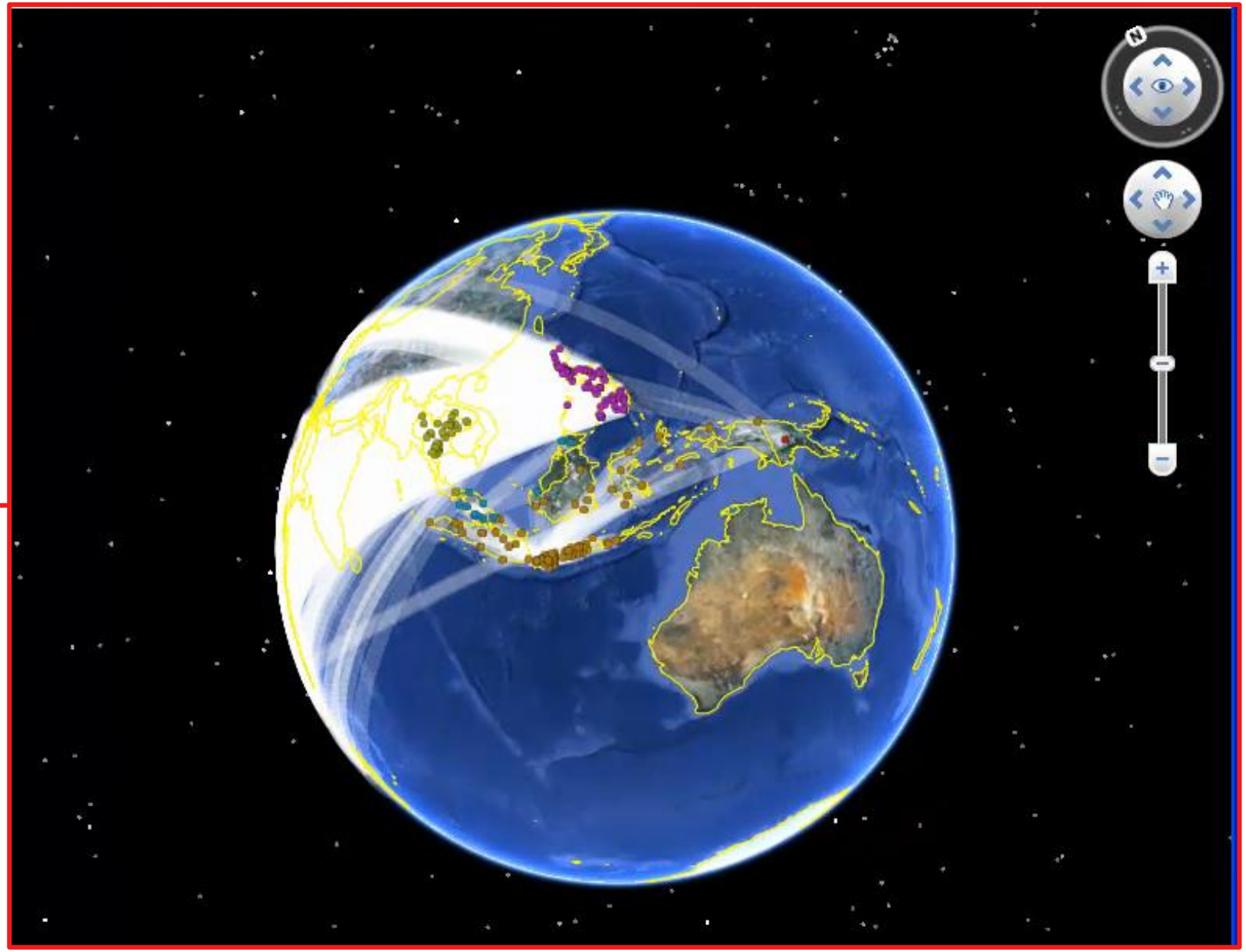
Linking Data and People on a Semantic Web



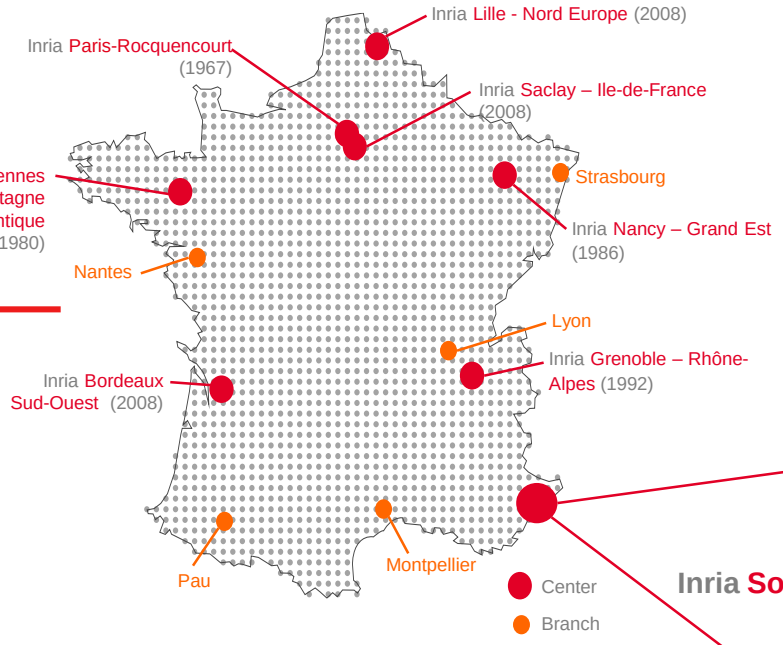
Fabien GANDON, @fabien_gandon http://fabien.info

WIMMICS TEAM

Web-Instrumented Man-Machine Interactions, Communities and Semantics

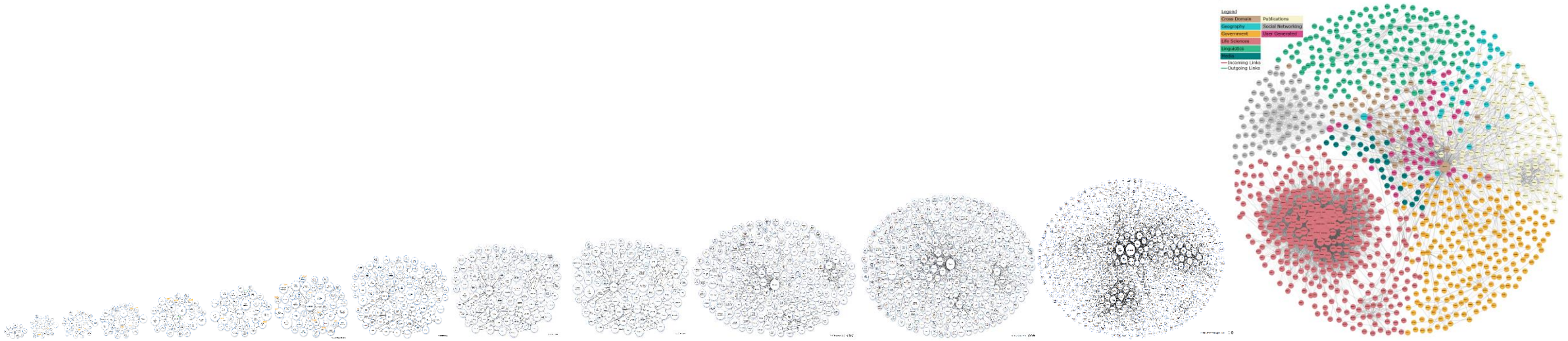
- Inria
- CNRS
- UCA, Univ. Nice

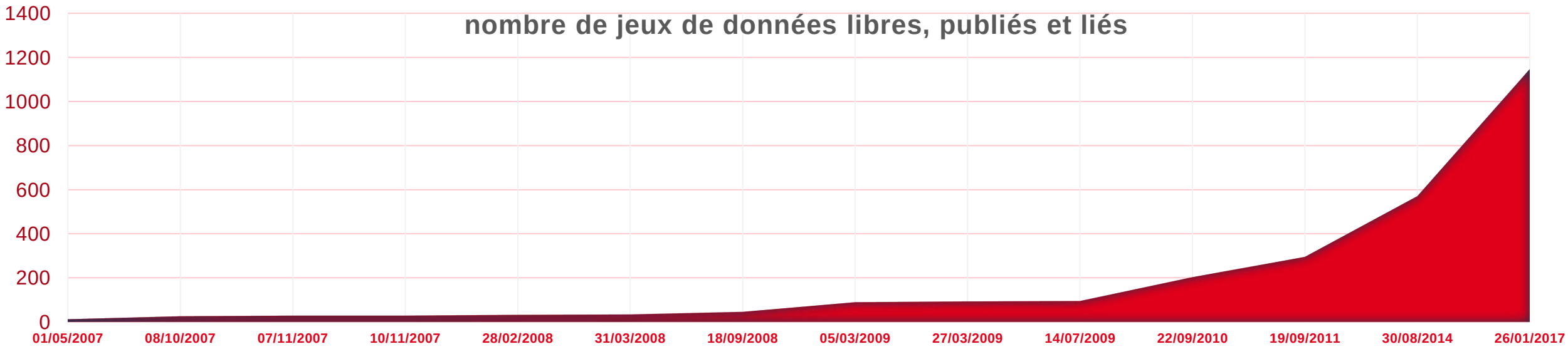
] I3S



Inria **Sophia Antipolis Méditerranée** (1983)

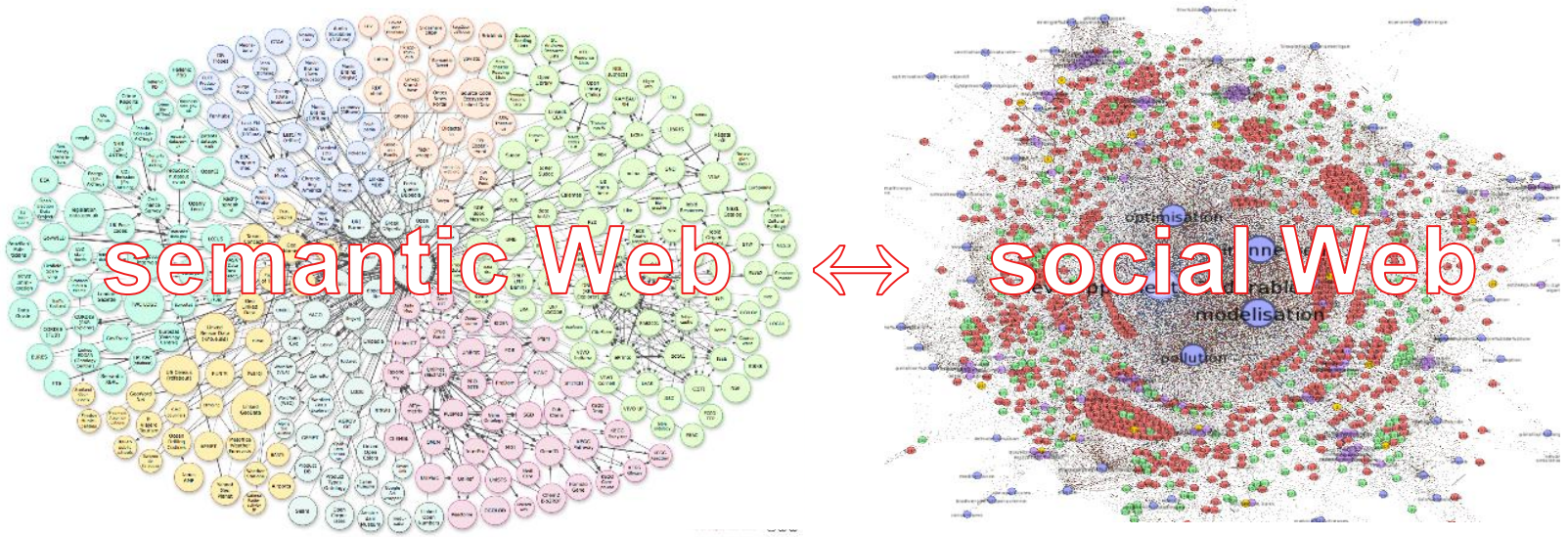
linked open data(sets) on the Web





CHALLENGE

to bridge social semantics and formal semantics on the Web



MULTI-DISCIPLINARY TEAM

- 41 members 2016, 50 in 2015
- 14 nationalities
- 1 DR, 3 Professors
- 3CR, 4 Assistant professors
- 1 SRP

DR/Professors:

- Fabien GANDON, Inria, AI, KR, Semantic Web, Social Web
- Nhan LE THANH, UNS, Logics, KR, Emotions
- Peter SANDER, UNS, Web, Emotions
- Andrea TETTAMANZI, UNS, AI, Logics, Agents,

CR/Assistant Professors:

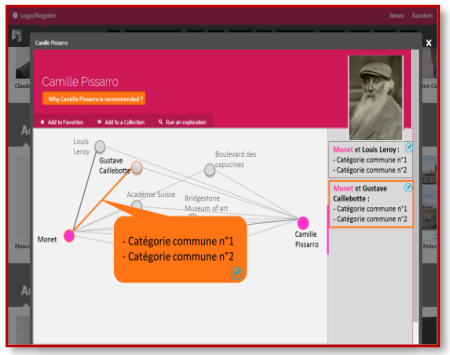
- Michel BUFFA, UNS, Web, Social Media
- Elena CABRIO, UNS, NLP, KR, Linguistics
- Olivier CORBY, Inria, KR, AI, Sem. Web, Programming, Graphs
- Catherine FARON-ZUCKER, UNS, KR, AI, Semantic Web, Graphs
- Alain GIBOIN, Inria, Interaction Design, KE, User & Task models
- Isabelle MIRBEL, UNS, Requirements, Communities
- Serena VILLATA, CNRS, AI, Argumentation, Licenses, Rights

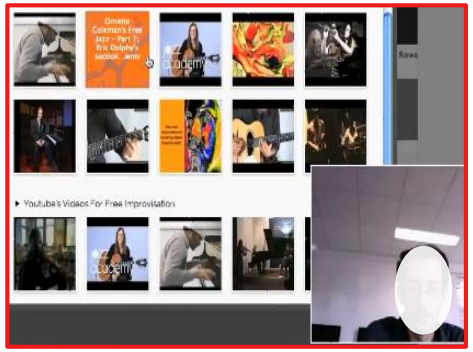
Inria Starting Position: Alexandre MONNIN, Philosophy, Web

