Wimmics - Olivier Corby

Web-Instrumented Man Machine Interactions, Communities and Semantics

Wimmics (ex Edelweiss)

- 2007 Edelweiss creation (after Acacia) Rose Dieng-Kuntz scientific leader
- 2008 Olivier Corby interim leader, Fabien Gandon deputy leader
- 2009 Research topics restructured
- 2011 End of Edelweiss
- 2012 Wimmics: follow-up team, Fabien Gandon team leader

Edelweiss topics

Knowledge Engineering for the Social Semantic Web

1. Semantic Annotation of Information Resources (2007-2009)
2. Graph based Knowledge Representation
3. Interaction Design for the Web

- Knowledge Engineering : Ontologies & Folksonomies
- Information Retrieval & Knowledge Sharing on the Web
- Annotation of Resources (Anything with an URI)
- Human-Computer(-Human) Interaction
- Labeled Graph Match, Social Network Analysis

Edelweiss topics

Methods & Models

Knowledge Engineering, Ergonomics, Semantic SNA, Graph matching

Tools

Corese, Sewese, Ecco, Semantic Wiki, Isicil platform

Applications

Bio Medicine, Geology, eLearning, Corporate Intelligence, Engineering Design

Edelweiss Team October 2011

1. Olivier Corby, CR INRIA
2. Fabien Gandon, CR INRIA, HDR
3. Alain Giboin, CR INRIA
4. Christine Foggia Admin,
5. Erwan Demairy, Eng. INRIA,
6. Nicolas Delaforge, Eng. ANR
7. Michel Buffa, CE UNS
8. Catherine Faron-Zucker, CE UNS
9. Isabelle Mirbel, CE UNS, HdR
10. Adrien Basse, PhD, UGB
11. Luca Costabello, PhD, INRIA
12. Corentin Follenfant, PhD SAP
13. Maxime Lefrançois, PhD, UNS
14. Nicolas Marie, PhD ALU
15. Rakebul Hasan, PhD ANR
16. Oumy Seye PhD, UGB
17. Elena Cabrio, PostDoc
18. Serena Villata, PostDoc

Semantic Annotation of Information Resources

Improve Information Retrieval using Ontology based Semantic Annotations

Extract Semantic Annotation from NL Text by semi automatic methods

Semantic Annotation of Information Resources

- Natural Language text mining
- GATE NLP Platform and Ontology with Terminology
- Identification of Instances and Relations
- Generation of RDF annotations
- Contextual Annotations using RDF Named Graphs
- Ambiguity solving using semantic distance

Graph based Knowledge Representation

- Knowledge Engineering with Graph based languages
- From Conceptual Graphs to RDF (standard in KE)
- Semantic Web, Linked Open Data, Social Network Analysis, Semantic Annotation, Ontology
- Information Retrieval in Labeled Graph
- Graph Match Algorithms
- SPARQL Query Language

SPARQL Extension: Property Path Edge enumeration

Path variable:

?x foaf:knows+ :: **$path** ?y

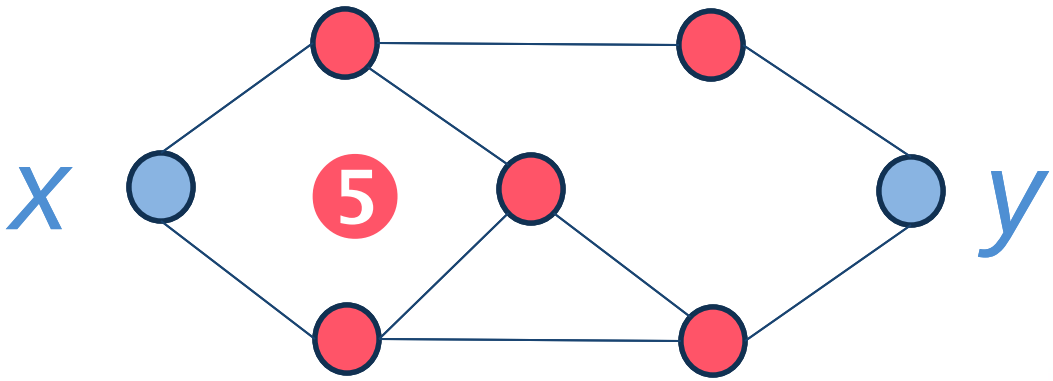
Graph pattern overload:

graph **$path** { ?a foaf:knows ?b }

SPARQL Extension: Count Nodes

```
select ?x ?y (count(distinct ?a) as ?c)
where {
  ?x foaf:knows+ :: $path ?y
  graph $path {?a foaf:knows ?b  filter(?a != ?x)}
}
group by ?x ?y
```

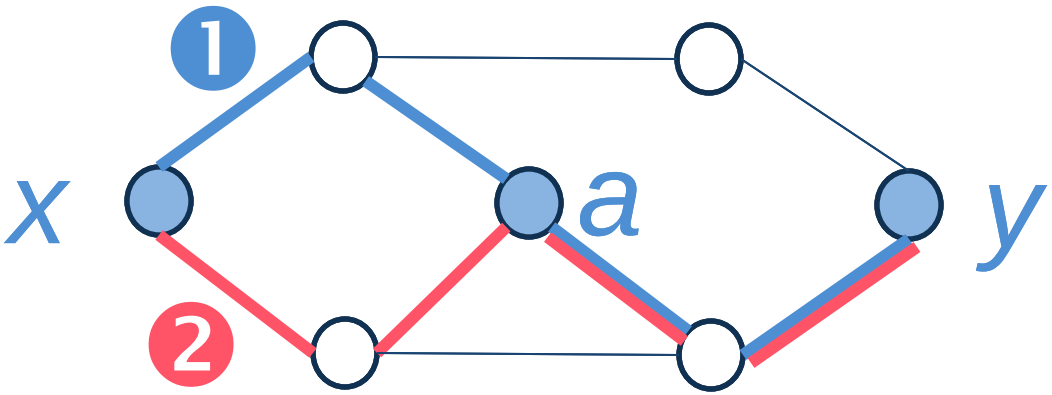
How many intermediate nodes between **x** *and* **y***?*



SPARQL Extension: count paths

```
select ?x ?y ?a (count($path) as ?c)
where {
  ?x foaf:knows+ :: $path ?y
  graph $path {?a foaf:knows ?b  filter(?a != ?x)}
}
group by ?x ?y ?a
```

