc.

Ward Cunningham, 94

read-write web
social web

web 2.0
social web networks
SOCIAL TAGGING

collaboratively create and manage tags to annotate and categorize content
a crowd of users creating massive categorizations
semantic web
mentioned by Tim BL
in **1994** at WWW

A WEB OF LINKED DATA
RDF stands for

**Resource:** pages, images, videos, ... everything that can have a URI

**Description:** attributes, features, and relations of the resources

**Framework:** model, languages and syntaxes for these descriptions
RDF is a triple model i.e. every piece of knowledge is broken down into

( subject, predicate, object )
doc.html has for author Fabien and has for theme Music
doc.html has for author Fabien
doc.html has for theme Music
( doc.html, author, Fabien )
( doc.html, theme, Music )
( subject, predicate, object )
RDF triples can be seen as arcs of a graph \((\text{vertex},\text{edge},\text{vertex})\)

(the RDF data model can be seen as a directed labelled multigraph)
Fabien

author

doc.html

theme

Music
a URI on everything
URL: 
http://my-site.fr

identify what exists on the web

URI:
http://animals.org/this-zebra

identify, on the web, what exists
"Music"
principles

- use RDF as data format
- use URIs as names for things
- use HTTP URIs so that people can look up those names
- when someone looks up a URI, provide useful information (RDF, HTML, etc.) using content negotiation
- include links to other URIs so that related things can be discovered
Linking Open Data

query with SPARQL Protocol and RDF Query Language
e.g. DBpedia
opening data silos
created by applications and that break the linked nature of the web
Published Semantics of Schemas
RDFS to declare classes of resources, properties, and organize their hierarchy
OWL in one...

- Algebraic properties
- Disjoint properties
- Qualified cardinality
- Individual property negation
- Chained properties

- Union
- Disjunction
- Intersection
- Complement
- Restriction
- Cardinality
- Equivalence
- Enumeration
- Value restrict.
- Disjoint union
- Keys
SKOS knowledge

thesauri, classifications, subjects, taxonomies, folksonomies, ...
... controlled vocabulary
natural language expressions to refer to concepts

inria:CorporateSemanticWeb
  skos:prefLabel "corporate semantic web"@en;
  skos:prefLabel "web sémantique d'entreprise"@fr;
  skos:altLabel "corporate SW"@en;
  skos:altLabel "CSW"@en;
  skos:hiddenLabel "web semantique d'entreprise"@fr.
between concepts

\texttt{inria:CorporateSemanticWeb} \\
\texttt{skos:broader} \texttt{w3c:SemanticWeb;} \\
\texttt{skos:narrower} \texttt{inria:CorporateSemanticWiki;} \\
\texttt{skos:related} \texttt{inria:KnowledgeManagement}.  

relations
</background_knowledge>
flat folksonomies
e.g. structuring folksonomy

web 2.0

flat folksonomies

thesaurus

pollutant

energy

related

related

pollution

has narrower

soil pollution

SKOS

[Limpens, et al.]
e.g. combining metric spaces

edition distances
Monge-Elkan Soundex, JaroWinkler, asymmetry Monge-Elkan Qgram

contextual metric

\[ \cos(\overrightarrow{\text{tag}_1}, \overrightarrow{\text{tag}_2}) = \frac{\text{tag}_1 \cdot \text{tag}_2}{\|\text{tag}_1\| \cdot \|\text{tag}_2\|} \]

social metrics
inclusion of communities of interest
e.g. ademe TheseNet

- 83,027 relations / 9,037 tags
- 68,633 related
- 11,254 hyponyms
- 3,193 spelling variants
evolution of the place of humans in complex web applications

= user

= data

= processor
e.g. search & feedback

[Limpens, et al.]
e.g. typing sociograms

$\text{Semantic web is not antisocial}$

$$d_{in}^\circ (p) = \lvert \{x; \text{rel}(x, p)\} \rvert$$
$d(\text{guillaume}) = 5$
e.g. parameterized analysis

\[
B<rel>(b,x,y) = \frac{nb<rel>(b,x,y)}{nb<rel>(x,y)}
\]

\[
= \text{select } ?\text{from } ?\text{to } ?b \text{ optional }
select (count(?spath)/count(?spath2)) as 
\text{betweenness where}
\]

\[
\text{from } sa \text{ (param[rel]) } *\text{:spath } ?\text{to}
\text{filter(!from } ?b \text{)} \text{ as parameters}
\text{optional } \text{from } ?\text{to } ?b
\text{from } ?\text{from } ?\text{to } ?b
\text{group by } ?\text{from } ?\text{to } ?b
\text{from } ?\text{from } ?\text{to } ?b
\]
ipernity.com dataset in RDF
61,937 actors & 494,510 relationships
– 18,771 family links between 8,047 actors
– 136,311 friend links implicating 17,441 actors
– 339,428 favorite links for 61,425 actors, etc.