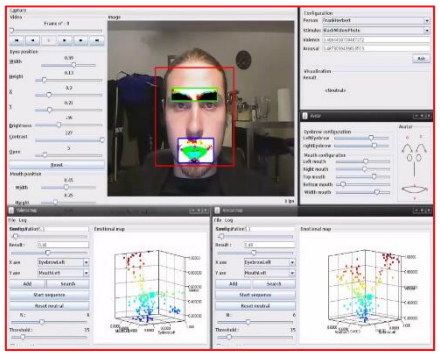
METHODS AND TOOLS

1. user & interaction design

❶

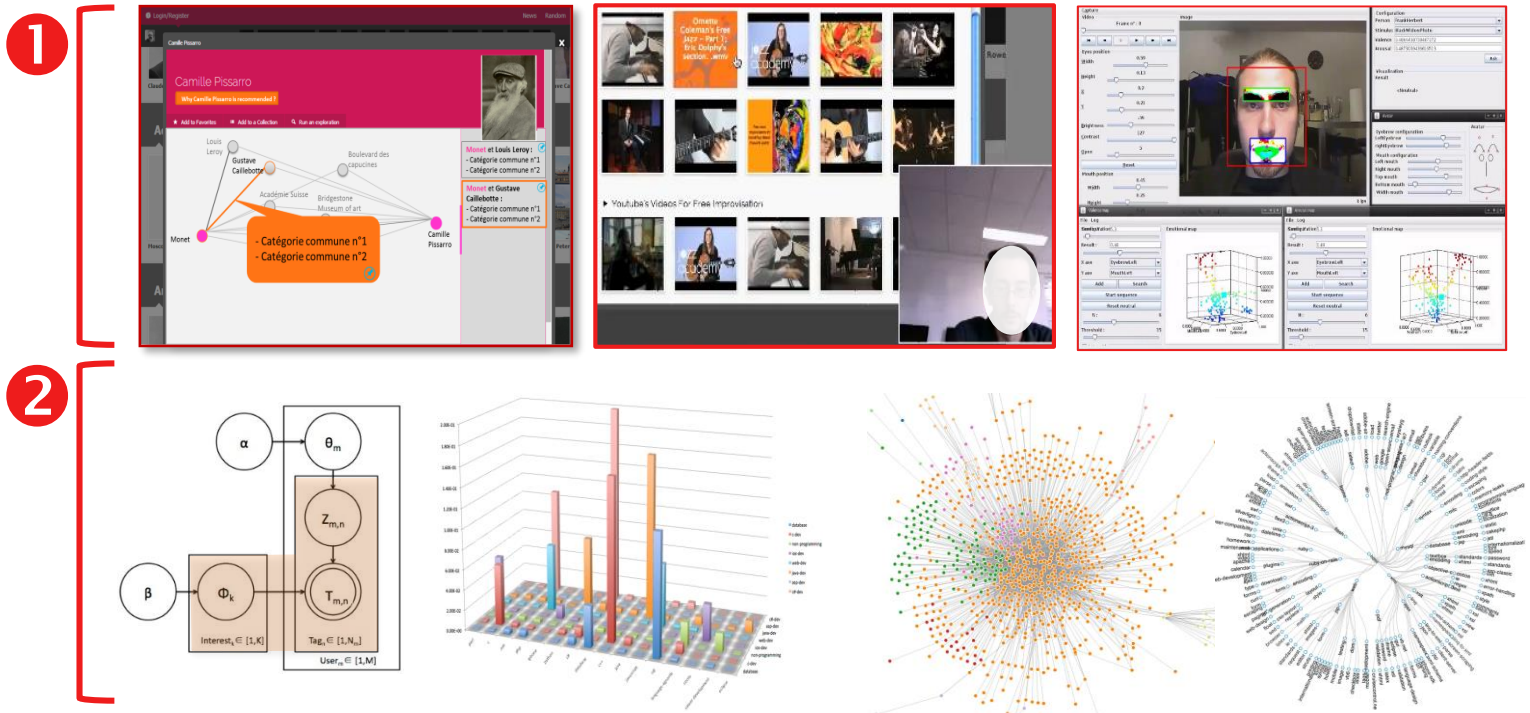






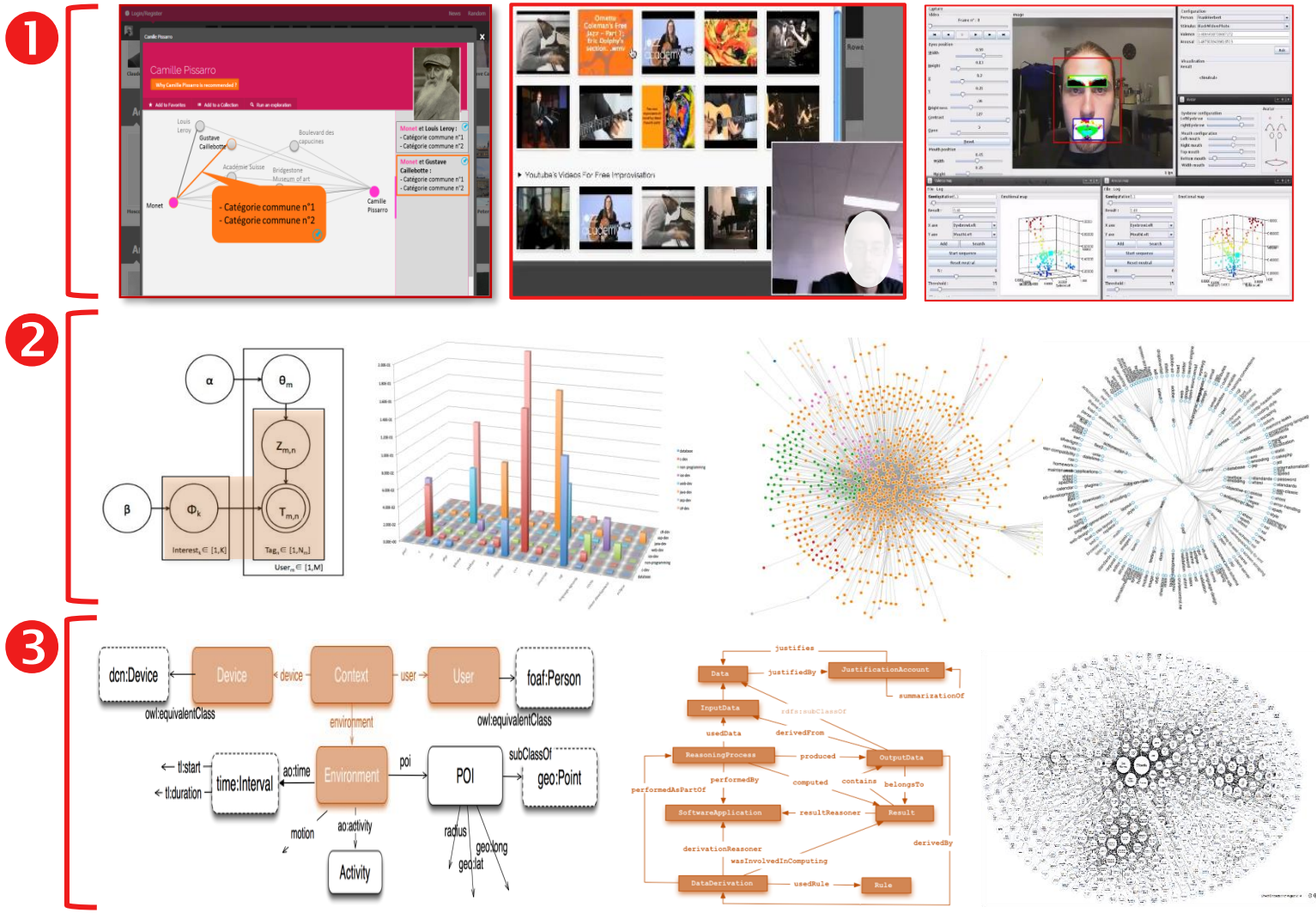
METHODS AND TOOLS

1. user & interaction design
2. communities & social medias



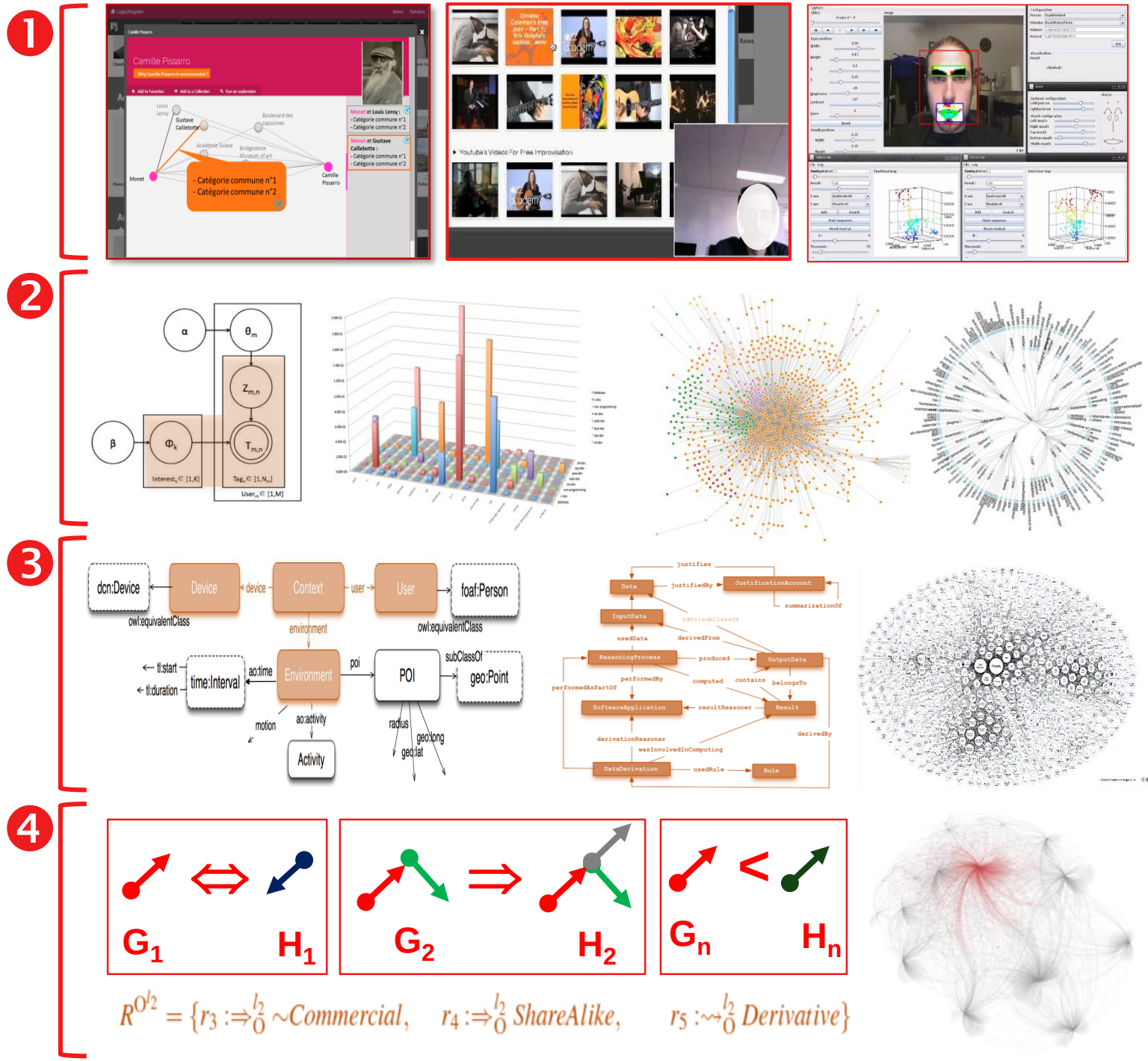
METHODS AND TOOLS

1. user & interaction design
2. communities & social medias
3. linked data & semantic Web



METHODS AND TOOLS

1. user & interaction design
2. communities & social medias
3. linked data & semantic Web
4. reasoning & analyzing

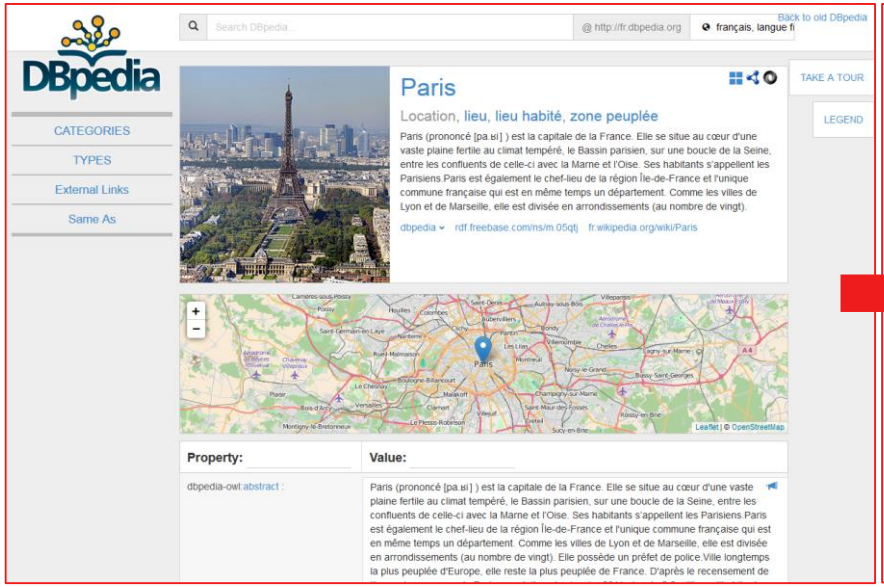


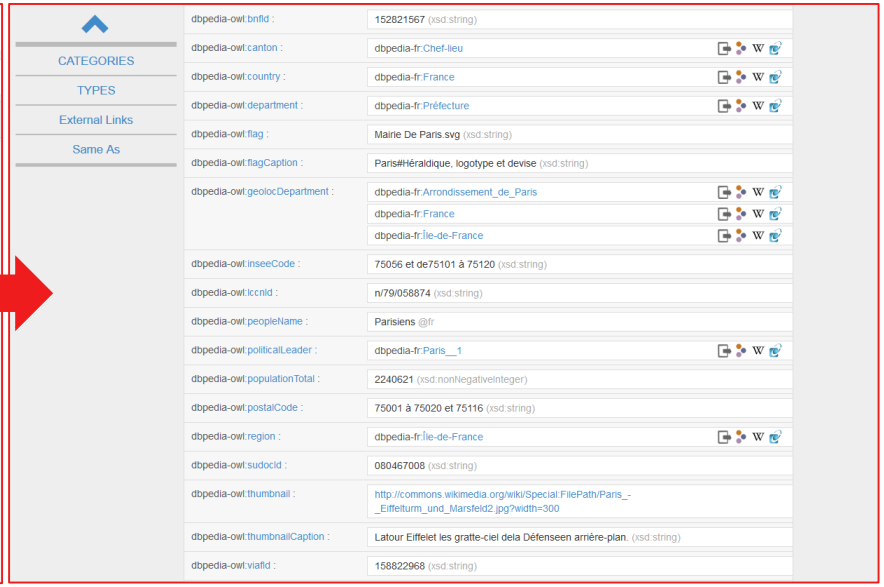
cultural data is a weapon of mass construction