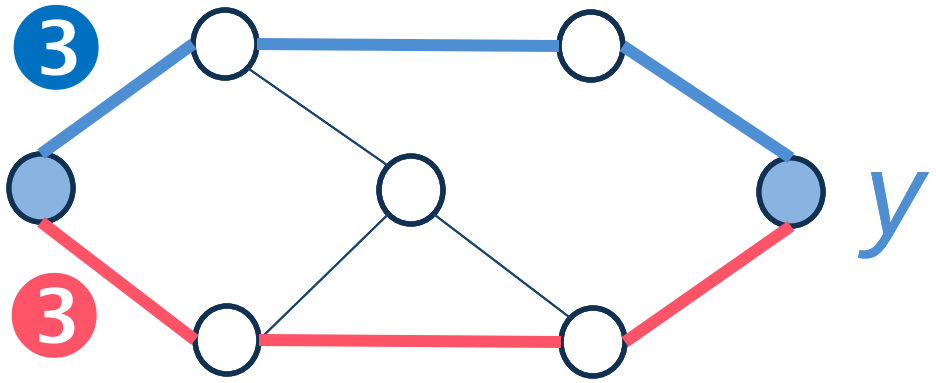
How many **x**-*to*-**y** *paths are passing by* **a***?*



SPARQL Extension: Shortest Path

```
select ?x ?y (min (pathLength($path) as ?min)
where {
        ?x foaf:knows+ :: $path ?y
}
group by ?x ?y
```

Shortest path length between **x** *and* **y***?*



Corese Semantic Web Factory

- RDF RDFS XSD
- SPARQL 1.1 Query & Update
- W3C Test cases
- Generic SPARQL Interpreter on Labeled Graphs

  3 Ports: Corese, Kgraph, Jena
- SPARQL Extensions: Approximate Search wrt

  RDFS Classes, sql(), xpath()
- Construct-where inference rules
- Pipeline: Query, Rule, if-then-else, Pipeline
- Event Listener

Corese Semantic Web Factory

Open Source, CeCILL-C, INRIA forge

45 applications, 21 PhD Thesis

Teaching: 8 universities

Projects:

-EU: Sealife, Palette, SevenPro

-ANR: Neurolog, eWOK Hub, Isicil, Kolflow

Users: IGN, CSTB, IFP, EADS, BRGM, Ademe, INRA, I3S, etc.

Interaction Design of SSW Applications

Aim

Designing Social Semantic Web (SSW) applications adapted to communities

SSW applications =
Applications based on a combination of
Semantic Web
& Web 2.0 (or Social Web)
technologies

Interaction Design of SSW Applications:

Challenges

- ***Reconciling Semantic Web and Social Web approaches***
  to the design of the Web

	Semantic Web	Social Web
User participation	Low	High
Formality	High	Low
Inferential capabilities	High	Low

- ***Articulating developers' and users' representations and operating modes***
  - Making the representations "interoperable"

	Developers	Users
Representations	Formal	Informal
Operating modes	Logics of functioning	Logics of use

Interaction Design of SSW Applications:

Solutions explored

Reconciling Semantic Web and Web 2.0 approaches

Articulating developers' and users' representations/operating modes

⇓

Development of participatory design methods

adapted to the design of SSW applications

Development of collaborative and participatory tools

for supporting the design of SSW applications

Modeling of "collectives" (communities, groups, etc.),

of their members and of their interactions

Recognizing/Visualizing "collectives"

Cf. Visualizing networks and graphs

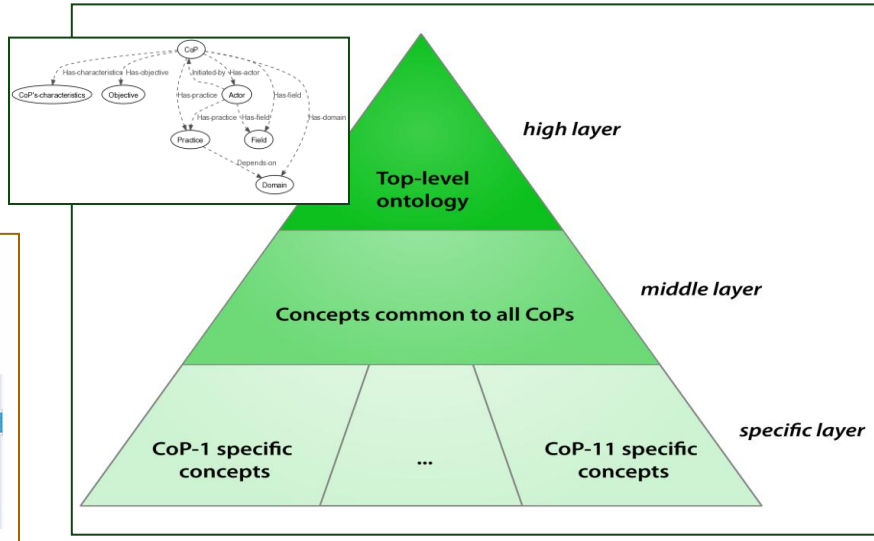
SELECTED APPLICATIONS

Interaction Design of SSW Applications:

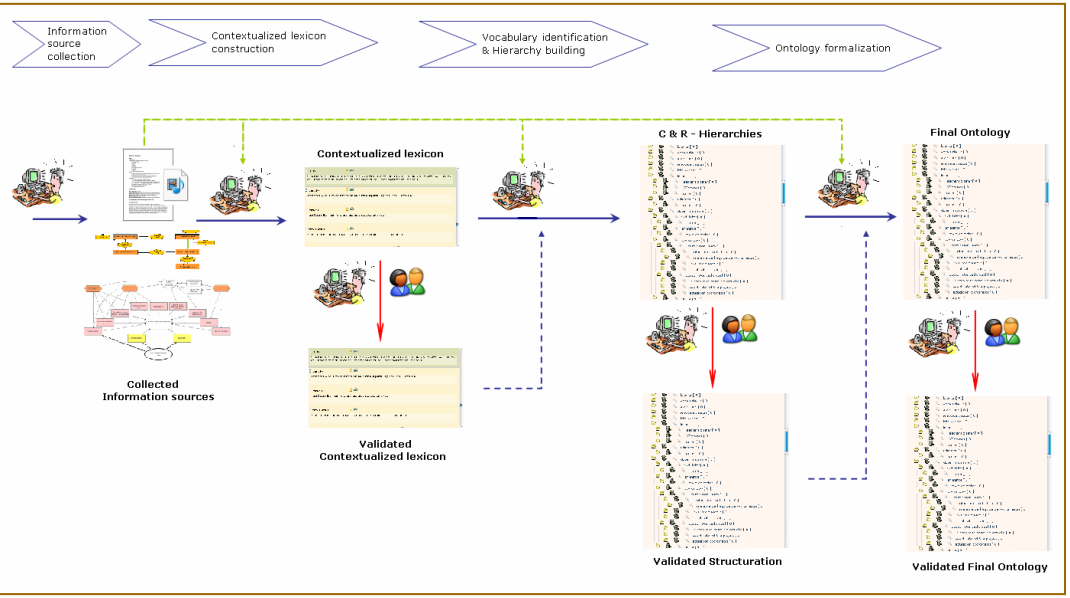
Participatory ontology engineering method