existence of a largest component in all sub networks
"the effectiveness of the social network at doing its job"
[Newman 2003]
typed centrality: different key actors for different kinds of links
detecting AND labeling communities
e.g. semantic propagation

from RAK/LP to SemTagP

rugby, foot  hockey  sel, eau
foot, ciné  moutarde  poivre, vin

sport  sport  condiment

Eretéo, et al.
applied to Ademe Ph.D. network

- **1853 agents**
- **1597 academic supervisors**
- **256 ADEME engineers.**

- **13 982 relationships**
  - **10 246 rel:worksWith**
  - **3 736 rel:colleagueOf**

- **6 583 tags**
- **3 570 skos:narrower**
- **relations between 2 785 tags**
Ademe, et al. (2020) propose des mesures pour réduire les émissions de polluants atmosphériques : 1 pollution ; 2 développement durable ; 3 énergie ; 4 chimie ; 5 pollution de l’air ; 6 métaux ; 7 biomasse ; 8 déchets.
Official keynote speakers announcement

Tim Berners-Lee

A graduate of Oxford University, Tim Berners-Lee is known as the inventor of the World Wide Web. He was the author of the first paper describing the World Wide Web in 1989 and a co-founder of CERN web development in 1990, which led to the development of HTML. While working at CERN, the European Particle Physics Laboratory, he developed the first web client and server in 1990. The HTML that he developed has become the standard for the web today and has transformed the way we access information. He is the Director of the World Wide Web Foundation, an organization founded in 1994 which is working to ensure that the web is a frontier for freedom, innovation, and progress.

He is a founding Director of the ISICIL Institute in 1999 in Lyon, France, that in 2009 promotes research and development in the multidisciplinary study of humanity and the web. He is a recipient of a number of works including the Time magazine’s Person of the Year in 1999, and the Webby Lifetime Achievement Award in 2006.

Bernard Stiegler

Bernard Stiegler is a director of IRIF at the Centre National d’Etudes des Sciences de l’Information et des Techniques (CNRS) and a Senior Researcher at the Centre for Cultural Studies at Goldsmith College in London. He is also a Professor at the Ecole Nationale Superieure des Beaux Arts and a Research Professor at the Centre National des Hautes Études de Technologie of Compiègne where he teaches the innovative techniques of contemporary form across art, science, and philosophy.

Before taking up the post at the Pompeu Fabra University in the International College of Philosophy, he directed the Laboratoire d’Economie et Sociologie du Spectacle (LES) and was a Professor at the National de l’Auditoire Visual, then Director of Coordination Acoustique/Musique (IRCAM) in Paris. He is the author of many books and articles, including Technics and Time. 1: The Dasein of Art and Technics and Technics and Time. 2: The World in Flight. His work has been exhibited internationally and has been translated into many languages. 2009

photo credit: Tony Scarpetta

Read more...

photo credit: Georges Pompidou Center

ISICIL

URL: http://www2012.org?page_id=1804
Title: www2012
Description: The World Wide Web Conference is a yearly international conference on the topic of the future direction of the World Wide Web. It began in 1994 at CERN and is organized by
Tags: #www2012 #conferences #Colleagues
Used tags: #www2012 #conferences #Colleagues
Your recent #Pittsburgh #boxe #kamo #gomertherm #finria

ISICIL

Lyon, France

 Scrap Geo Social Live

 16 Temporal

Latitude: 45.76043
Longitude: 4.835868999999964

Annuler OK

Nicole DELAFORGE

Access Condition Set Editor

ACS Type
- Disjunctive (OR)
- Conjunctive (AND)

Accessor
is
Serena Villalta

SPARQL Box
ASK (?accessor a ?class?Person )
BINDINGS ?accessor (?http://no.inria.fr/isicil/id/person/svillalta )