PUBLISHING

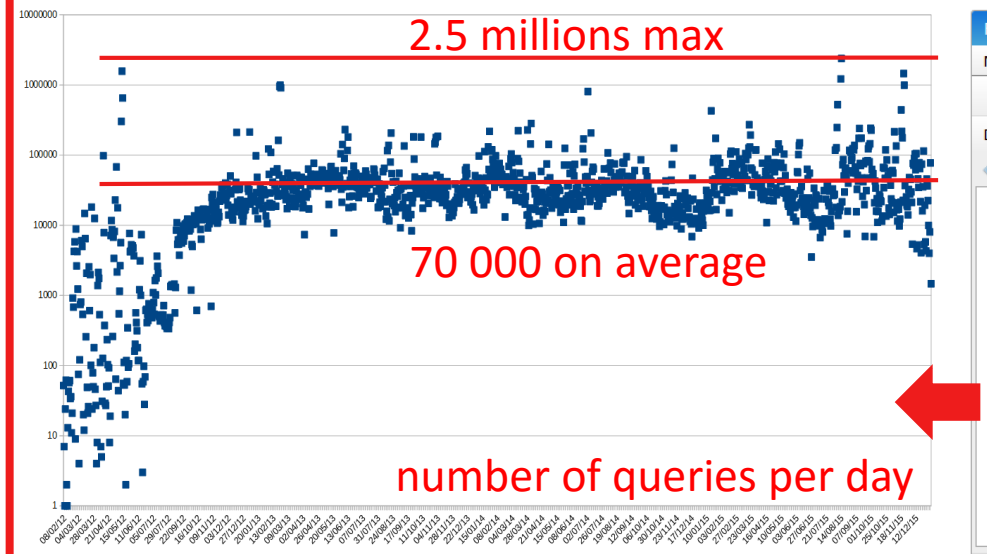
e.g. DBpedia.fr

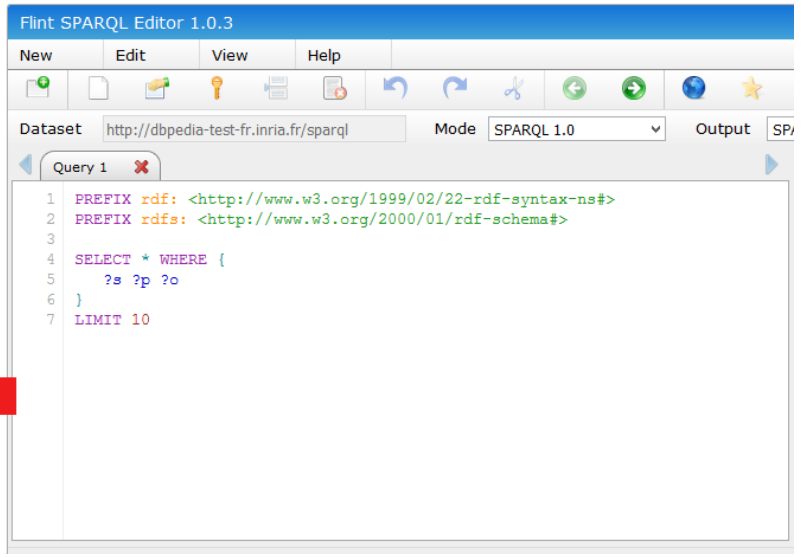
185 377 686 RDF triples extracted and mapped





public dumps, endpoints, interfaces, APIs…

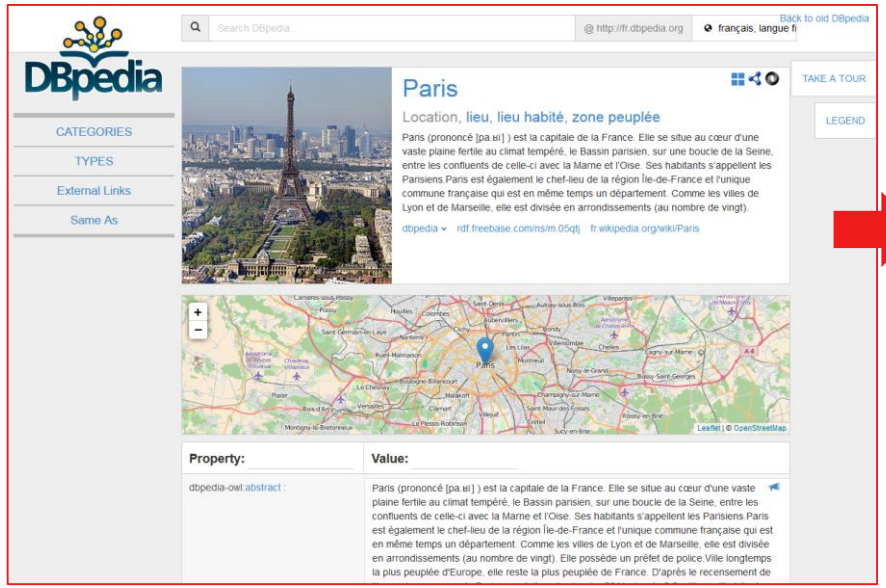


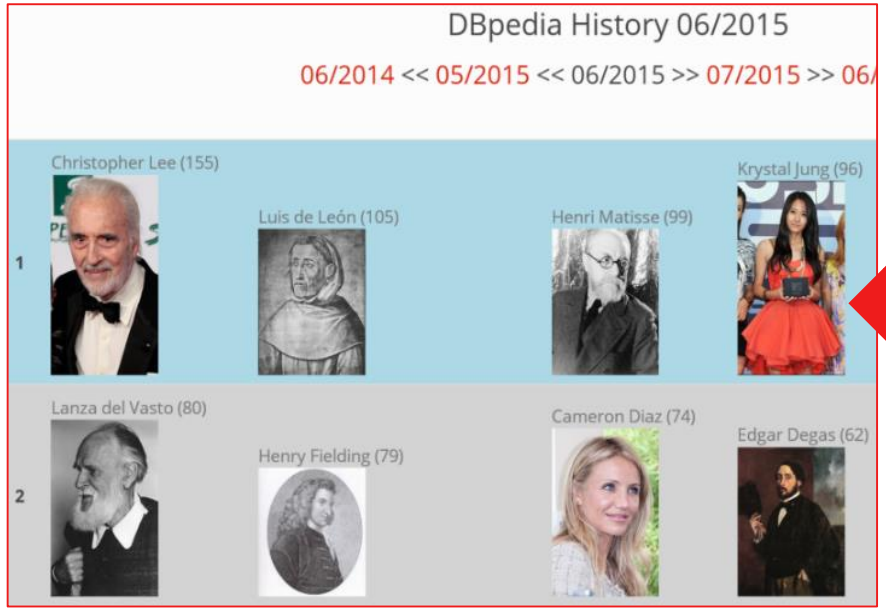


HISTORIC

extending DBpedia

2.5 billion RDF triples of versioning activities





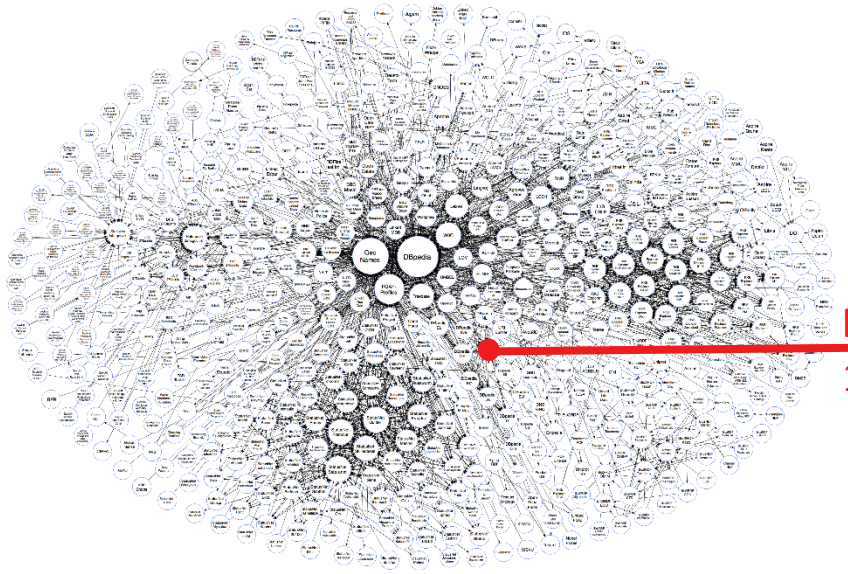

```
 <http://fr.dbpedia.org/Réaux>
a prov:Revision ;
swp:isVersion "96"^^xsd:integer ;
dc:created "2005-08-05T07:27:07"^^xsd:dateTime ;
dc:modified "2015-01-06T10:26:35"^^xsd:dateTime ;
dbfr:uniqueContributorNb 58 ;

dbfr:revPerYear [ dc:date "2005"^^xsd:gYear ; rdf:value
"2"^^xsd:integer ] ;
…
dbfr:revPerYear [ dc:date "2015"^^xsd:gYear ; rdf:value
"1"^^xsd:integer ] ;

dbfr:revPerMonth [ dc:date "08/2005"^^xsd:gYearMonth ;
rdf:value "1"^^xsd:integer ] ;
…
dbfr:revPerMonth [ dc:date "01/2015"^^xsd:gYearMonth ;
rdf:value "1"^^xsd:integer ] ;

dbfr:averageSizePerMonth [ dc:date
"08/2005"^^xsd:gYearMonth ; rdf:value "3060"^^xsd:float ] ;
…
dbfr:averageSizePerYear [ dc:date "2015"^^xsd:gYear ;
rdf:value "4767"^^xsd:float ] ;


dbfr:averageSizePerMonth [ dc:date
"08/2005"^^xsd:gYearMonth ; rdf:value "3060"^^xsd:float ] ;
…
dbfr:averageSizePerMonth [ dc:date
"01/2015"^^xsd:gYearMonth ; rdf:value "4767"^^xsd:float ] ;

dbfr:size "4767"^^xsd:integer ;
dc:creator [ foaf:name "DasBot" ; rdf:type
scoro:ComputationalAgent ] ;
sioc:note "Robot : Remplacement de texte automatisé (-
[[commune française| +[[commune (France)|)"^^xsd:string ;
prov:wasRevisionOf
<https://fr.wikipedia.org/w/index.php?title=Réaux&oldid=103
441506> ;
prov:wasAttributedTo [ foaf:name "Escarbot" ; a
prov:SoftwareAgent ] .
```

[Corby, Boyer et al.]

“searching” comes in many flavors

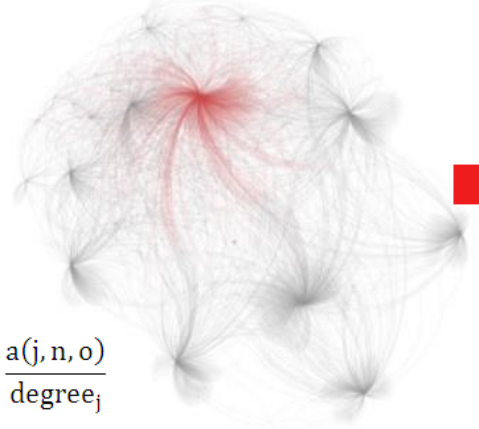
SEARCHING

- exploratory search
- question-answering



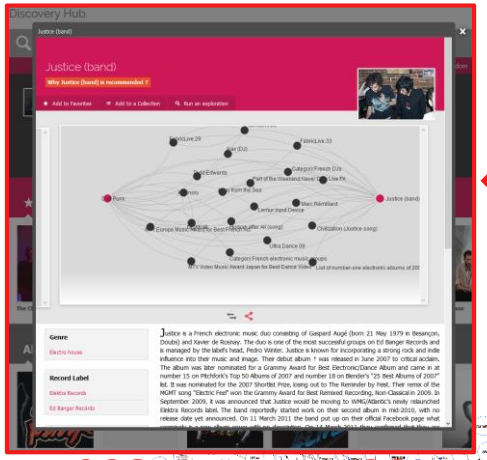
DBPEDIA.FR (extraction, end-point)
180 000 000 triples
[Cojan, Boyer et al.]

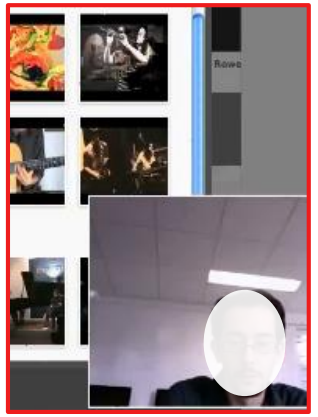
semantic spreading activation



$$a(i,n) = \prod_{o \in O} [a(i,n,o)] / \log\,(degree_i)$$

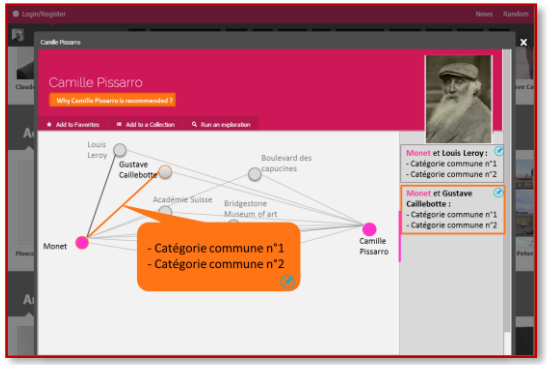
$$a(i,n+1,o) = s(i,n,o) + \sum_j w(i,o) * \frac{a(j,n,o)}{degree_j}$$



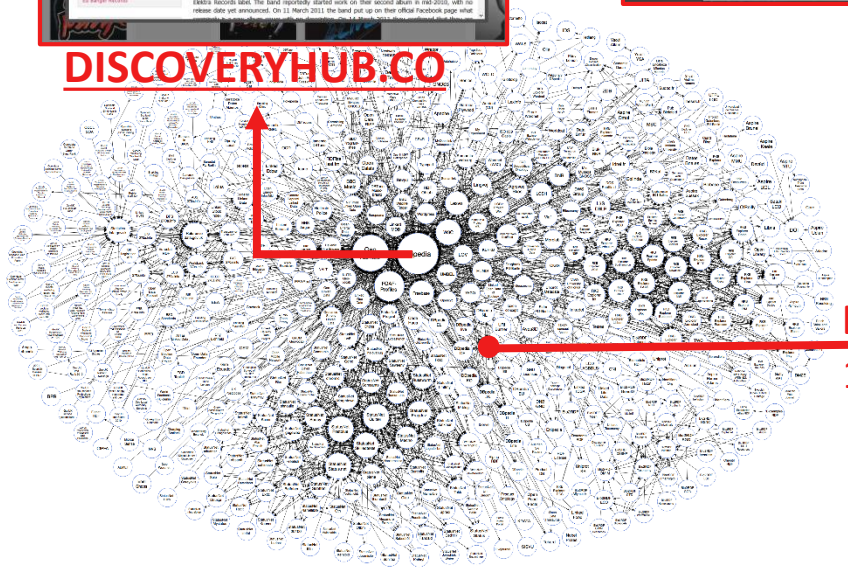


DISCOVERYHUB.CO

new evaluation protocol



[Marie, Giboin, Palagi et al.]



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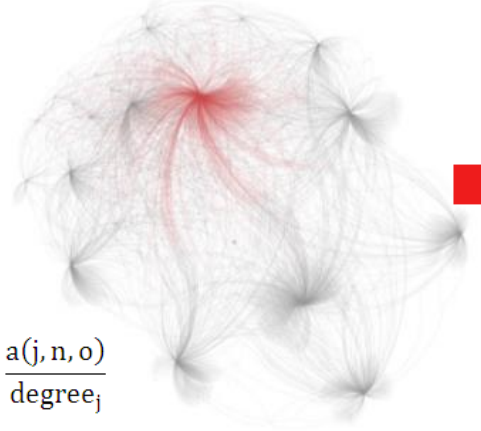
SEARCHING

- exploratory search
- question-answering

semantic spreading activation



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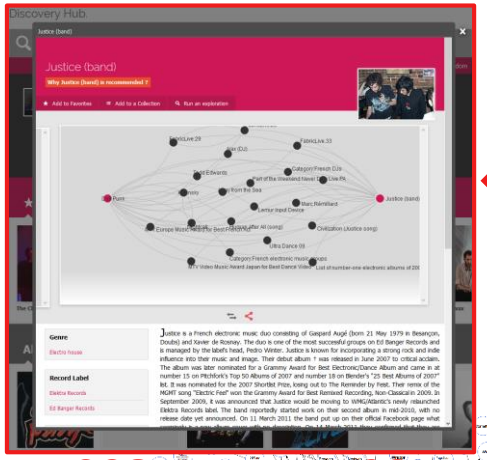
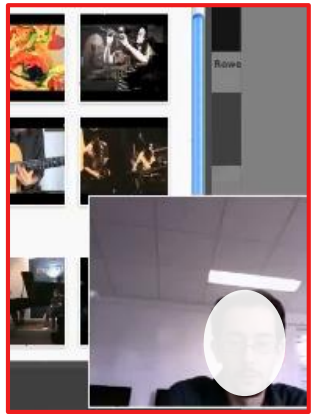
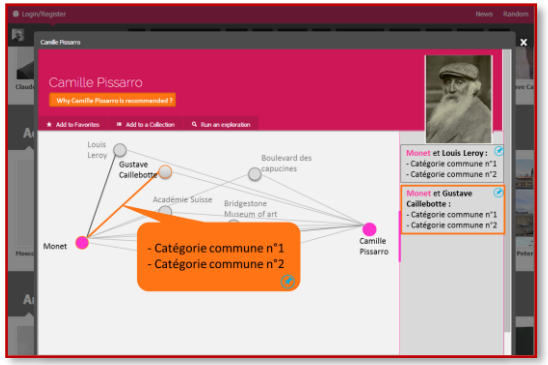


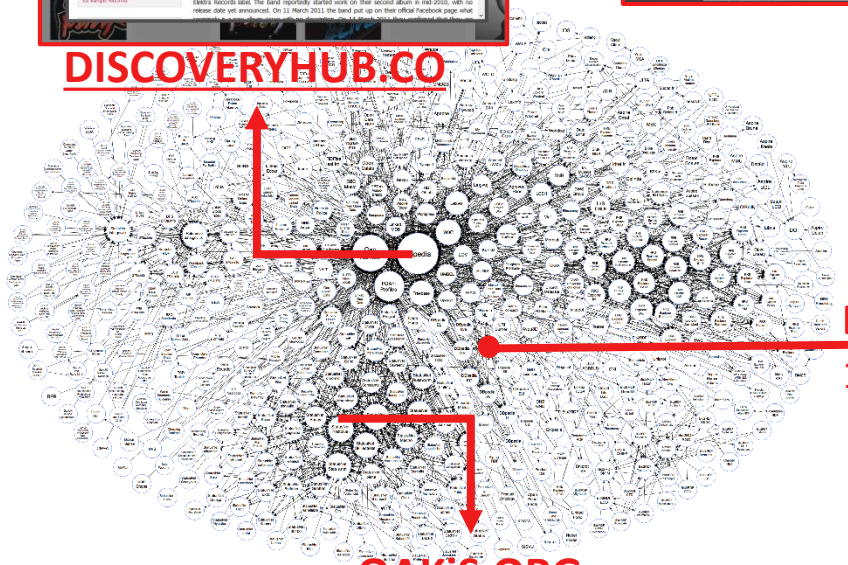


new evaluation protocol



[Marie, Giboin, Palagi et al.]

