Activity Report 2013

Project-Team WIMMICS

Web-Instrumented Man-Machine Interactions, Communities and Semantics

IN COLLABORATION WITH: Laboratoire informatique, signaux systèmes de Sophia Antipolis (I3S)

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Keywords: Semantic Web, Social Web, Ontologies, Social Networks, Knowledge Engineering, Collaborative Work

Creation of the Team: 2012 January 01*, updated into Project-Team:* 2013 July 01.

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2. Overall Objectives

2.1. Introduction

2.1.1. *Context and Objectives*

The Web is no longer perceived as a documentary system. Among its many evolutions, it became a virtual place where persons and software interact in mixed communities. These large scale interactions create many problems in particular the one of reconciling formal semantics of computer science (e.g. logics, ontologies, typing systems, etc.) on which the Web architecture is built, with soft semantics of people (e.g. posts, tags, status, etc.) on which the Web content is built.

Let us take a concrete and very common example of such semantic frictions on the Web. Many Web sites include forums, blogs, status feeds, wikis, etc. In other words, many Web sites include content management systems and rapidly build huge collections of information resources. As these collections grow, several tasks become harder to automate: search, notification, restructuring, navigation assistance, recommendation, trend analysis, etc. One of the main problems is the gap between the fairly informal way content is generated (e.g. plain text, short messages, free keywords) and the need for structured data and formal semantics to automate these functionalities (e.g. efficient indexes, domain thesauri). Mixed structures are starting to appear (e.g. structured folksonomies, hash tags, machine tags, etc.) but automating support in such collaboration spaces requires efficient and complete methods to fully bridge that gap.

As the Web becomes a ubiquitous infrastructure bathing all the objects of our world, this is just one example of the many frictions it will create between formal semantics and social semantics. This is why the Wimmics team proposes to study models and methods to bridge formal semantics and social semantics on the Web.

2.1.2. *Research Topics*

Our main challenge is to bridge formal semantics and social semantics.

From a formal modeling point of view, one of the consequences of the evolutions of the Web is that the initial graph of linked pages has been joined by a growing number of other graphs. This initial graph is now mixed with sociograms capturing the social network structure, workflows specifying the decision paths to be followed, browsing logs capturing the trails of our navigation, service compositions specifying distributed processing, open data linking distant datasets, etc.

Moreover, these graphs are not available in a single central repository but distributed over many different sources and some sub-graphs are public (e.g. dbpedia [1]) while other are private (e.g. corporate data). Some sub-graphs are small and local (e.g. a users' profile on a device), some are huge and hosted on clusters (e.g. Wikipedia), some are largely stable (e.g. thesaurus of Latin), some change several times per second (e.g. social network statuses), etc.

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[1] http://dbpedia.org

Each type of network of the Web is not an isolated island. Networks interact with each other: the networks of communities influence the message flows, their subjects and types, the semantic links between terms interact with the links between sites and vice-versa, etc.

Not only do we need means to represent and analyze each kind of graphs, we also need the means to combine them and to perform multi-criteria analysis on their combination. Wimmics proposes to address this problem focusing on the characterization of (a) typed graphs formalisms to model and capture these different pieces of knowledge and (b) hybrid operators to process them jointly. We will especially consider the problems that occur in such structures when we blend formal stable semantic models and socially emergent and evolving semantics. We believe Wimmics can contribute to this understanding by combining two research domains:

- by proposing a multidisciplinary approach to analyze and model the many aspects of these intertwined information systems, their communities of users and their interactions;
- by formalizing and reasoning on these models to propose new analysis tools and indicators, and support new functionalities and better management.

2.1.3. International and industrial relations

We have a joint Ph.D with Alcatel Lucent Bell Labs and another joint Ph.D with SAP.

We collaborate with the LIRIMA International Lab and with the W3C.

We have an ongoing collaboration with the Heron laboratory, University of Montreal.

We obtained the first ANR LabCom (joint laboratory SMILK) in computer science with the company Viseo.

2.2. Highlights of the Year

Best Paper Award at IEEE International Conference on Cognitive Infocommunications: Franck Berthelon and Peter Sander, *Regression Algorithm for Emotion Detection* [53].

Best Demo Award at ESWC: Nicolas Marie, Myriam Ribière, Fabien Gandon and Damien Legrand, *Exploratory search on the top of DBpedia chapters with the Discovery Hub application*.

Second best poster at SSSW, the 10th Summer School on Ontology Engineering and the Semantic Web, Rakebul Hasan and Fabien Gandon, *Linked Justifications*.

First ANR LabCom (joint laboratory SMILK) in computer science with the company Viseo.

The project *The Showcase Machine*, follow-up of DiscoveryHub, wins the challenge *Jeune Pousse* at Telecom Valley in Sophia Antipolis.