SPARQL Box
ASK (?group ?memberof ?Accessor )
BINDINGS ?group (?http://no.inria.fr/isicil/id/group/edelweissteam )

SPARQL Box
ASK (?Accessor ?hasrelationship ?provider )

Annuler OK
L'AFP recadrée par le Parlement

Les députés ont voté un texte précisant les missions de l'Agence France Presse. Une mesure imposée par Bruxelles.
Fresnel lenses to adapt results

[Jean-Yves]

Person

Jean-Yves

Ingénieur

01 49 01 45 40

jean-yves.marie-rose@ademe.fr

Document

société face à ses odeurs. Journée ECRIN de l'Environnement, audiotoriu...

Description:
Conférence d'André Holley du Centre Européen du Goût à Dijon, quelques exemples de traitement des odeurs, le témoignage d'un maire et la clôture de la journée par Danièle Manfredi de la DPPR/SEI du MEDD. Le second DVD présente les ateliers : Sait-on identifier, qualifier et quantifier les odeurs ?, Modélisation de la dispersion des odeurs, Aspects santé, la restitution de ces ateliers et une table ronde de synthèse et perspective avec notamment Jean-Claude Oppeneau.
toward social webmarks
socially defined online identities
Senior Researcher in Informatics and Web Science
Leader for the Wimmics team
Sophia-Antipolis (France)
General co-chair conference

Quote: "He who controls metadata controls the Web."
Semantic Web: a web to link data

Card: Dr. Fabien Gandon (Fab or Fabien) is a senior researcher at INRIA. He works on the Semantic Web and metadata. His email is fabien.gandon@inria.fr. He is the leader of the Wimmics team and the general co-chair of a conference.

Twitter: @fabien_gandon

Card as vCard or Card in RDF

[Delaforge, et al.]
Senior Research Informatics and
Leader for the Wimmics team
Sophia-Antipolis (France)
General co-chair conferences

twitter: @fabien_gandon

Quote: “He who controls metadata controls the Semantic Web: a web to link data"
search & navigation in info. networks
Semantic Web plugin for Gephi
activity flow and notification
web-scraping: archiving and integrating
create dynamic reports in the wiki
Welcome to WikiNEXT

You need to be logged in to create/edit and other actions. Please click in right-top corner "Login"

Learn more ➤

WikiNEXT Pages

Create your own application from scratch. Check out our tutorial

WikiNEXT API

To learn more about WikiNEXT API.

Recent changes

<table>
<thead>
<tr>
<th>Page</th>
<th>Change At</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Application</td>
<td>Wed Oct 09 2013</td>
<td>Pavel Arapov</td>
</tr>
<tr>
<td>Nice</td>
<td>Mon Oct 07 2013</td>
<td>Pavel Arapov</td>
</tr>
<tr>
<td>Dialog test</td>
<td>Mon Oct 07 2013</td>
<td>Pavel Arapov</td>
</tr>
<tr>
<td>CompareDBpediaValues</td>
<td>Mon Sep 30 2013</td>
<td>Julien Cojan</td>
</tr>
<tr>
<td>CompareValues</td>
<td>Mon Sep 30 2013</td>
<td>Julien Cojan</td>
</tr>
<tr>
<td>Pavel Arapov</td>
<td>Wed Sep 25 2013</td>
<td>Amel Ben</td>
</tr>
<tr>
<td>Paris</td>
<td>Tue Sep 24 2013</td>
<td>Amel Ben</td>
</tr>
<tr>
<td>Cloned: City template</td>
<td>Mon Sep 23 2013</td>
<td>Michel Buffa</td>
</tr>
<tr>
<td>Template Data Example</td>
<td>Mon Sep 23 2013</td>
<td>Pavel Arapov</td>
</tr>
<tr>
<td>TODO List</td>
<td>Mon Sep 23 2013</td>
<td>Pavel Arapov</td>
</tr>
</tbody>
</table>
gave birth to ... « Unveil the semantic imprint from within your Community » cooperative society of social semantic web specialists
industrialization and maintenance of research results
developing webmarks as linked semantic traces
all in one
going mobile
mobile access to web of data

Mobile & Web of Data & Context & Interaction

[Costabello et al.]
Context-aware Adaptation for Linked Data?