DISCOVERYHUB.CO



DBPEDIA.FR (extraction, end-point)
180 000 000 triples
[Cojan, Boyer et al.]

SEARCHING

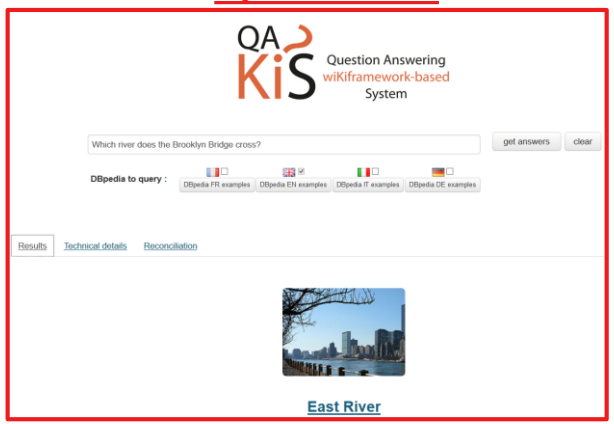
- exploratory search
- question-answering

QAKiS.ORG

linguistic relational pattern extraction

starring(Work, Person)

```
[D:Work], played by [R:Person]
[D:Work] stars [R:Person]
[D:Work] film stars [R:Person]
```



named entity recognition
similarity based SPARQL generation

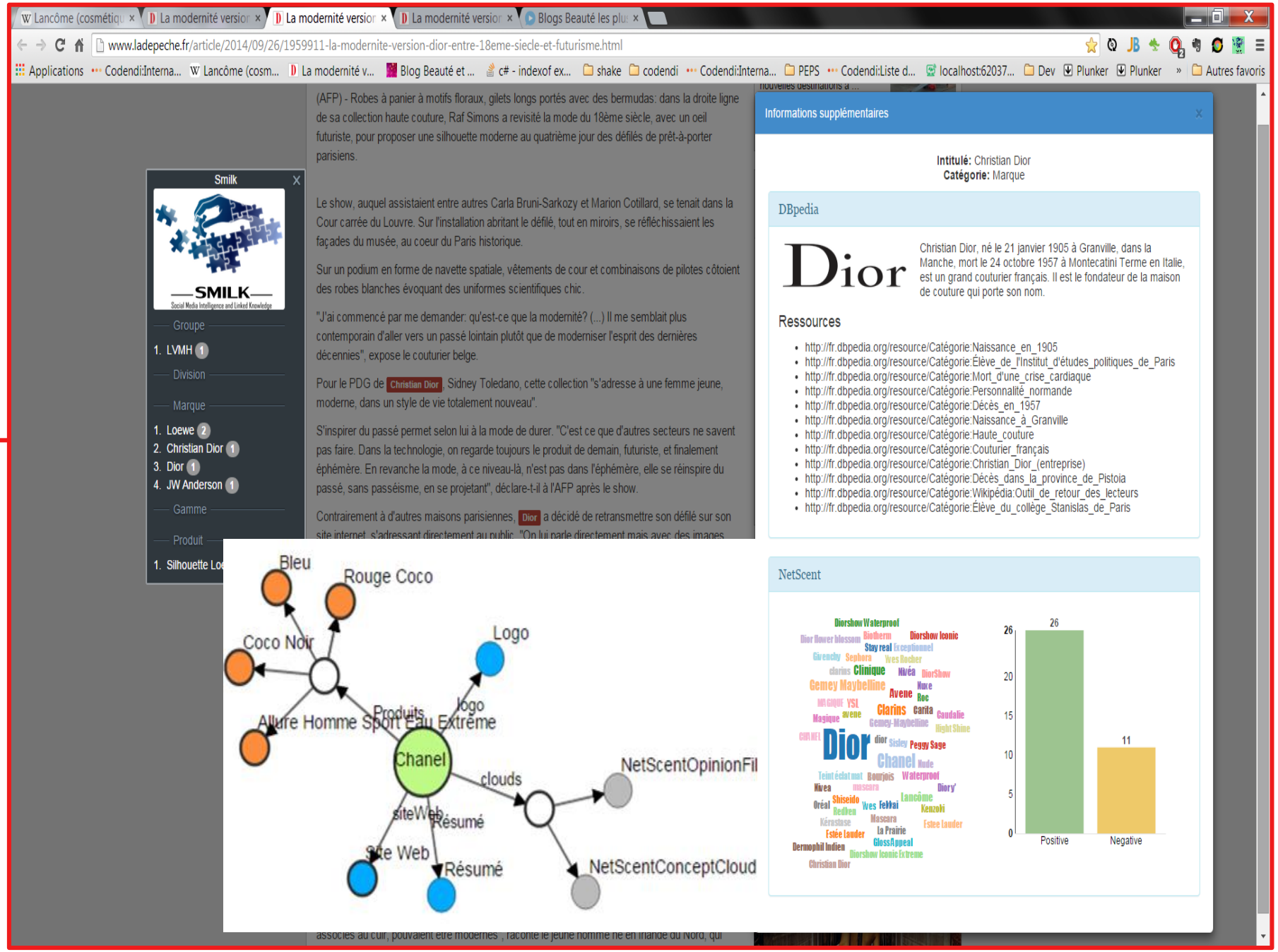
```
select * where {
dbpr:Batman_Begins dbp:starring ?v  .
OPTIONAL {?v rdfs:label ?l
          filter(lang(?l)="en")} }
```

[Cabrio et al.]

BROWSING

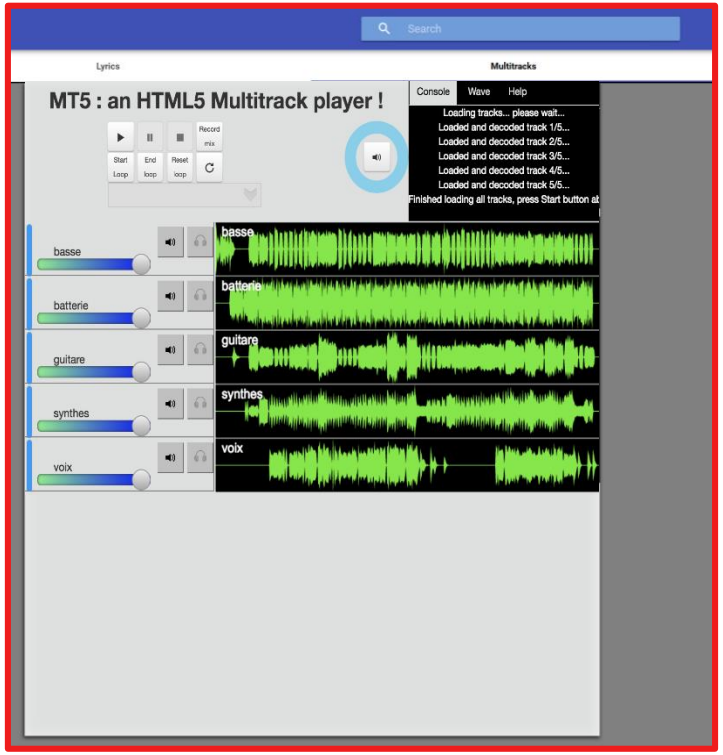
e.g. SMILK plugin

[Lopez, Cabrio, et al.]

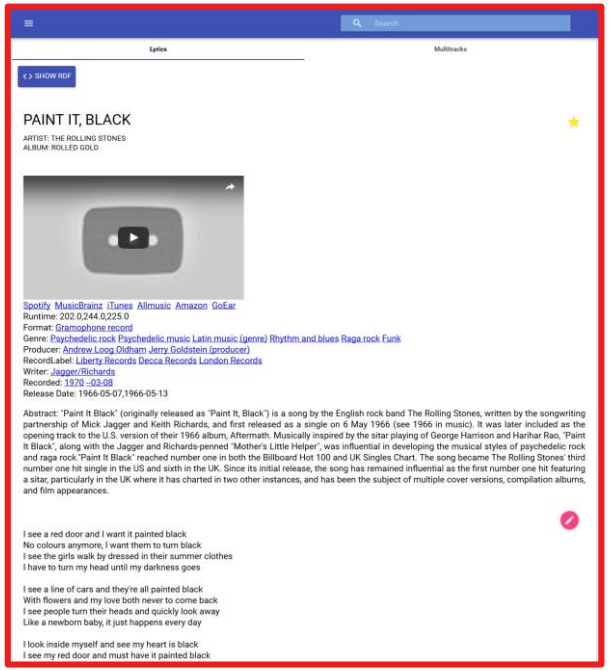


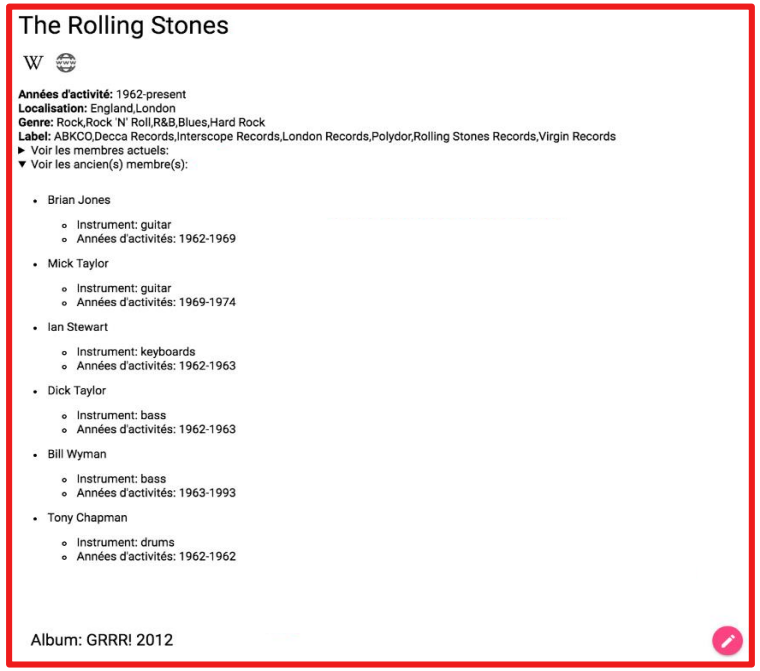
WASABI

augmenting musical
experience with the Web



[Buffa, Jauva et al.]