BEST PAPER AWARD :

[31] **A Support Framework for Argumentative Discussions Management in the Web in ESWC - 10th International Conference on The Semantic Web: Semantics and Big Data - 2013**. E. CABRIO, S. VILLATA, F. GANDON.

3. Research Program

3.1. Analyzing and Modeling Users, Communities and their Interactions in a Social Semantic Web Context

We rely on cognitive studies to build models of the system, the user and the interactions between users through the system, in order to support and improve these interactions.

In the short term, following the user modeling technique known as *Personas*, we are interested in these user models that are represented as specific, individual humans. *Personas* are derived from significant behavior patterns (i.e., sets of behavioral variables) elicited from interviews with and observations of users (and sometimes customers) of the future product. Our user models will specialize *Personas* approaches to include aspects appropriate to Web applications. The formalization of these models will rely on ontology-based modeling of users and communities starting with generalist schemas (e.g. FOAF: *Friend of a Friend*). In a longer term we will consider additional extensions of these schemas to capture additional aspects (e.g. emotional states). We will extend current descriptions of relational and emotional aspects in existing variants of the *Personas* technique.

Beyond the individual user models, we propose to rely on social studies to build models of the communities, their vocabularies, activities and protocols in order to identify where and when formal semantics is useful. In the short term we will further develop our method for elaborating collective personas and compare it to the related *collaboration personas* method and to the group modeling methods which are extensions to groups of the classical user modeling techniques dedicated to individuals. We also propose to rely on and adapt participatory sketching and prototyping to support the design of interfaces for visualizing and manipulating representations of collectives. In a longer term we want to focus on studying and modeling mixed representations containing social semantic representations (e.g. folksonomies) and formal semantic representations (e.g. ontologies) and propose operations that allow us to couple them and exchange knowledge between them.

Since we have a background in requirement models, we want to consider in the short term their formalization too in order to support mutual understanding and interoperability between requirements expressed with these heterogeneous models. In a longer term, we believe that argumentation theory can be combined to requirement engineering to improve participant awareness and support decision-making. On the methodological side, we propose to adapt to the design of such systems the incremental formalization approach originally introduced in the context of CSCW (Computer Supported Cooperative Work) and HCI (Human Computer Interaction) communities.

Finally, in the short term, for all the models we identified here we will rely on and evaluate knowledge representation methodologies and theories, in particular ontology-based modeling. In a longer term, additional models of the contexts, devices, processes and mediums will also be formalized and used to support adaptation, proof and explanation and foster acceptation and trust from the users. We specifically target a unified formalization of these contextual aspects to be able to integrate them at any stage of the processing.

3.2. Formalizing and Reasoning on Heterogeneous Semantic Graphs

Our second line of work is to formalize as typed graphs the models identified in the previous section in order to exploit them, e.g. in software. The challenge then is two-sided:

- To propose models and formalisms to capture and merge representations of both kinds of semantics (e.g. formal ontologies and social folksonomies). The important point is to allow us to capture those structures precisely and flexibly and yet create as many links as possible between these different objects.

- To propose algorithms (in particular graph-based reasoning) and approaches (e.g. human-computing methods) to process these mixed representations. In particular we are interested in allowing cross-enrichment between them and in exploiting the life cycle and specificities of each one to foster the life-cycles of the others.

While some of these problems are known, for instance in the field of knowledge representation and acquisition (e.g. disambiguation, fuzzy representations, argumentation theory), the Web reopens them with exacerbated difficulties of scale, speed, heterogeneity, and an open-world assumption.

Many approaches emphasize the logical aspect of the problem especially because logics are close to computer languages. We defend that the graph nature of Linked Data on the Web and the large variety of types of links that compose them call for typed graphs models. We believe the relational dimension is of paramount importance in these representations and we propose to consider all these representations as fragments of a typed graph formalism directly built above the Semantic Web formalisms. Our choice of a graph based programming approach for the semantic and social Web and of a focus on one graph based formalism is also an efficient way to support interoperability, genericity, uniformity and reuse.

4. Application Domains

4.1. Introduction

A number of evolutions have changed the face of information systems in the past decade but the advent of the Web is unquestionably a major one and it is here to stay. From an initial wide-spread perception of a public documentary system, the Web as an object turned into a social virtual space and, as a technology, grew as an application design paradigm (services, data formats, query languages, scripting, interfaces, reasoning, etc.). The universal deployment and support of its standards led the Web to take over nearly all of our information systems. As the Web continues to evolve, our information systems are evolving with it.

Today in organizations, not only almost every internal information system is a Web application, but these applications also more and more often interact with external Web applications. The complexity and coupling of these Web-based information systems call for specification methods and engineering tools. From capturing the needs of users to deploying a usable solution, there are many steps involving computer science specialists and non-specialists.