[Costabello et al.]
fault-tolerant matching with graph-edit distances

[Costabello et al.]
PRISSMA Browser for Android

The Louvre

Address
Palais Royal, Musée du Louvre - 75058 Paris - France

Public Transportation
Palais Royal – Musée du Louvre *Louvre-Rivoli

Tel.
+33 (0)1 40 20 53 17

Opening Hours
Monday, Thursday, Saturday, Sunday: from 9 a.m. to 6 p.m. Wednesday, Friday: from 9 a.m. to 9:45 p.m. Closed on Tuesdays

Ticket Price
Tickets for the Permanent Collections: 12€
Tickets for Exhibitions in the Hall Napoléon: 13€
Combined Ticket: 16€

The Musée du Louvre—in English, the Louvre Museum or simply The Louvre—is one of the world’s largest museums, and a historic monument. A central landmark of Paris, France, it is located on the Right Bank of the Seine in the 1st arrondissement (district). Nearly 35,000 objects from prehistory to the 19th century are exhibited over an area of 66,000 square metres (652,300 square feet). With more than 8 million visitors each year, the Louvre is the world’s most visited museum.

City
Paris

Director
Jean-Luc Martinez

Curator
Marie-Laure de Rochebrune

Established
1793

Smartphone, user walking in museum town.

Tablet, user at home.

[Costabello et al.]
when the link makes sense
linking data to create knowledge
contextual notification propagation of interests for suggestion

\[ a(i, n + 1, t) = \frac{w_s \cdot s(i, n + 1, t) + \sum_{j} e_{ij} [w_p(1(e_{ij}), t) \cdot a(j, n, t)]}{w_s + \sum_{j} e_{ij} w_p(e_{ij})} \]
Let $KB$ be the set of all triples in the triple asserted and inferred store.


definitions:

\[
    depth(t) = \begin{cases} 
        0 & \text{if } t = T \text{ the root of the hierarchy} \\
        (\text{depth}(t) + 1) & \text{otherwise}
    \end{cases}
\]

\[
    Types(x) = \{ t; (x, rdf\:\text{-type}, t) \in KB \}
\]

\[
    T_{\text{max}}(x) = \{ t \in Types(x); \forall t_i \in Types(x); depth(t) \geq depth(t_i) \}
\]

\[
    \text{Neighbor}(o) = \{ x; (o, p, x) \in KB \land (x, p, o) \in KB \} \land p \neq \text{rdf}\:\text{-type}
\]

\[
    NT(o) = \{ (t, c); t \in T_{\text{max}}(x), o \in \text{Neighbor}(o); c = \|n \in \text{Neighbor}(o); t \in T_{\text{max}}(n)\|\}
\]

\[
    FNT(o) = \begin{cases} 
        (t, c) \in NT(o); \frac{c}{\sum_{n \in \text{Neighbor}(o)}} & \geq \text{threshold} \\
        \end{cases}
\]

\[
    w(i, o) = \begin{cases} 
        0 & \text{if } t \in Types(x); t \in FNT(o) \\
        1 + |\text{coat}(o)| & \text{otherwise}
    \end{cases}
\]

where

\[
    \text{coat}(o) = \{ \text{cat}; (i, \text{dcterm}\:\text{-subcat}, \text{cat}) \in KB \land (o, \text{dcterm}\:\text{-subject}, \text{cat}) \in KB \}
\]

\[
    a(i, n + 1, o) = s(i, n, o) + \sum_i w(i, o) \cdot \frac{a(j, n, o)}{\text{degree}_j}
\]

\[
    a(i, n) = \prod_{o \in O}[a(i, n, o)] / \log(\text{degree}_i)
\]
Discovery Hub (Inria, Alcatel Bell Lucent)
ELIZA: You're not really talking about me -- are you?
YOU: What?
ELIZA: What do you think?
YOU: I mean, I feel happy to be writing right now, to be typing this as we speak. Lately, I've had writer's block.
ELIZA: You say you mean?
YOU: That's what I said.
ELIZA: Can you elaborate on that?
YOU: I only really feel happy when I'm writing.
ELIZA: How long have you been writing?
YOU: Always, but I've been writing seriously since I was eighteen.
ELIZA: What incident are you thinking of?
YOU: Um.
ELIZA: What does that suggest to you?
YOU: I don't think it's enough, to only be happy when you write.
ELIZA: Does that trouble you?
YOU: ...Um, because you can't write all the time. And then there's the real world, and you still have to deal with real people.
ELIZA: What are your feelings now?
YOU: I've been thinking a lot of that poem by Yeats: "The Man and the Echo."
Do you know it?
ELIZA: Do you say you've been thinking a lot of that poem by Yeats: "the man and the echo" for some special reason?
YOU: Yes.
Who is starring in Batman Begins?