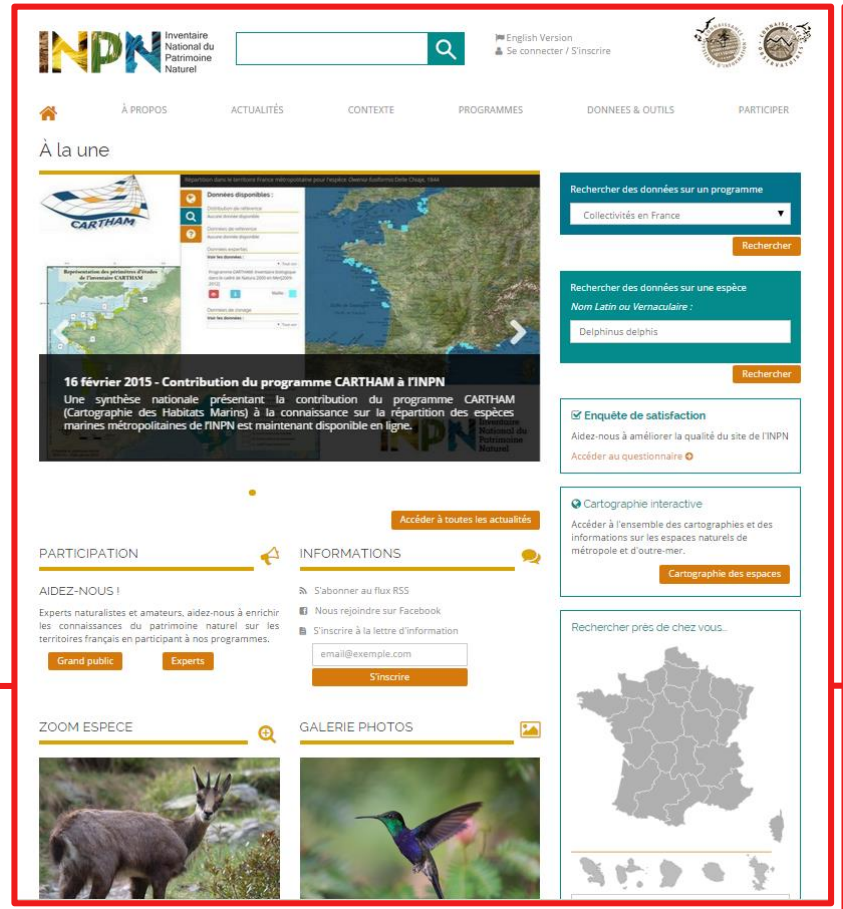


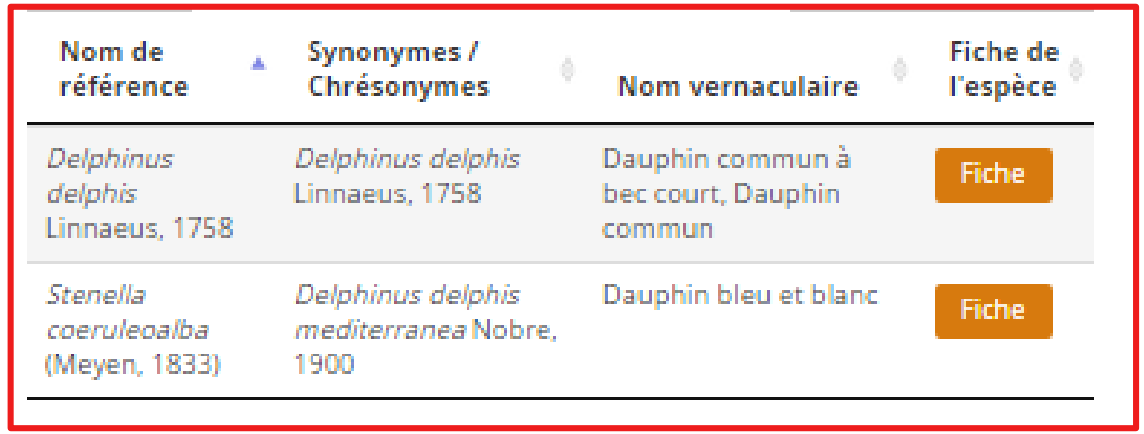


ZOOMATHIA

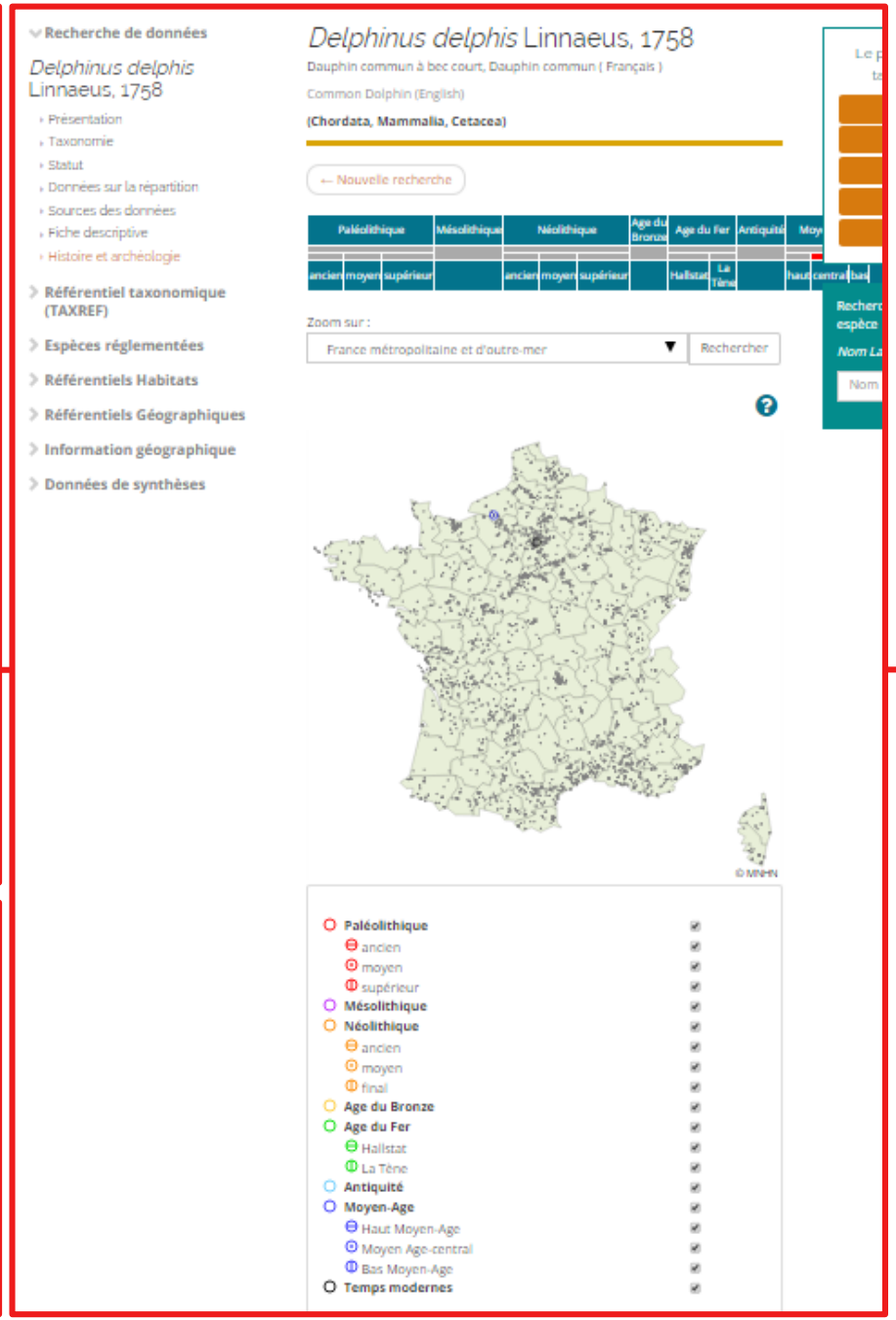
Cultural transmission of zoological knowledge from Antiquity to Middle Age

[Faron Zucker, et al.]

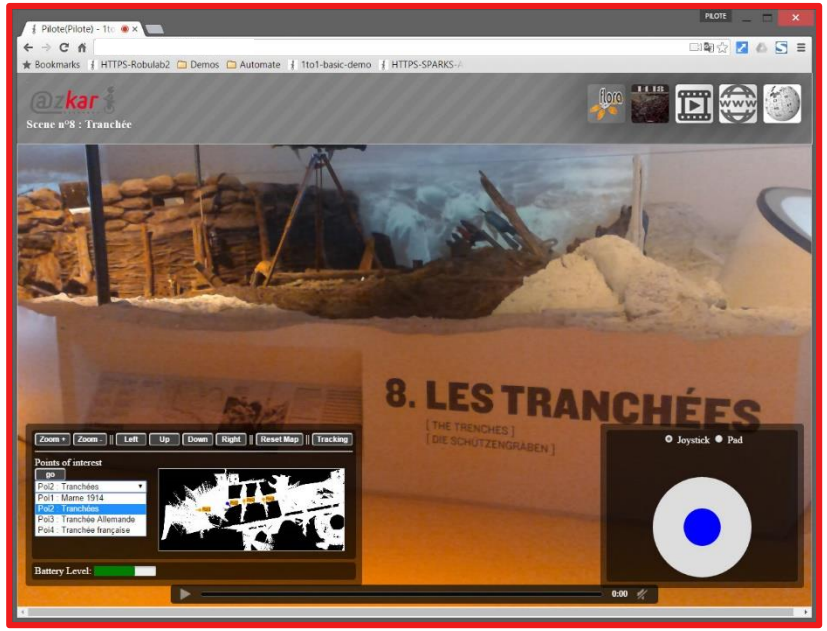


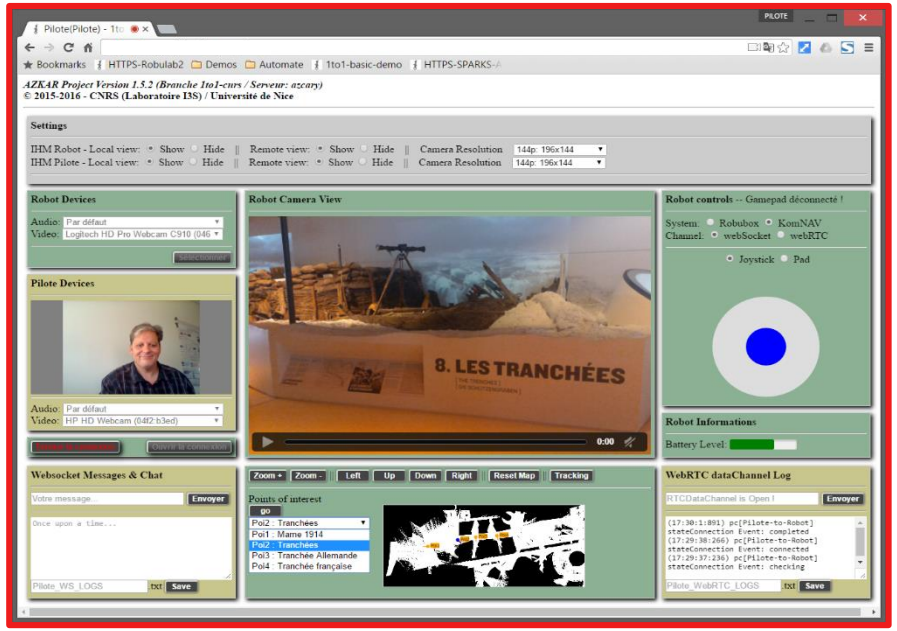


Nom de référence	Synonymes / Chrésonymes	Nom vernaculaire	Fiche de l'espèce
Delphinus delphis Linnaeus, 1758	*Delphinus delphis* Linnaeus, 1758	Dauphin commun à bec court, Dauphin commun	Fiche
Stenella coeruleoalba (Meyen, 1833)	*Delphinus delphis mediterranea* Nobre, 1900	Dauphin bleu et blanc	Fiche



[Buffa et al.]





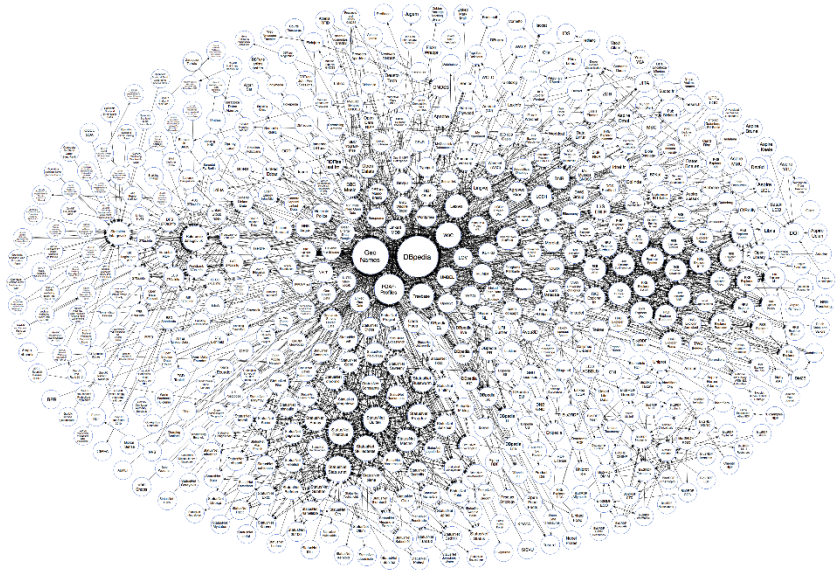
AZKAR

remotely visit and interact with a museum through a robot and via the Web


users & interaction

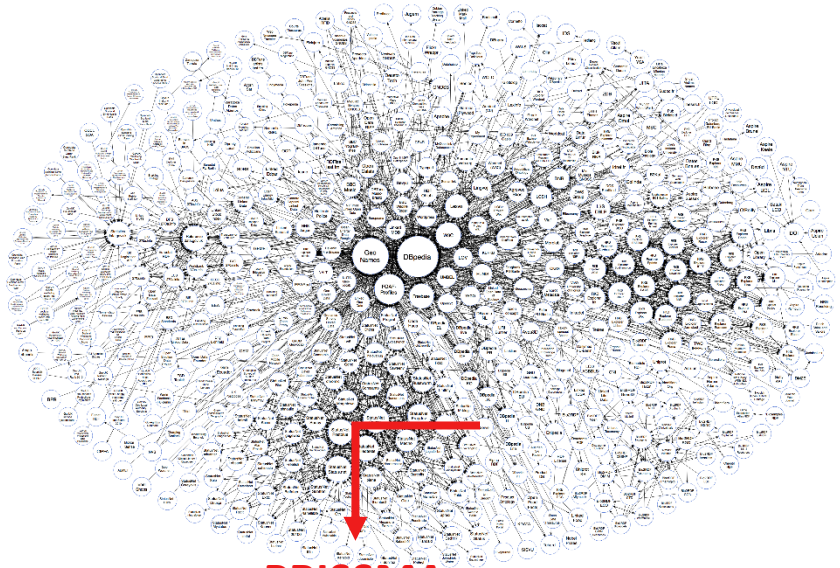
MODELING USERS

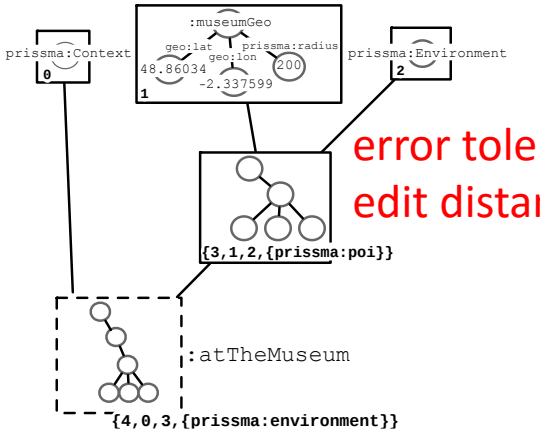
- individual context
- social structures



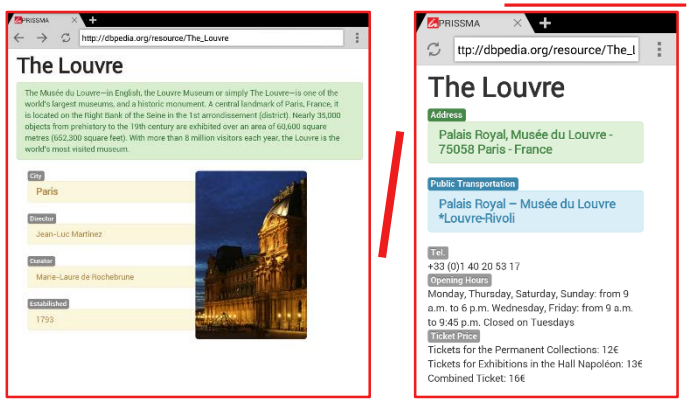
MODELING USERS

- individual context
- social structures

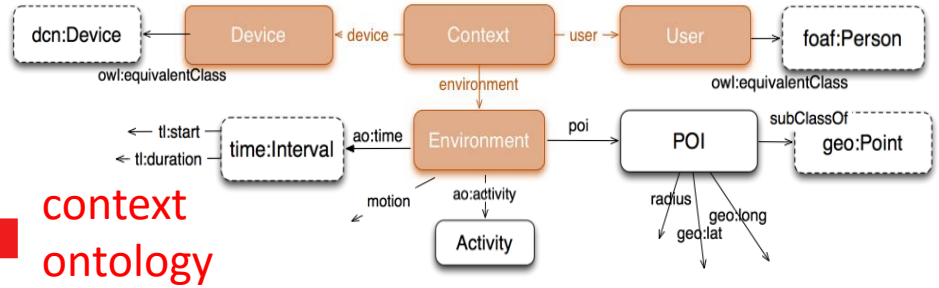




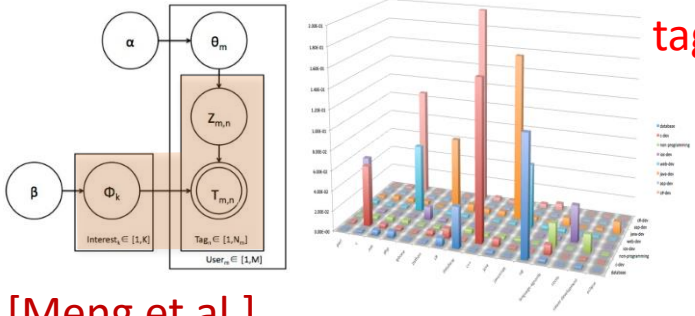
error tolerant graph edit distance



context ontology

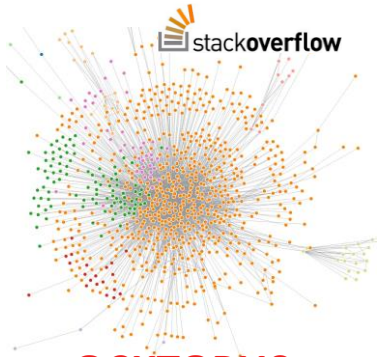


[Costabello et al.]