- **Adaptation of a method** designed in the Acacia project
- **Requirements**
  - Making the method collaborative
  - Allowing the participation of end-users
  - Designing tools/functionalities to support the application of the collaborative method
- **Method developed**
  - in the context of: European project PALETTE / ANR project e-WoK_HUB
  - in connection with the development of the ECCO collaborative ontology editor

O'CoP Generic Ontology



Ontology Engineering Method



- Collaborative Workflow
- Distribution of tasks between Developers and Users

Context : European project **PALETTE**,
ANR project **e-WoK_HUB**

CoP-specific Ontologies	CoPs
O' ICTE	TIC-EF/TIC-FA
DocHETICE	Form@HETICE
O'Learn-Nett	Learn-Nett
Technical, Human, Learning/Training Problems	@pretic
"Transition Formation Travail" Ontology	TFT
"Pedagogical Resource Management"	CoPe-L
"WikiPrépas"	ePreP

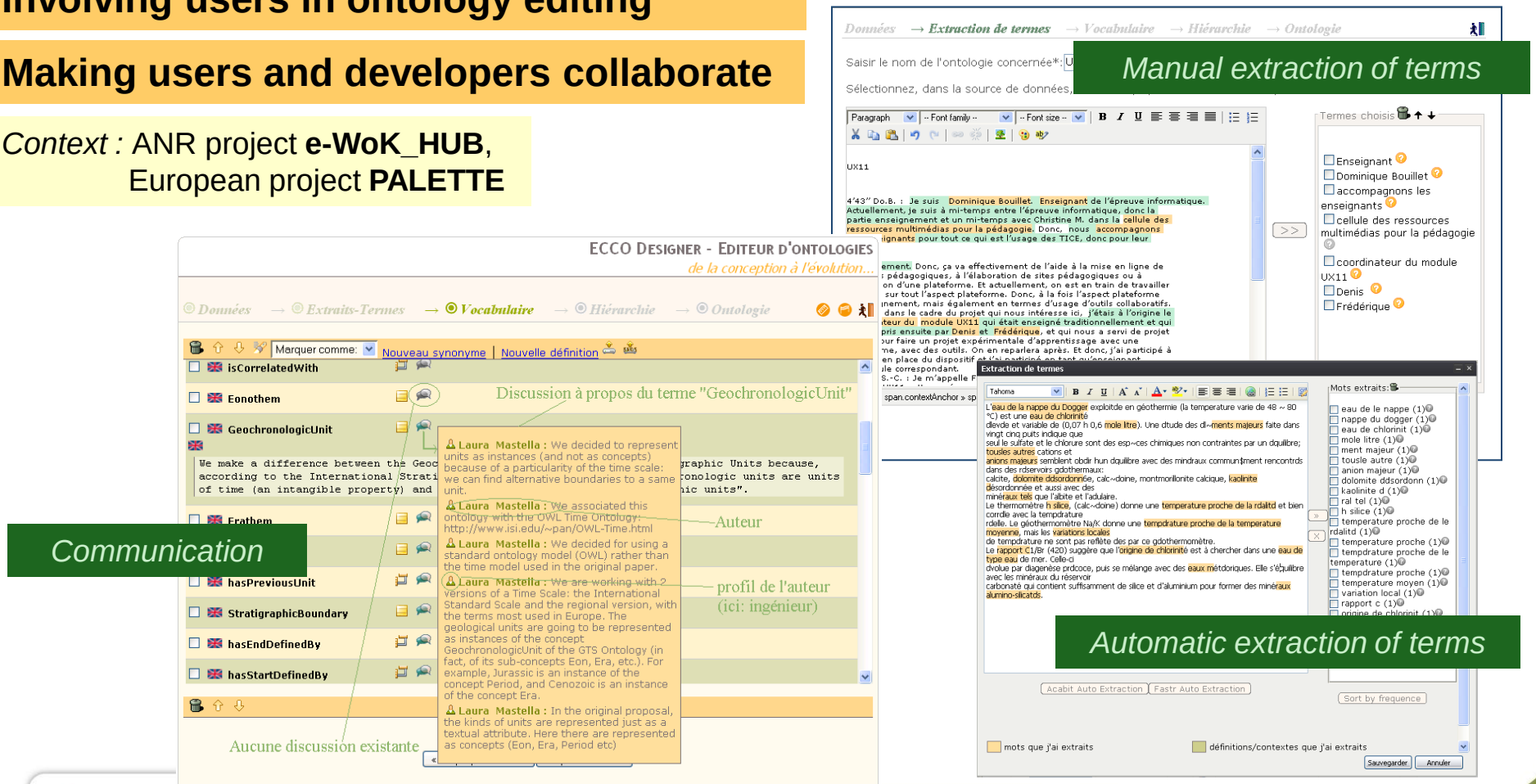
Interaction Design of SSW Applications:

ECCO – A Collaborative an Contextual Ontology Editor

Involving users in ontology editing

Making users and developers collaborate

Context : ANR project **e-WoK_HUB**,
European project **PALETTE**

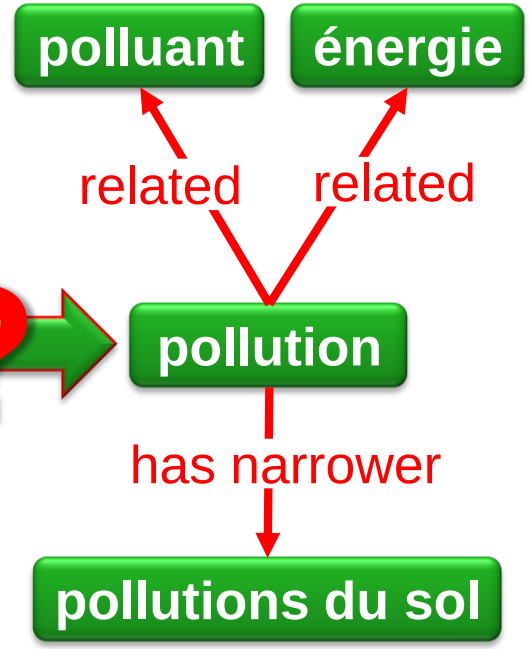


Assisted Structuration of Folksonomies

web 2.0

Flat folksonomy

thesaurus



Combining metrics

Orthographic metric

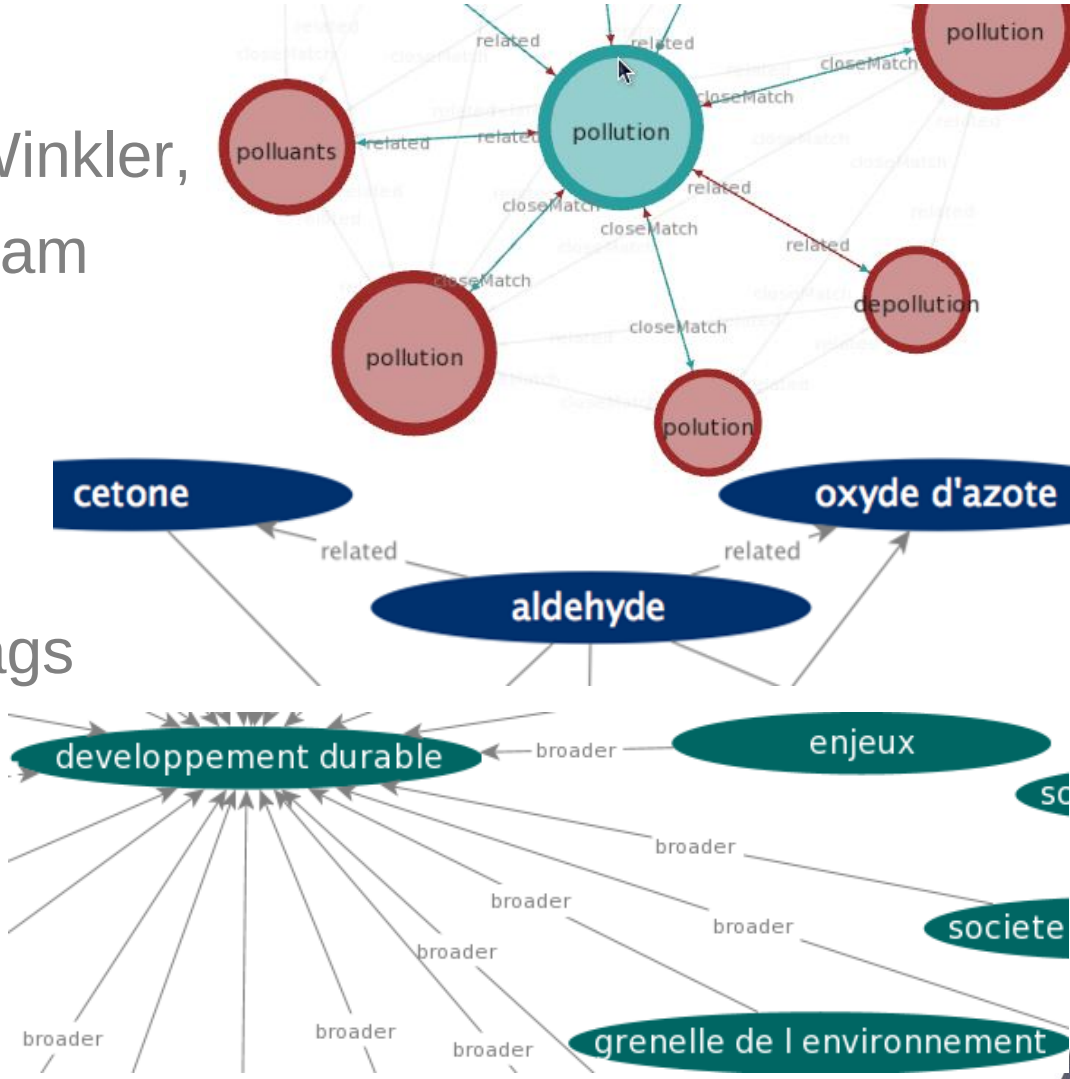
Monge-Elkan Soundex, JaroWinkler, asymmetric Monge-Elkan Qgram