EAT and NE recognition:
Stanford NER+ DBpedia

Query pattern
[Person] is starring in [Movie]?

select * where {
  dbpr:Batman_Begins dbp:starring ?v .
  OPTIONAL {?v rdfs:label ?l
  filter(lang(?l)="en")}
}

ENTAILMENT ENGINE/SIMILARITY ALGORITHM

Christian Bale, Michael Caine, ...

QALD-2 Open Challenge:

<table>
<thead>
<tr>
<th></th>
<th>total</th>
<th>answered</th>
<th>right</th>
<th>partially right</th>
<th>precision</th>
<th>recall</th>
<th>f-measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groovy Answering</td>
<td>100</td>
<td>74</td>
<td>44</td>
<td>17</td>
<td>0.79</td>
<td>0.8</td>
<td>0.79</td>
</tr>
<tr>
<td>SemSeK</td>
<td>100</td>
<td>80</td>
<td>32</td>
<td>7</td>
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<tr>
<td>Alexandria</td>
<td>100</td>
<td>25</td>
<td>5</td>
<td>10</td>
<td>0.43</td>
<td>0.46</td>
<td>0.45</td>
</tr>
<tr>
<td>MHE</td>
<td>100</td>
<td>97</td>
<td>30</td>
<td>12</td>
<td>0.36</td>
<td>0.4</td>
<td>0.38</td>
</tr>
<tr>
<td>QAKis</td>
<td>100</td>
<td>35</td>
<td>11</td>
<td>4</td>
<td>0.39</td>
<td>0.37</td>
<td>0.38</td>
</tr>
</tbody>
</table>
QAKIS demo

QAKiS - Mozilla Firefox

Examples:

demo -- contact@dbpedia.fr

FONDATION BRUNO KESSLER

INRIA

INVENTEURS DU MONDE NUMERIQUE
EMOTION

detection

transfer

adaptation
ns.inria.fr/emoca

[Berthelon, et al.]
typed graph machinery
e.g. DBpedia.fr
publication

Datalift process

demo

• on click setup
• raw data import
• RDF transformation
• Web publication
• online querying
corese/kgram

- Semantic Web Factory: RDF/S, SPARQL 1.1 Query & Update, Inference Rules
- Open Source CeCILL-C
- Knowledge Graph Abstract Machine with 3 Proxies (Producer, Matcher, Evaluator)

3 ANR, 2 RNRT, 1 region project, 4 european project, 4 industry grants, 10 academic grants, >30 applications, 23 PhD, 9 edu. Institutions, etc.

[Corby, et al.]
\[ \begin{align*}
\text{left}(x, y) & \quad \text{right}(z, v) \\
\text{left}(y, z) & \quad \text{right}(z, u) \\
\text{right}(u, v) & \\
\end{align*} \]

\[ \iff \]

\[ \begin{align*}
\text{left}(x, ?p) & \quad \text{left}(?p, z) \\
\end{align*} \]
mapping modulo an ontology
reset...
RDFS/Rules : 0.00 s
Load Triples : 488
Load Relations : 423
Load Concepts : 135
done.

[Corby, et al.]
my watch has only one hand, it is not broken, it is a feature.

why approximation is interesting
e.g. controlled approximation

\[ t_1(x) \Rightarrow t_2(x) \quad \rightarrow \quad d(t_1, t_2) < \text{threshold} \]

\[ \forall (t_1, t_2) \in H^2_c \quad \text{let} \quad \text{dist}(t_1, t_2) = \min_{\{t \geq t_1, t \geq t_2\}} \left( l_{H_c}(t_1, t) + l_{H_c}(t_2, t) \right) \]

\[ \forall (t_1, t_2) \in H^2_c ; t_1 \leq t_2 \quad \text{let} \quad l_{H_c}(t_1, t_2) = \sum_{\{t \in \langle t_1, t_2 \rangle, t \neq t_1\}} \left[ \frac{1}{2^{\text{depth}(t)}} \right] \]
e.g. approximated search
Plugin Gephi

```sparql
prefix gephi: <http://gephi.org/>
CONSTRUCT{
  ?director gephi:category "director" .
  ?actor gephi:category "actor" .
} WHERE {
  FILTER(lang(?title)="en")
} LIMIT 10000
```
peer servers

web service

web service

web service

web service

web application

RDF

SPARQL
inductive index creation for a triple store

- characterize distributed RDF sources
- incremental index generation and maintenance

[Basse, et al.]
Data sources configuration

http://localhost:8080/kgram/e

Federated SPARQL querying

Predefined SPARQL queries for data sources federation.