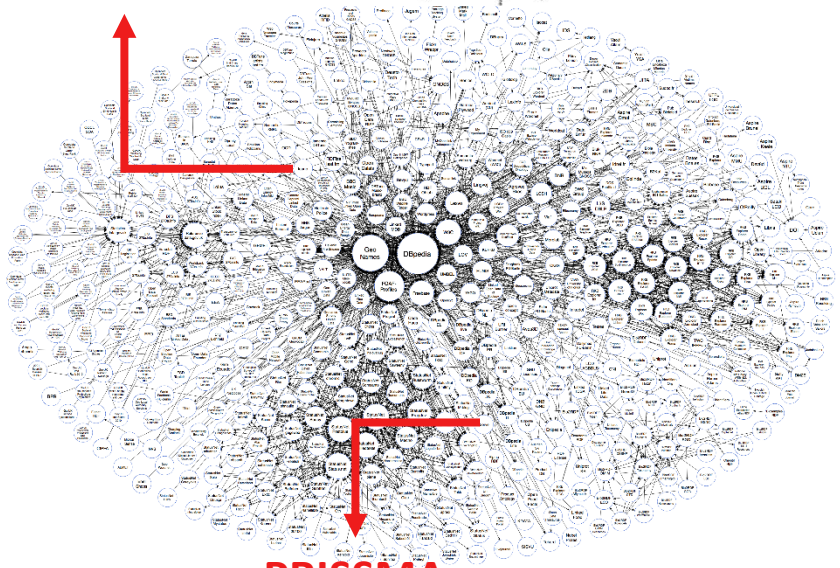
[Meng et al.]

tag, topic, user distribution



tag and folksonomy restructuring with prefix trees

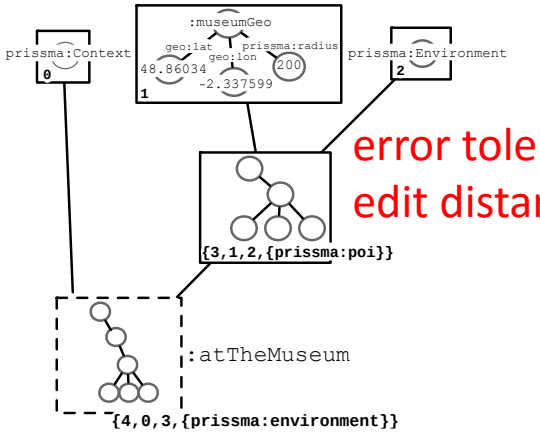
OCKTOPUS



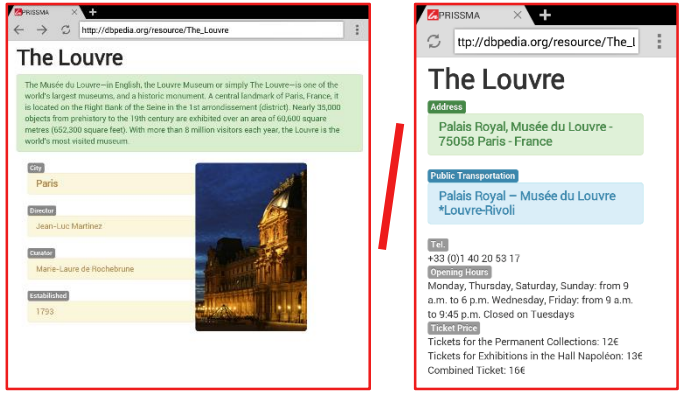
PRISSMA

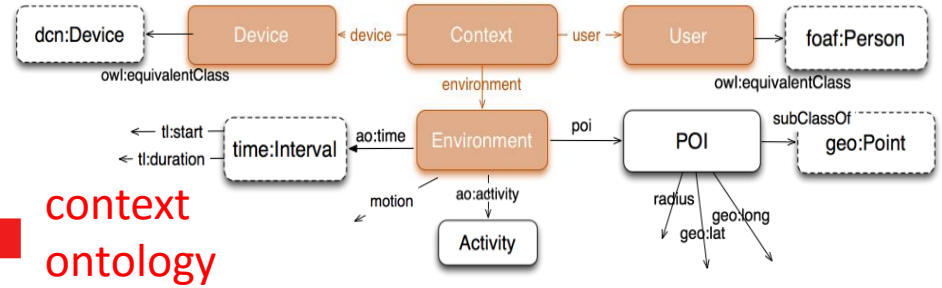
MODELING USERS

- individual context
- social structures



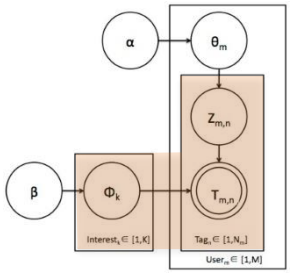
error tolerant graph edit distance

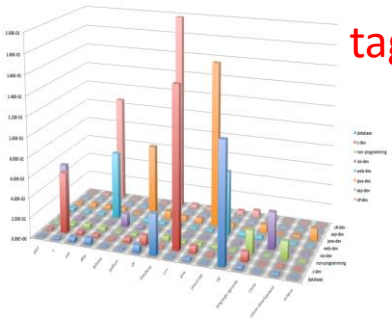




context ontology

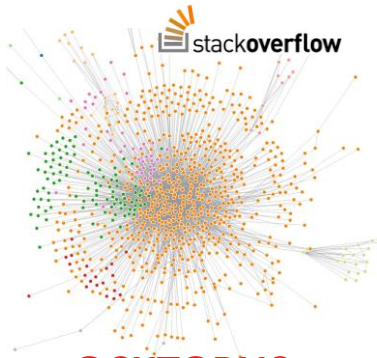
[Costabello et al.]





[Meng et al.]

tag, topic, user distribution

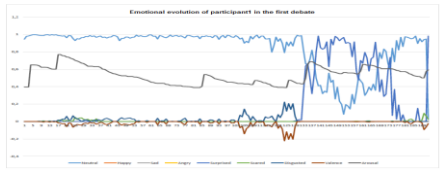


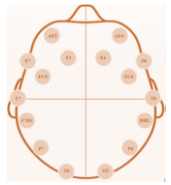
OCKTOPUS

tag and folksonomy restructuring with prefix trees

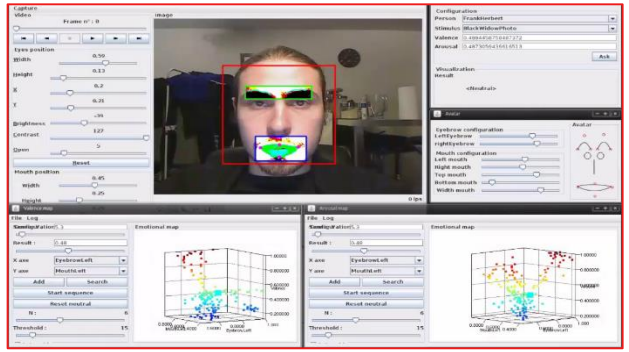
[Villata, Cabrio et al.]

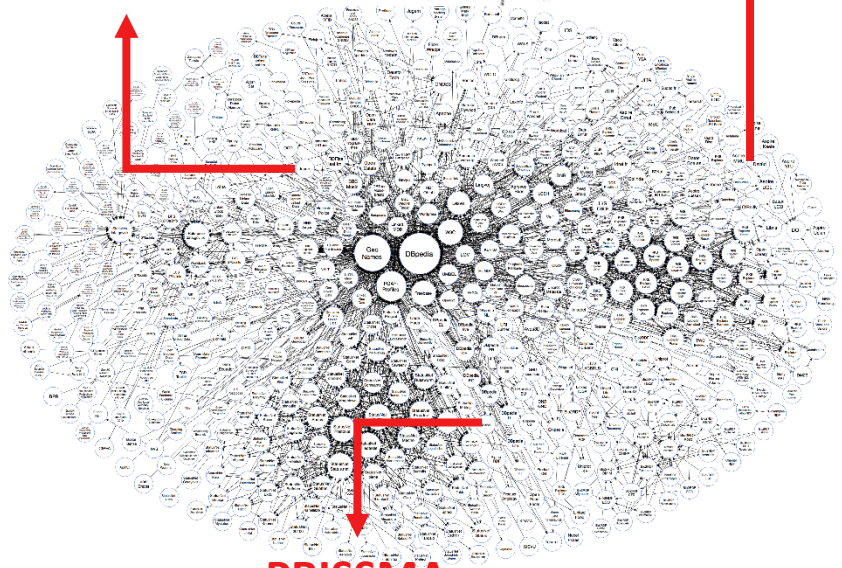
EMOCA&SEEMPAD



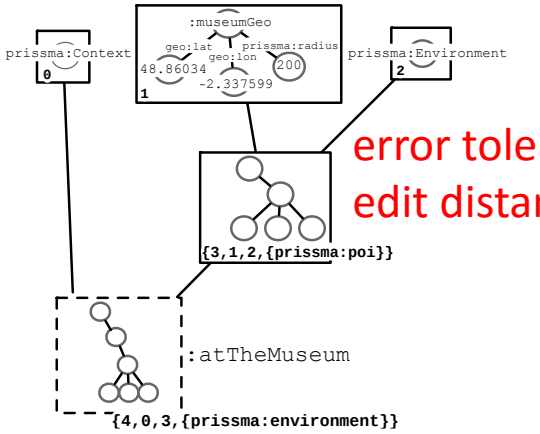


emotion detection & annotation

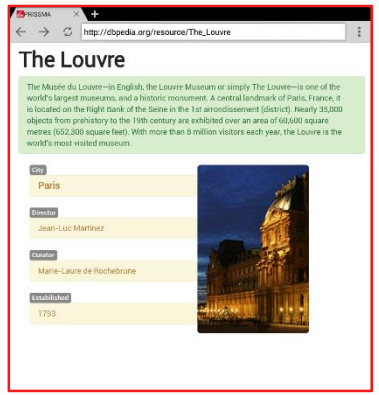




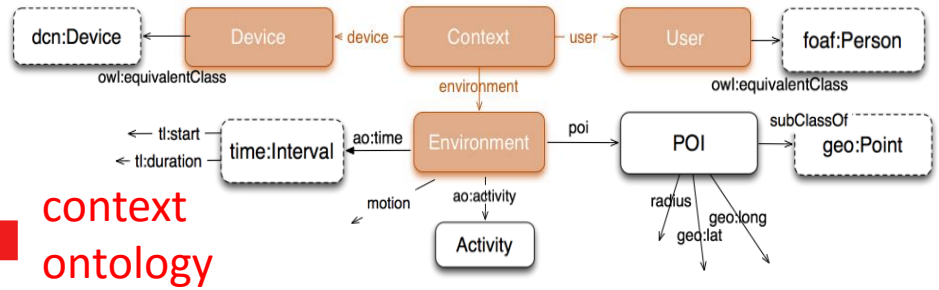
PRISSMA



error tolerant graph edit distance



context ontology



[Costabello et al.]

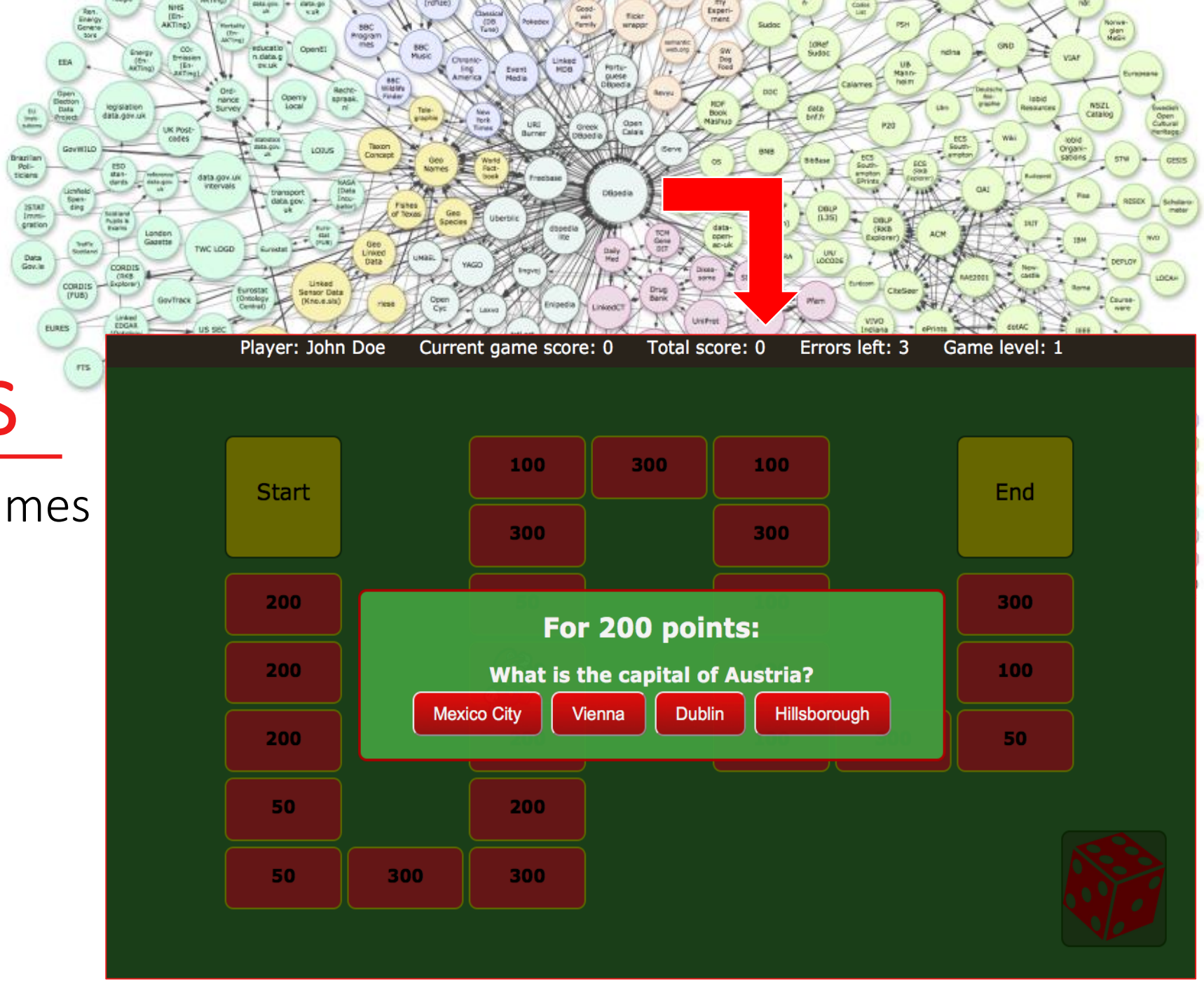
MODELING USERS

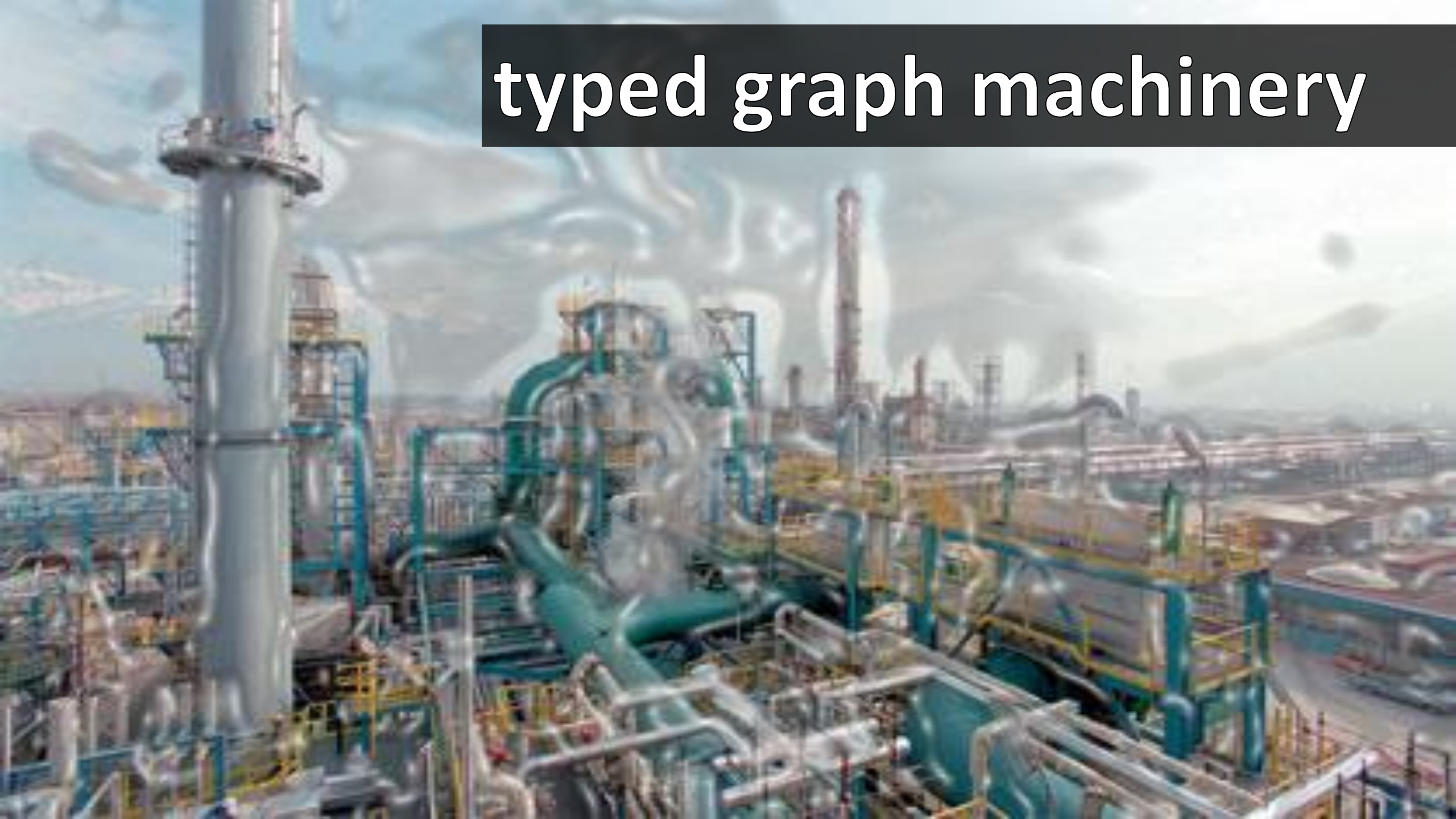
- individual context
- social structures