Contextual metric

cosine vectors co-occurrent tags

Social metric

include user communities

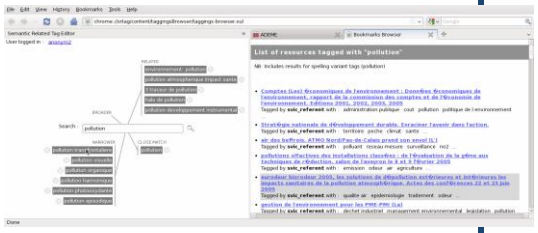


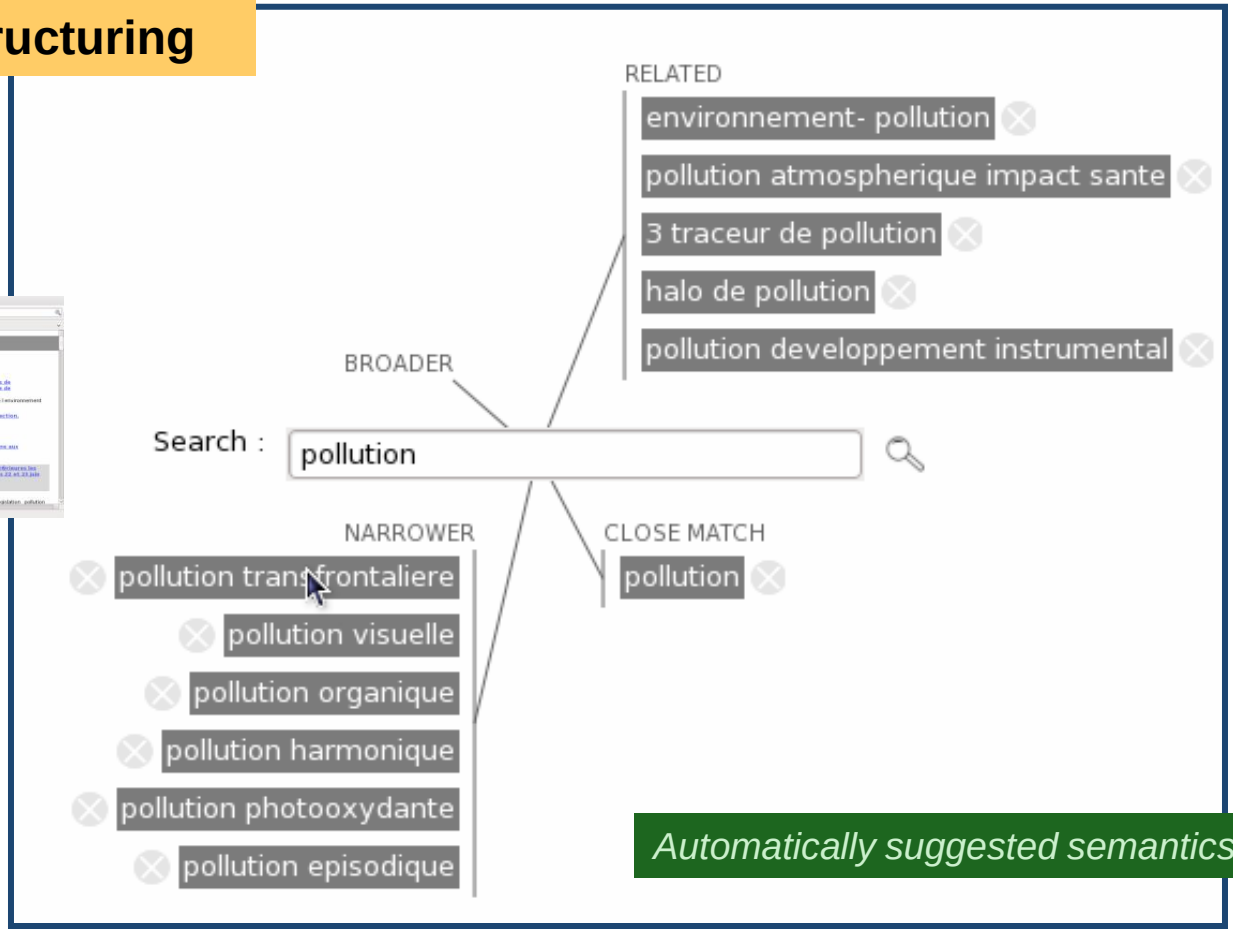
Interaction Design of SSW Applications:

Tag Editor/Browser

Involving users in tags structuring

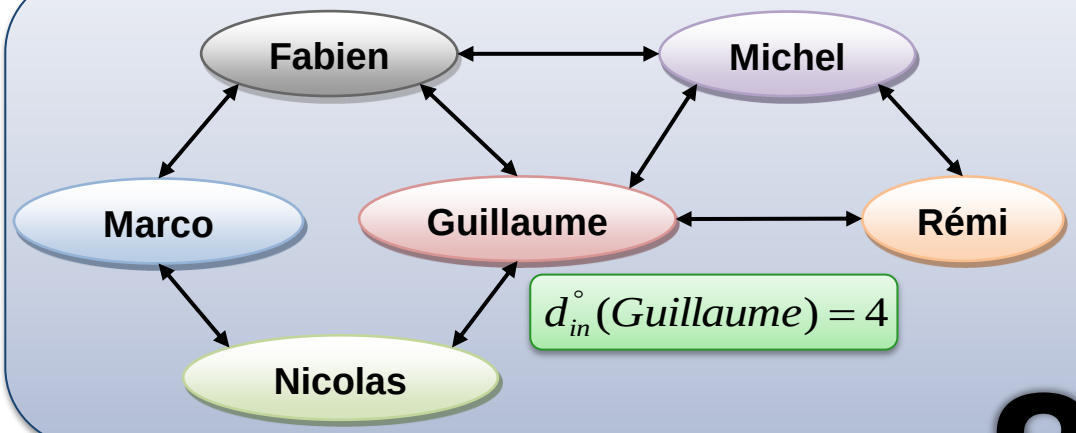
Context : ANR project **ISICIL**





Automatically suggested semantics

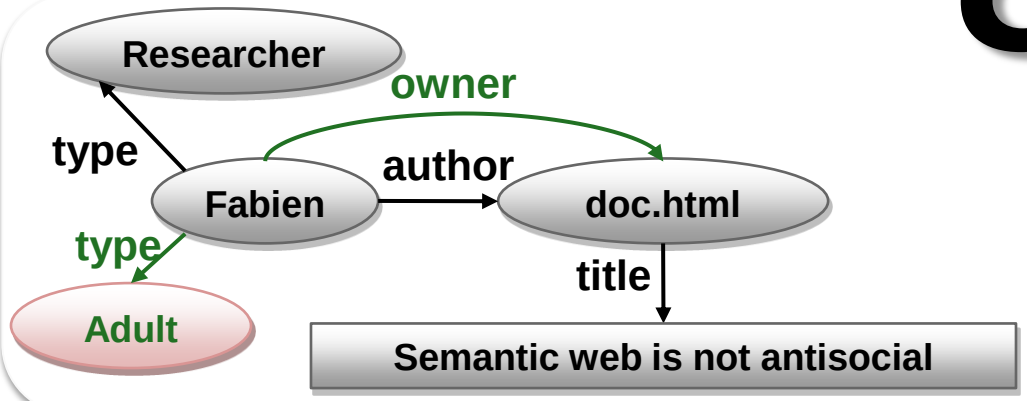
Social Network Semantic Analysis



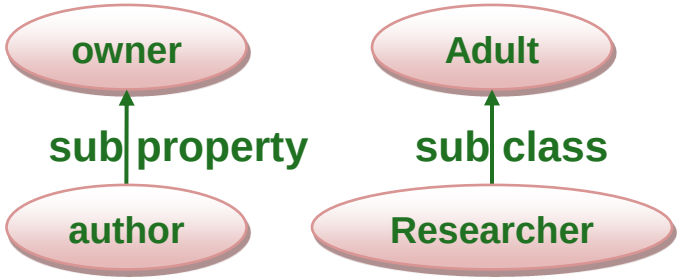
$$d^{\circ}_{in}(p) = |\{x; rel(x, p)\}|$$