Demo federated query

```
PREFIX idemo:<http://rdf.insee.fr/def/demo#>
PREFIX igeo:<http://rdf.insee.fr/def/geo#>
SELECT ?departement ?nom ?popTotale WHERE {
   ?region igeo:codeRegion "24".
   ?popLeg idemo:populationTotale ?popTotale.
} ORDER BY ?popTotale
```

Federated SPARQL querying on both DS#1 and DS#2
```sparql
prefix dbpedia-owl: <http://dbpedia.org/ontology/>
prefix dbpedia-pro: <http://dbpedia.org/property/>
prefix geo: <http://www.w3.org/2003/01/geo/wgs84_pos#>
prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
prefix geonames: <http://sws.geonames.org/>
prefix wgs84_pos: <http://www.w3.org/2003/01/geo/wgs84_pos#>
prefix gephi: <http://gephi.org/>
prefix owl: <http://www.w3.org/2002/07/owl#>

construct {

    ?city1 gephi:label ?city_name1 ;
        gephi:longitude ?long1 ;
        gephi:latitude ?lat1 ;
        gephi:image ?im1 ;
        gephi:language ?language ;
        gephi:populationTotal ?population1 .
    
    ?city2 gephi:label ?city_name2 ;
        gephi:longitude ?long2 ;
        gephi:latitude ?lat2 ;
        gephi:image ?im2 ;
        gephi:language ?language ;
        gephi:populationTotal ?population2 .

    }

where {

    service <http://live.dbpedia.org/sparql/> {

```
access control
socio-semantic access control

e.g. only my colleagues working on the same subject

  ?prov prov:rel:hasColleague ?user .
  ?user foaf:interestedBy ?topic }

s4ac:

- DisjunctiveACS
- ConjunctiveACS
- AccessPolicy
- AccessConditionSet
- AccessCondition
- AccessPrivilege
- Device
- Context
- Environment
- User

Diagram:

- AccessPolicy hasAccessConditionSet
- AccessConditionSet hasAccessCondition
- AccessCondition hasQueryAsk
- AccessCondition hasContext
- AccessPrivilege appliesTo
- Device device
- Context environment
- User user
Context-aware **Access Control** for Linked Data

**Shi3ld** Access Control Manager

```
SELECT ... 
WHERE {...}
```

GET /data/resource HTTP/1.1
Host: example.org
Authorization: ...

Sample Policy

Data accessible within the area:
Address or latitude, longitude pair
Cour Carrée et Pyramide du Louvre
119

Example
2004 Route des Lucioles,
06560 Sophia Antipolis,
France
43.6162401, 7.06794420

Access will be granted to users with the following:
knows
Knows: By Reputation
Knows: In Passing
Knows Of
knows: Friend Of: http://example.org/8ob age: "24"

Sample Policy

Data accessible for the following time period:
From
16/07/2013
10:00
Set Current

to
23/07/2013
18:00

Sample Policy
Oh, yeah?

Lost that feeling of trust?
Here's some information about this document.

Request date: Fri, 08 Feb 2013 14:07:44 GMT
Last modified on: Wed, 06 Feb 2013 10:49:01 GMT

Linked provenance resources

 ✓ example

Valid: This is valid provenance
URI: http://users.ugent.be/~tdenies/provenance/example.provn
Target: http://ruben.verborg.org:1234/
Serialization: PROV-N

 ✓ example2

 ✓ example
representing query and reasoning workflows \[\text{[Hasan et al.]}\]

- Ratio4TA*, a lightweight vocabulary for encoding justifications.
- A specialization of the W3C PROV ontology

*http://ns.inria.fr/ratio4ta/
overwhelming...

evaluating quality of summaries
doggy-bag
of the talk
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