MODELING USERS

e.g. e-learning & serious games

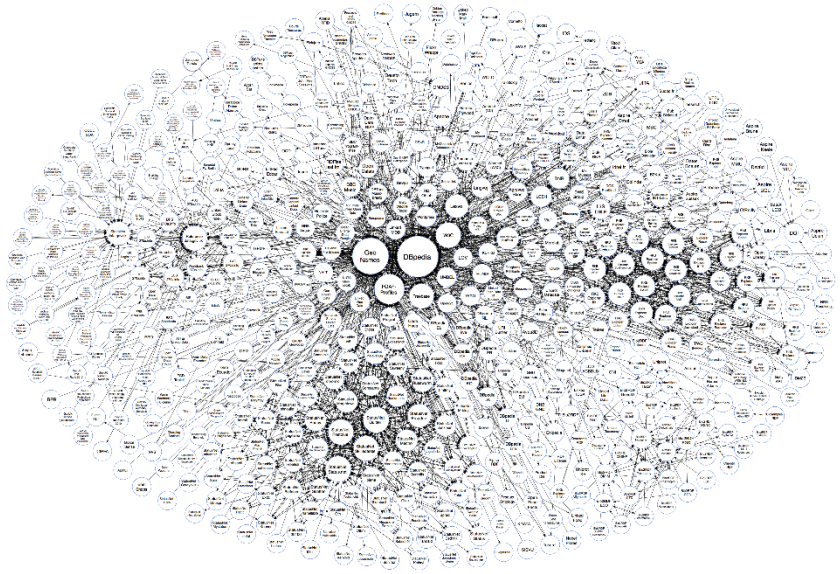
[Rodriguez-Rocha, Faron-Zucker et al.]

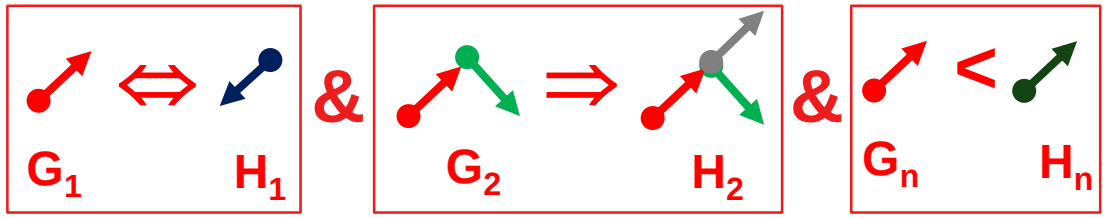



typed graph machinery

QUERY & INFER

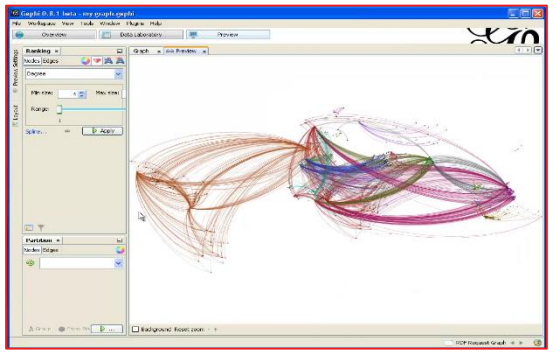
- graph rules and queries
- deontic reasoning
- induction





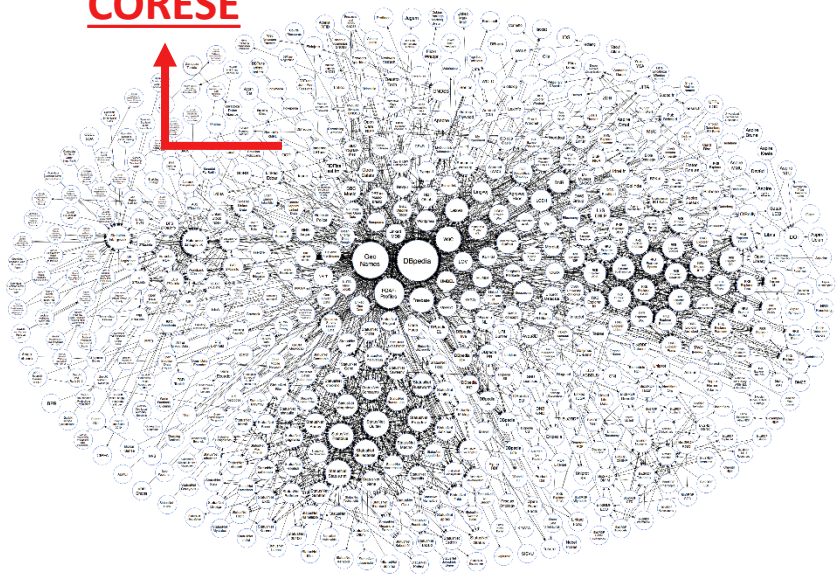
abstract graph machine

STTL



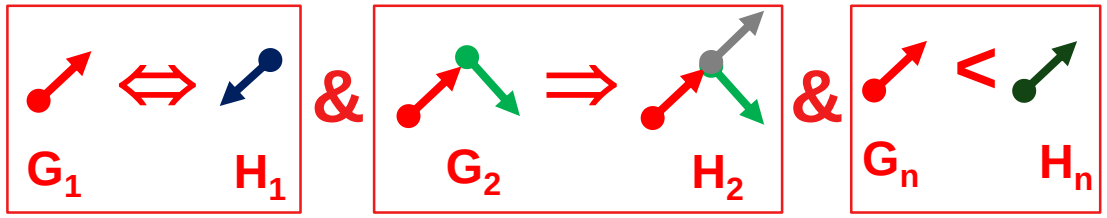
[Corby, Faron-Zucker et al.]

CORESE



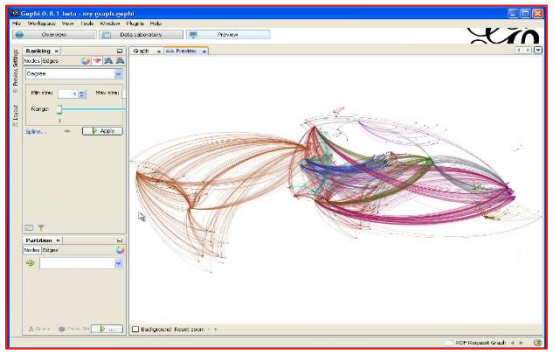
QUERY & INFER

- graph rules and queries
- deontic reasoning
- induction

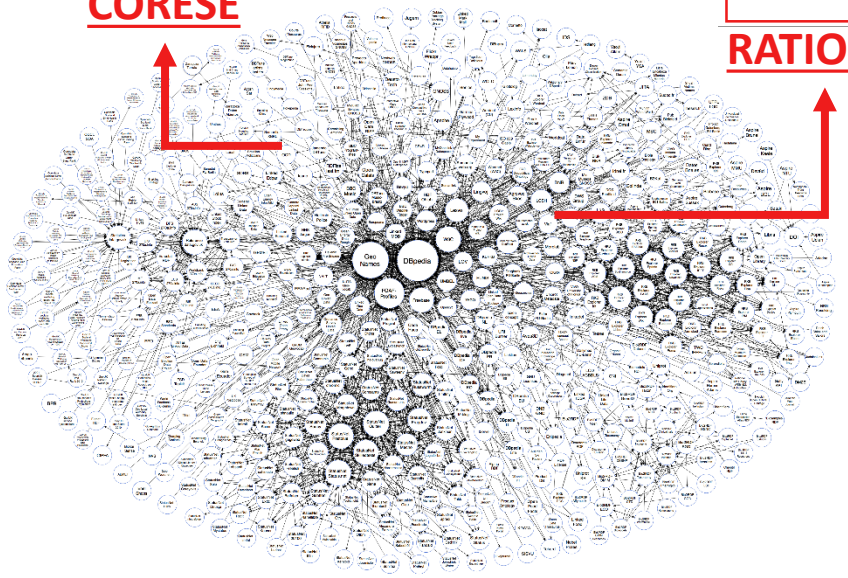


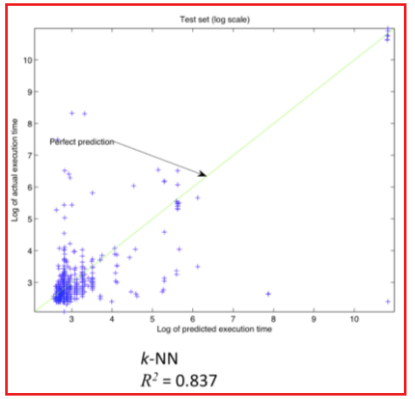
abstract graph machine
STTL

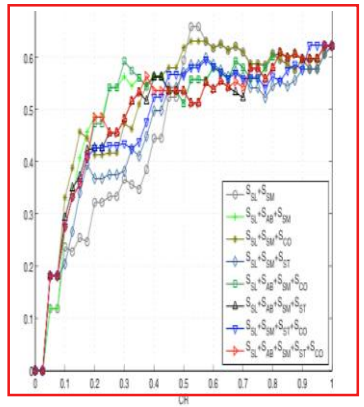
[Corby, Faron-Zucker et al.]



CORESE

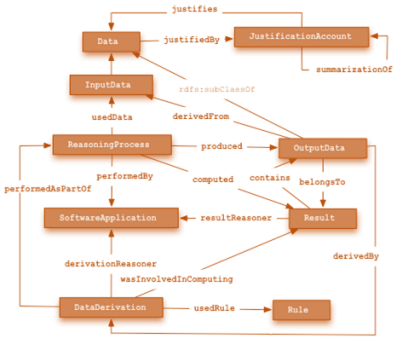






RATIO4TA

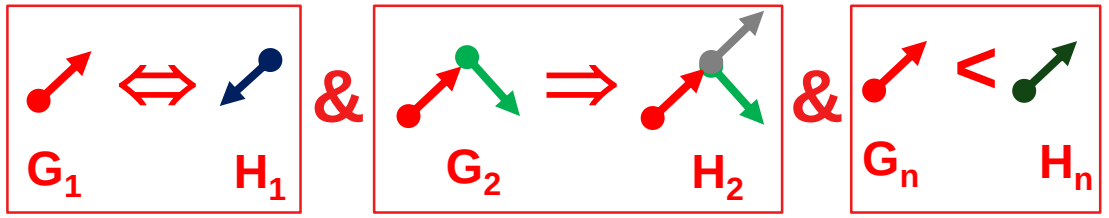
predict &
explain



[Hasan et al.]

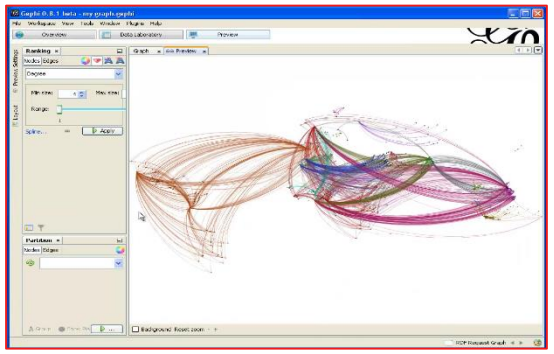
QUERY & INFER

- graph rules and queries
- deontic reasoning
- induction

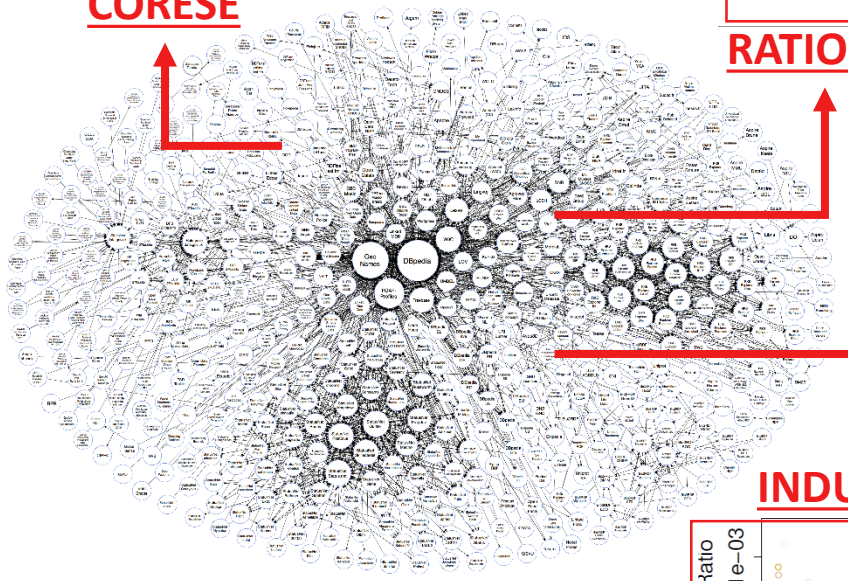


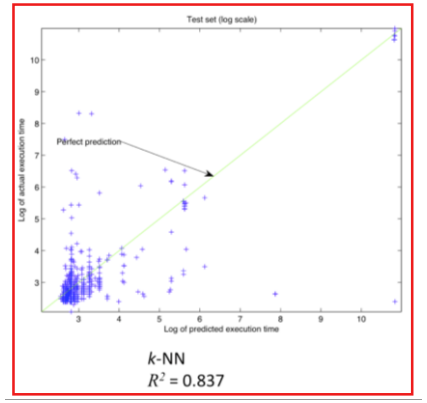
abstract graph machine
STTL

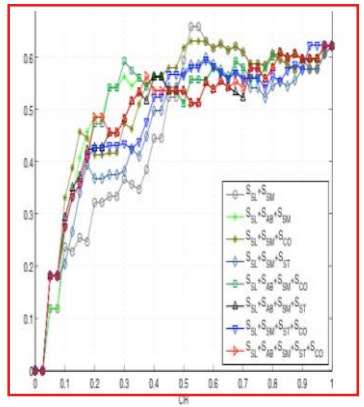
[Corby, Faron-Zucker et al.]