Social network analysis

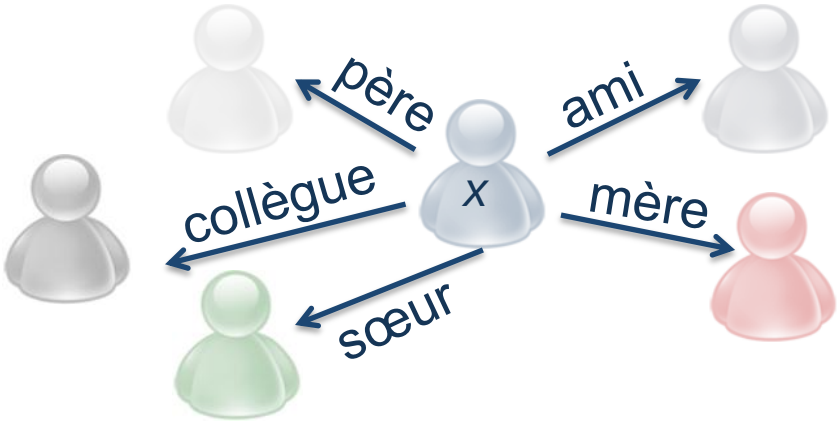
&



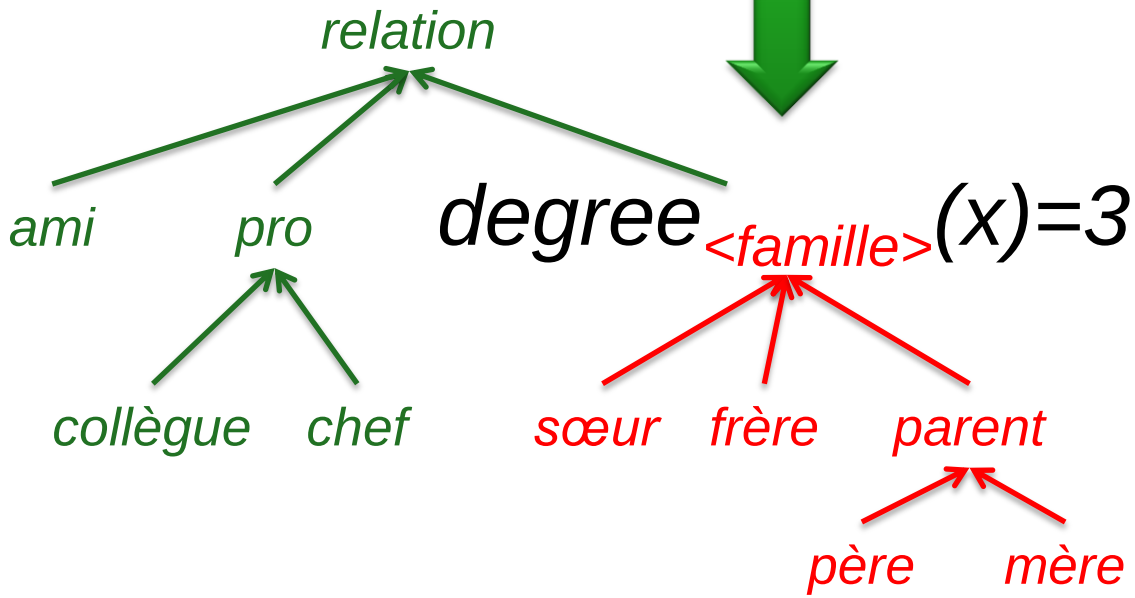
Semantic web



ex. qualified degree



degree(x)=5



Formal definition in SPARQL

SNA indices	SPARQL formal definition
$Comp_{<rel>}(G)$	select ?x ?y from <G> where { ?x param[rel] ?y }group by any[7]
$D_{<rel,dist>}(y)$	select ?y count(?x) as ?degree where { {?x (param[rel])*::$path ?y filter(pathLength($path) <= param[dist])} UNION {?y param[rel]::$path ?x filter(pathLength($path) <= param[dist])} }group by ?y
$D^{in}_{<rel,dist>}(y)$	select ?y count(?x) as ?indegree where{ ?x (param[rel])*::$path ?y filter(pathLength($path)[8] <= param[dist]) }group by ?y
$Diam_{<rel>}(G)$	select pathLength($path) as ?length from <G> where { ?y s (param[rel])*::$path ?to }order by desc(?length) limit 1
$nb^{g}_{<rel>}(from,to)$	select ?from ?to count($path) as ?count where{ ?from sa (param[rel])*::$path ?to }group by ?from ?to
$nb^{g}_{<rel>}(b,from,to)$	select ?from ?to ?b count($path) as ?count where{ ?from sa (param[rel])*::$path ?to graph $path{?b param[rel] ?j} filter(?from != ?b) optional { ?from param[rel]::$p ?to } filter(!bound($p)) }group by ?from ?to ?b
$C^{c}_{<rel>}(y)$	select distinct ?y ?to pathLength($path) as ?length (1/sum(?length)) as ?centrality where{ ?y s (param[rel])*::$path ?to ... }group by ?y

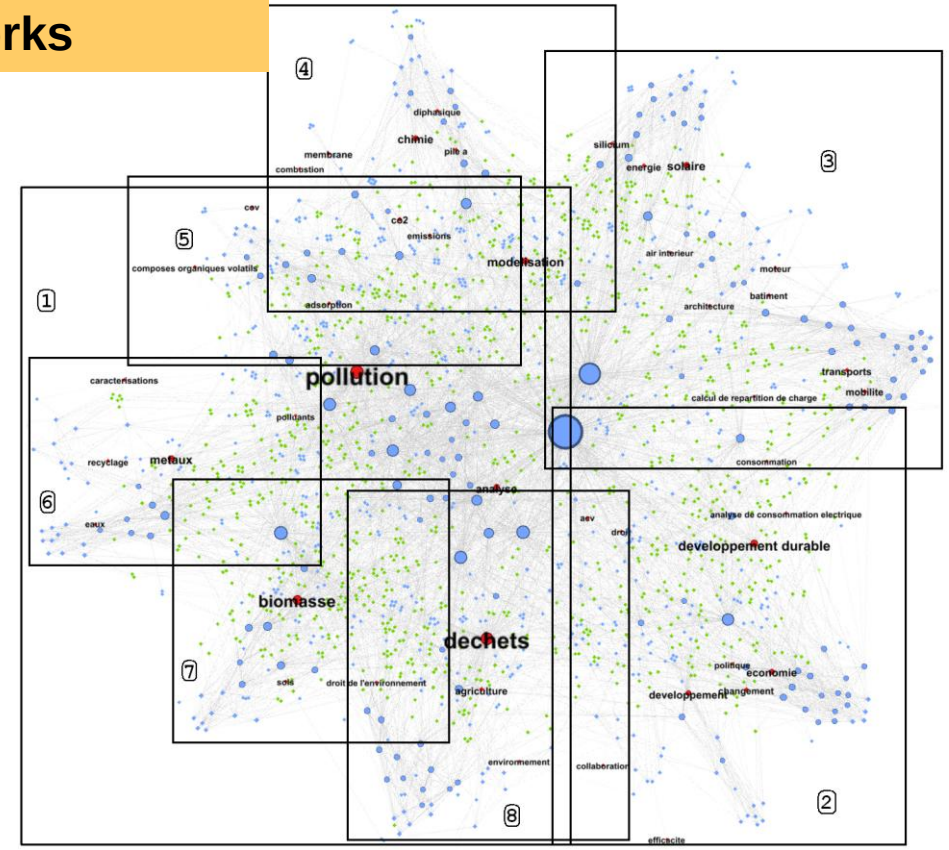
CORESE/KGRAM

Interaction Design of SSW Applications:

ISICIL Network Visualizer/Recognizer

Recognizing and visualizing communities in social networks

Context : ANR project **ISICIL,** INRIA ADT **SegViz** (Gephi Plugin)



1. pollution
2. sustainable development
3. energy
4. chemistry
5. air pollution
6. metals
7. biomass
8. wastes

Mixed graph of actors and interests

Selected Publications

- Erétéo et al. Semantic Social Network Analysis, a Concrete Case, Handbook of Research on Methods and Techniques for Studying Virtual Communities, IGI Global, 2011.
- Gandon et al. Semantic Annotation and Retrieval: RDF, in Handbook of Semantic Web Technologies, Domingue, Fensel, Hendler, Springer; 1st Edition (June 24, 2011)
- Gandon, Ontologies in Computer Science, in Ontology Theory, Book chapter Management and Design: Advanced Tools and Models, IGI Global, 2010.
- Corby et al. The KGRAM Abstract Machine for Knowledge Graph Querying. IEEE/WIC/ACM 2010
- Erétéo et al. Analysis of a Real Online Social Network using Semantic Web Frameworks. ISWC 2009
- Buffa et al. SweetWiki: A Semantic Wiki. Journal of Web Semantics, 2008
- Khelif et al. An Ontology-based Approach to Support Text Mining and Information Retrieval in the Biological Domain. Journal of Universal Computer Science, 2007

Completed Projects

SeaLife EU: SW in Bio Medicine

SevenPro EU: SW in Engineering Design

Palette EU: SW in Education

e-WOK Hub ANR: SW in Geology

ImmunoSearch, Biomarker: SW in Genetics

Griwes Color INRIA: Generic Graph Model

DESIR Color INRIA: with INRA & UNS

Collaborations

Alcatel Lucent PhD Thesis

SAP PhD Thesis

IGN Master Thesis

Orange Labs, Atos, Mondeca, EADS : ANR Projects

Fraunhofer, London U., EPFL, Biotec Dresden, etc.

EU Projects

Collaborations

Kewi I3S CNRS UNS

Orpailleur, Exmo, Silex LIRIS, GDD Nantes, Tatoo, RCR/GraphIK, Tech Cico UTT, Telecom ParisTech, Eurecom

INSEE, Ademe, Fing, BRGM, IFP, ENSMP, LISI

Standardization

W3C WG

- GRDDL
- RDFa
- SPARQL 1.1
- RDF 1.1
- Provenance

Education

- UNS Semantic Web & Knowledge Engineering, Master & Licence Pro
- UNS GUI, Ergonomics of IT, Master
- UGB Senegal Semantic Web
- Ecole Centrale Semantic Web Introduction
- SKEMA/Ceram Semantic Web Introduction

Misc.

- co Chair of WWW 2012
- co Chair of *Social Web & Web Science* at ESWC 2012
- Will represent INRIA at W3C
- Contint Program Committee
- GDR Psycho Ergo, member of Concil
- Organizing Committee of EPIQUE 2009
- Chair IC 2009
- dbpedia.fr
- ILab in preparation
- Book on Semantic Web with Dunod

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

a proposal for a joint research team between INRIA Sophia Antipolis –Méditerranée and I3S (CNRS and University of Nice – Sophia Antipolis).

(*) wimmics comes from wimi, a variety of roses.

members

Head (and INRIA contact): Fabien Gandon

Researchers

1. Michel Buffa, MdC (UNS)
2. Olivier Corby, CR1 (INRIA)
3. Catherine Faron-Zucker, MdC (UNS)
4. Fabien Gandon, CR1, HDR (INRIA)
5. Alain Giboin, CR1 (INRIA)
6. Nhan Le Thanh, Pr. (UNS)
7. Isabelle Mirbel, MdC, HDR (UNS)
8. Peter Sander, Pr. (UNS)

Post-doc

1. Elena Cabrio (INRIA)
2. Serena Villata (ANR Datalift)

Research engineers

1. Julien Cojan (INRIA)
2. Nicolas Delaforge (INRIA, ANR ISICIL)
3. Erwan Demairy (INRIA, ADT)

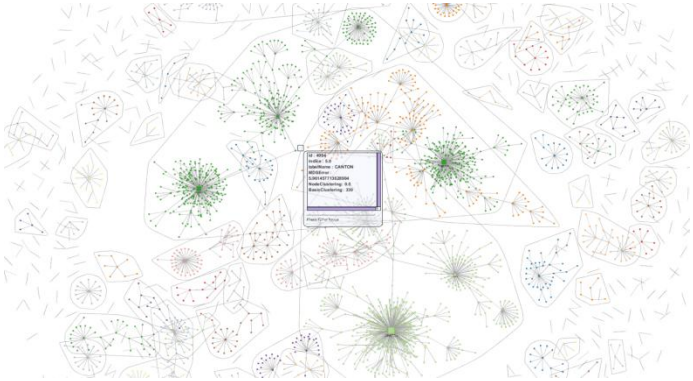
Assistants

Christine Foggia (INRIA) and Marie Hélène Prosillico (I3S)