CORESE

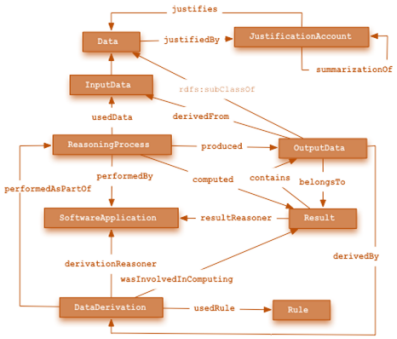






RATIO4TA

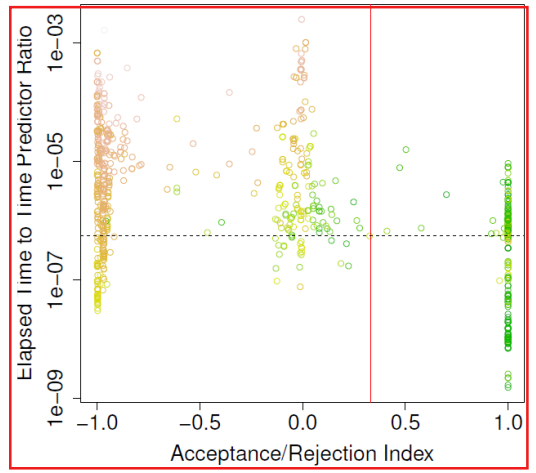
predict &
explain



[Hasan et al.]

INDUCTION

[Tettamanzi et al.]

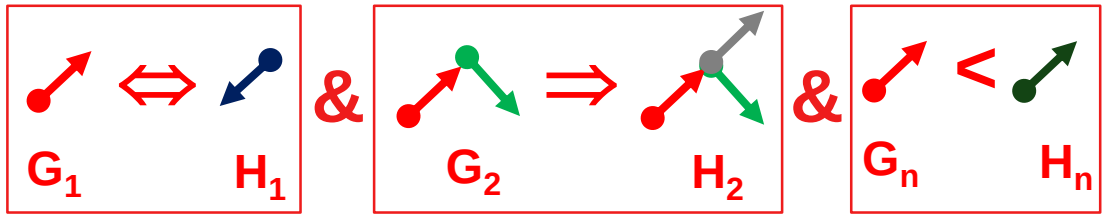


find missing
knowledge

$\phi = \texttt{SubClassOf(dbo:LaunchPad dbo:Infrastructure)}$

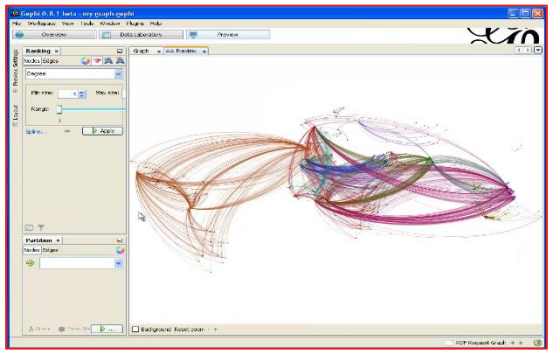
QUERY & INFER

- graph rules and queries
- deontic reasoning
- induction

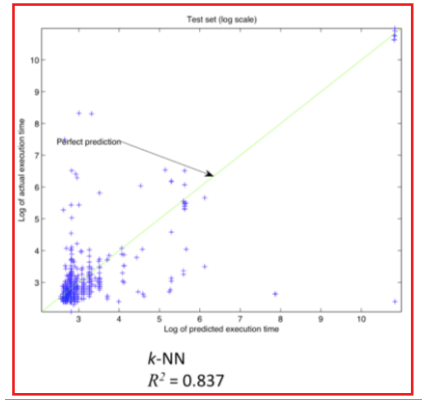


abstract graph machine
STTL

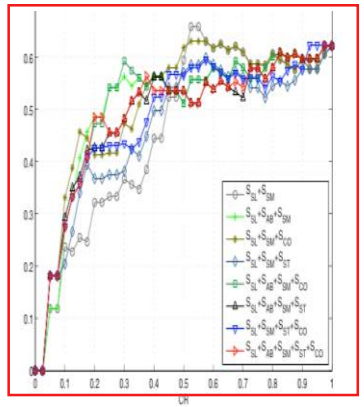
[Corby, Faron-Zucker et al.]



CORESE



RATIO4TA



QUERY & INFER

- graph rules and queries
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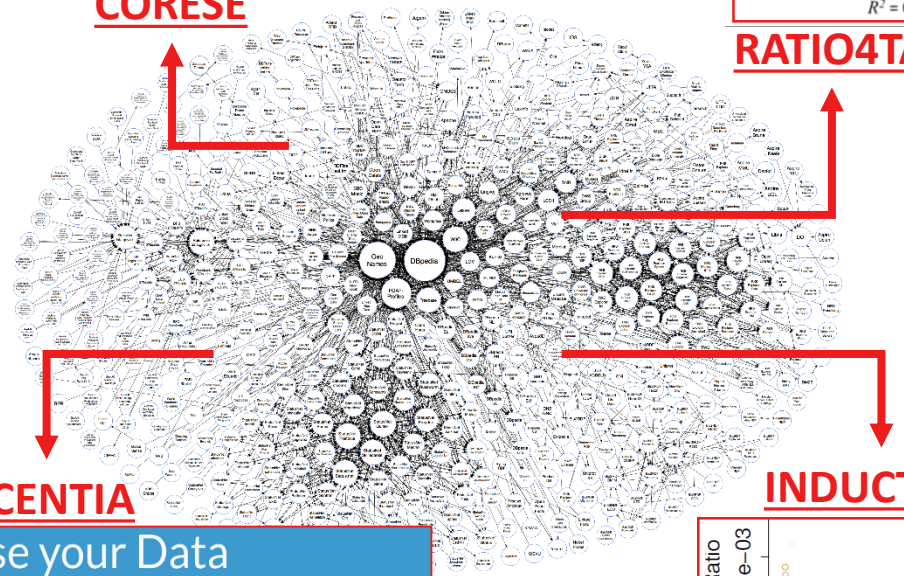
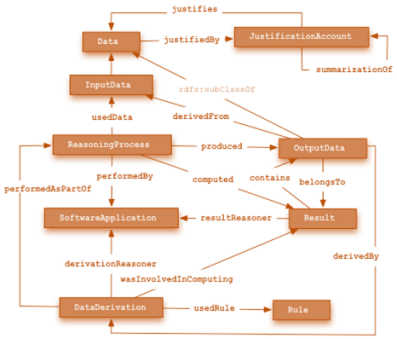


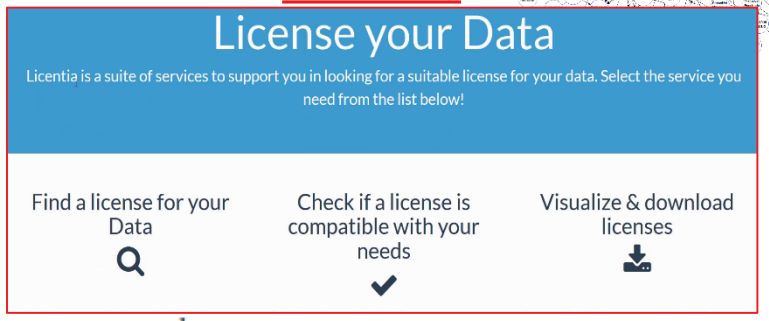
LICENTIA



predict &
explain

[Hasan et al.]

license compatibility
and composition
[Villata et al.]



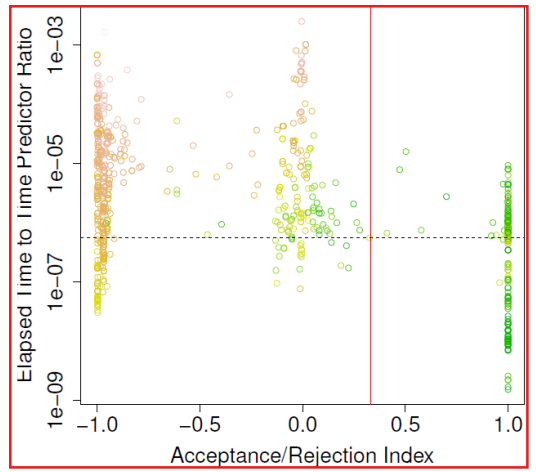
$$L = \{l_1, l_2\}$$

$$R^{O^{l_1}} = \{r_1 :\Rightarrow_O^{l_1} Attribution, \quad r_2 :\rightsquigarrow_O^{l_1} Commercial\}$$

$$R^{O^{l_2}} = \{r_3 :\Rightarrow_O^{l_2} \sim Commercial, \quad r_4 :\Rightarrow_O^{l_2} ShareAlike, \quad r_5 :\rightsquigarrow_O^{l_2} Derivative\}$$

INDUCTION

[Tettamanzi et al.]



find missing
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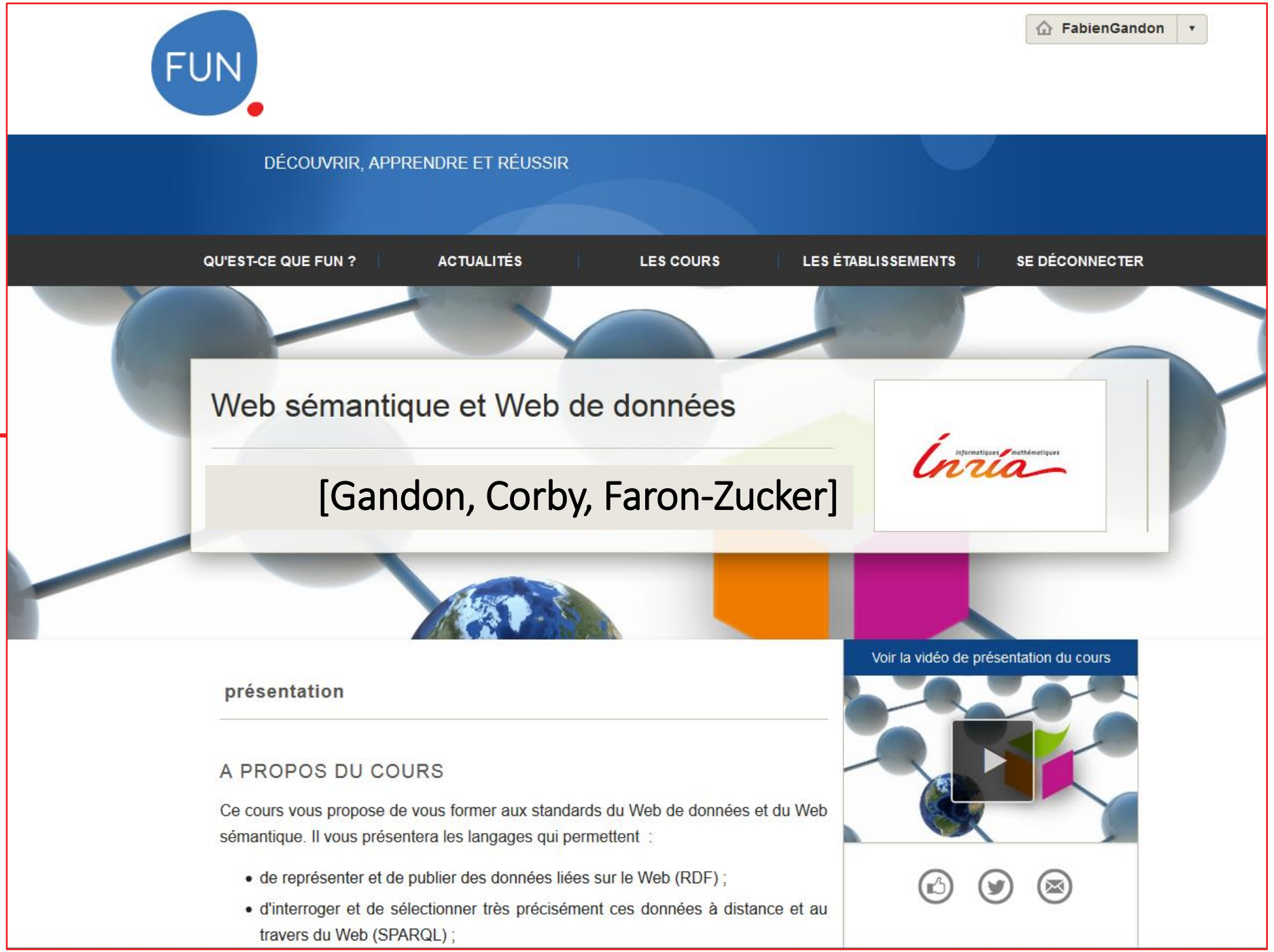
$\phi = \texttt{SubClassOf(dbo:LaunchPad dbo:Infrastructure)}$

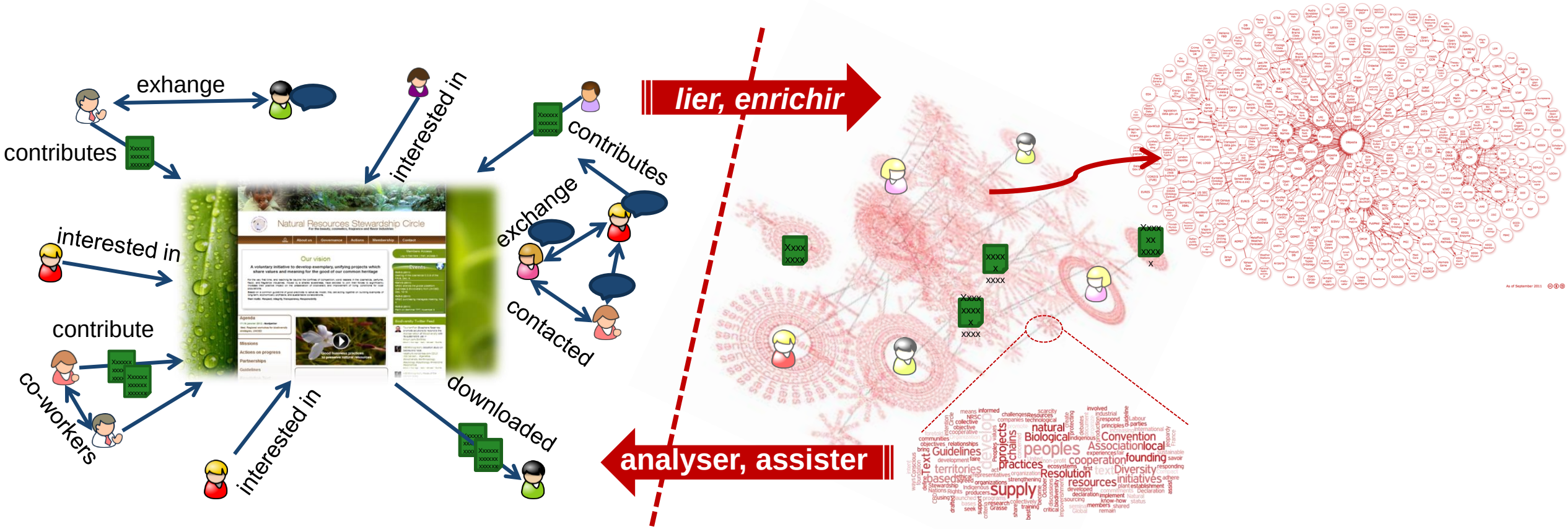
MOOC


FUN
FabienGandon
DÉCOUVRIR, APPRENDRE ET RÉUSSIR
QU'EST-CE QUE FUN ?
ACTUALITÉS
LES COURS
LES ÉTABLISSEMENTS
SE DÉCONNECTER
Web sémantique et Web de données
[Gandon, Corby, Faron-Zucker]
Inria
informatiques mathématiques
présentation
A PROPOS DU COURS
Ce cours vous propose de vous former aux standards du Web de données et du Web sémantique. Il vous présentera les langages qui permettent :
• de représenter et de publier des données liées sur le Web (RDF) ;
• d'interroger et de sélectionner très précisément ces données à distance et au travers du Web (SPARQL) ;
Voir la vidéo de présentation du cours

société coopérative spin-off wimmics

intégration aux SI, veille, intelligence, réseaux sociaux d'entreprise

mnemotix
WHEN DATA MAKE SENSE



he who controls metadata, controls the web
and through the *world-wide* web many things in our world.

Fabien Gandon - @fabien_gandon - http://fabien.info

Web-instrumented man-machine interactions, communities and semantics

Technical details: http://bit.ly/wimmics-papers