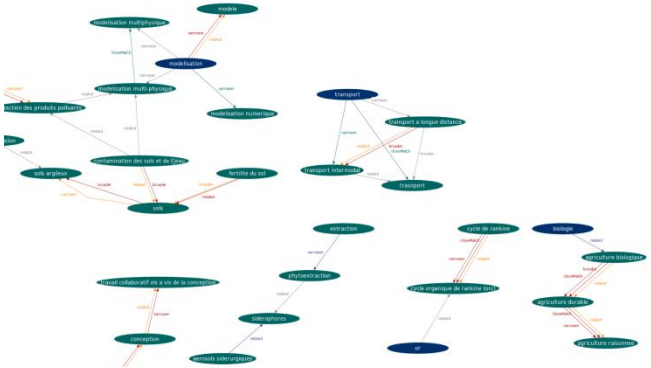
PhD students

1. Pavel Arapov, 1st year (EDSTIC-INRIA)
2. Adrien Basse, 2nd year (UGB-INRIA)
3. Franck Berthelon, 2nd year (UNS-EDSTIC)
4. Ahlem Bouchahda, 3rd year (UNS-SupCom Tunis)
5. Khalil Riad Bouzidi, 2nd year (UNS-CSTB)
6. Luca Costabello, 1st year (INRIA-CORDI)
7. Corentin Follenfant, 1st year (SAP)
8. Maxime Lefrançois, 1st year (EDSTIC-INRIA)
9. Nicolas Marie, 1st year (Bell-ALU, INRIA)
10. Hasan Rakebul, 1st year (ANR-Kolflow)
11. Oumy Seye, 1st year, (Rose Dieng allocation)
12. Imen Tayari, 3rd year (UNS-Sfax Tunisie)
13. Viet-Hoang Vu, 4th year (UNS-Factory)

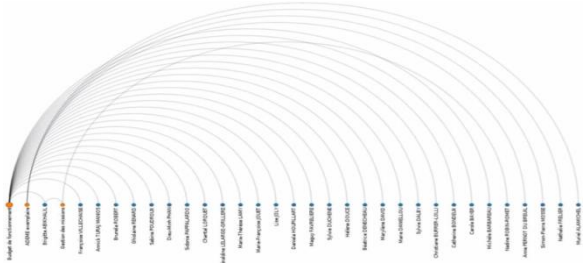
graphs, graphs…



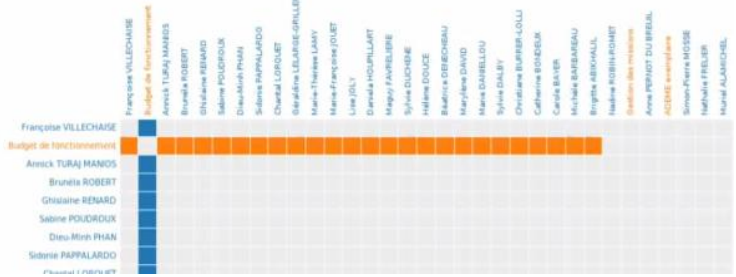
Ipernity social network structure



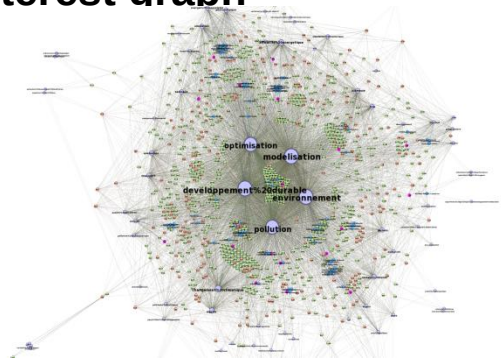
Folksonomy restructuring



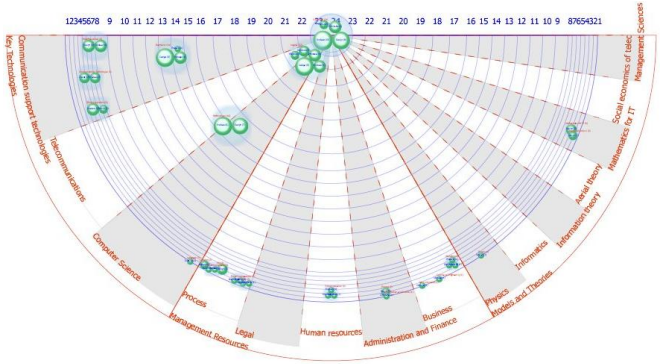
Interest graph



Interest matrix



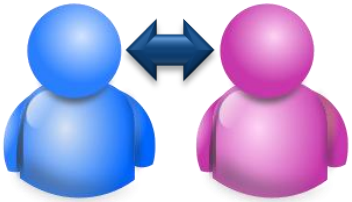
Mixed graph of actors and interest



Clusters in KmP

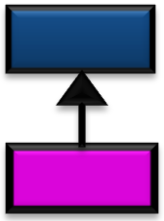
challenges

analyzing, modeling, formalizing and implementing graph-based social semantic web applications for communities.



multidisciplinary approach for analyzing and modeling

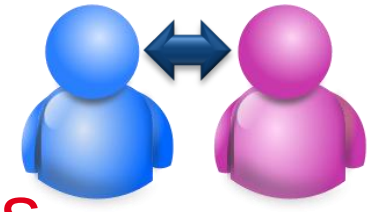
- the many aspects of intertwined information systems
- communities of users and their interactions



formalize and reason on these models

- new analysis tools and indicators
- new functionalities and better community management.

interactions



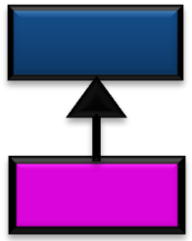
- analyzing & modeling communities interactions through social semantic web app.
- interacting with dynamic semantic web app.

how do we improve our interactions with such an information system that keeps getting more and more complex?

how do we reconcile and integrate the formalized stable semantics of computer science and the negotiable social interactions?

how do we reconcile local contexts of users and global characteristics of the world-wide virtual machine and information systems that the web has become?

typed graphs



- formalizing models and implementing social semantic web applications
- calculating on heterogeneous joined typed graphs of the web

what kind of formalism is the best suited for such models?

how do we analyze these typed graph structures and their interactions?

how do we support different graph life-cycles, calculations and characteristics in a coherent and understandable way?

ANR projects

isicil.inria.fr (2/3)

- enterprise social networking
- business intelligence, watching, monitoring
- communities of interest, of practice, of experts

datalift.org (1/3)

- frow raw public data to interlinked data and schemas
- a platform and documentation to assist the process
- validation on real datasets

kolflow.univ-nantes.fr (1/3)

- reduce the overhead of communities in the process of continuously building knowledge
- federated semantic wikis as a distributed blackboard for man-machine collaboration

projects

dbpedia.fr

- French version of dbpedia from wikipedia
- Ministry of culture

SeGViz

- Semantic Graph Visualization
- INRIA Grant for software development

the end

Thank you for your attention