We defend the idea of relying on Semantic Web formalisms to capture and reason on the models of these information systems supporting the design, evolution, interoperability and reuse of the models and their data as well as the workflows and the processing.

4.2. Linked Data on the Web and on Intranets

With billions of triples online (see Linked Open Data initiative), the Semantic Web is providing and linking open data at a growing pace and publishing and interlinking the semantics of their schemas. Information systems can now tap into and contribute to this Web of data, pulling and integrating data on demand. Many organisations also started to use this approach on their intranets leading to what is called linked enterprise data.

A first application domain for us is the publication and linking of data and their schemas through Web architectures. Our results provide software platforms to publish and query data and their schemas, to enrich these data in particular by reasoning on their schemas, to control their access and licences, to assist the workflows that exploit them, to support the use of distributed datasets, to assist the browsing and visualization of data, etc.

Examples of collaboration and applied projects include: Corese/KGRAM, Datalift, DBpedia, ALU/BLF Convention, ADT SeGViz.

4.3. Assisting Web-based Epistemic Communities

In parallel to linked open data on the Web, social Web applications also spread virally (e.g. Facebook growing toward 800 million users) first giving the Web back its status of a social read-write media and then leading it to its full potential of a virtual place where to act, react and interact. In addition, many organizations are now considering deploying social Web applications internally to foster community building, expert cartography, business intelligence, technological watch and knowledge sharing in general.

Reasoning on the Linked Data and the semantics of the schemas used to represent social structures and Web resources, we intend to provide applications supporting communities of practice and interest and fostering their interactions.

We use typed graphs to capture and mix: social networks with the kinds of relationships and the descriptions of the persons; compositions of Web services with types of inputs and outputs; links between documents with their genre and topics; hierarchies of classes, thesauri, ontologies and folksonomies; recorded traces and suggested navigation courses; submitted queries and detected frequent patterns; timelines and workflows; etc.

Our results assist epistemic communities in their daily activities such as biologists exchanging results, business intelligence and technological watch networks informing companies, engineers interacting on a project, conference attendees, students following the same course, tourists visiting a region, mobile experts on the field, etc. Examples of collaboration and applied projects include: Kolflow, OCKTOPUS, ISICIL, SAP Convention.

5. Software and Platforms

5.1. Corese

Participants: Olivier Corby [correspondant], Alban Gaignard, Fabien Gandon.

Corese (COnceptual REsource Search Engine) is a Semantic Web Factory. It enables users to load and process RDFS schemas, RDF data and query and update the graph base thus created by using the SPARQL 1.1 Query & Update Language (figure 1).

Furthermore, Corese query language integrates original features such as approximate search, extended Property Path, SQL or XPath. It provides a SPARQL based pretty printing language for RDF graphs and a SPARQL based Inference Rule Language for RDF. Corese also provides distributed federated query processing, thanks to a collaboration with Alban Gaignard and Johan Montagnat from CNRS I3S.

Corese is a Semantic Web Factory that enables us to design and develop Semantic Web applications; it is available for download. In the past, Corese received two software development grants (ADT) from Inria and in 2013 we have a new grant for two more years. Corese is registered at the APP and in 2007 we decided to distribute it as open source software under license CeCILL-C.

Corese is used and has been used in more than 60 applications, 24 PhD Thesis and is used for education by several institutions. It has been used in European projects such as Ontorule, Palette, SevenPro, SeaLife and in ANR projects such as Kolflow, Ginseng, Neurolog, VIP, ISICIL, e-WOK Hub. Corese is the Semantic Web engine of Discovery Hub and of the Semantic Web Import Plugin for Gephi visualization.

The work on Corese was published in [2], [1], [3], [4].

Web page: http://wimmics.inria.fr/corese

5.2. Semantic Web Import Plugin for Gephi visualization

Participants: Erwan Demairy, Fabien Gandon, Olivier Corby.

The SemanticWebImport [2] plugin is intended to allow the import of semantic data into Gephi open graph vizualisation platform (figure 2). Gephi is an interactive visualization and exploration platform for all kinds of networks and complex systems, dynamic and hierarchical graphs. The imported data are obtained by processing a SPARQL request on the semantic data. The data can be accessed following three manners:

1. by accessing local RDF & RDFS files and using the embedded Corese engine to apply the SPARQL request;
2. by accessing a remote REST SPARQL endpoint. In that case, the SPARQL request is applied remotely and the graph is built locally by analyzing the result sent by the endpoint;
3. by accessing a remote SOAP SPARQL endpoint. As for the REST endpoint, the resulting graph is built from the result returned by the endpoint.

The software is released under version 1.0. It has received a development grant (ADT) from Inria.
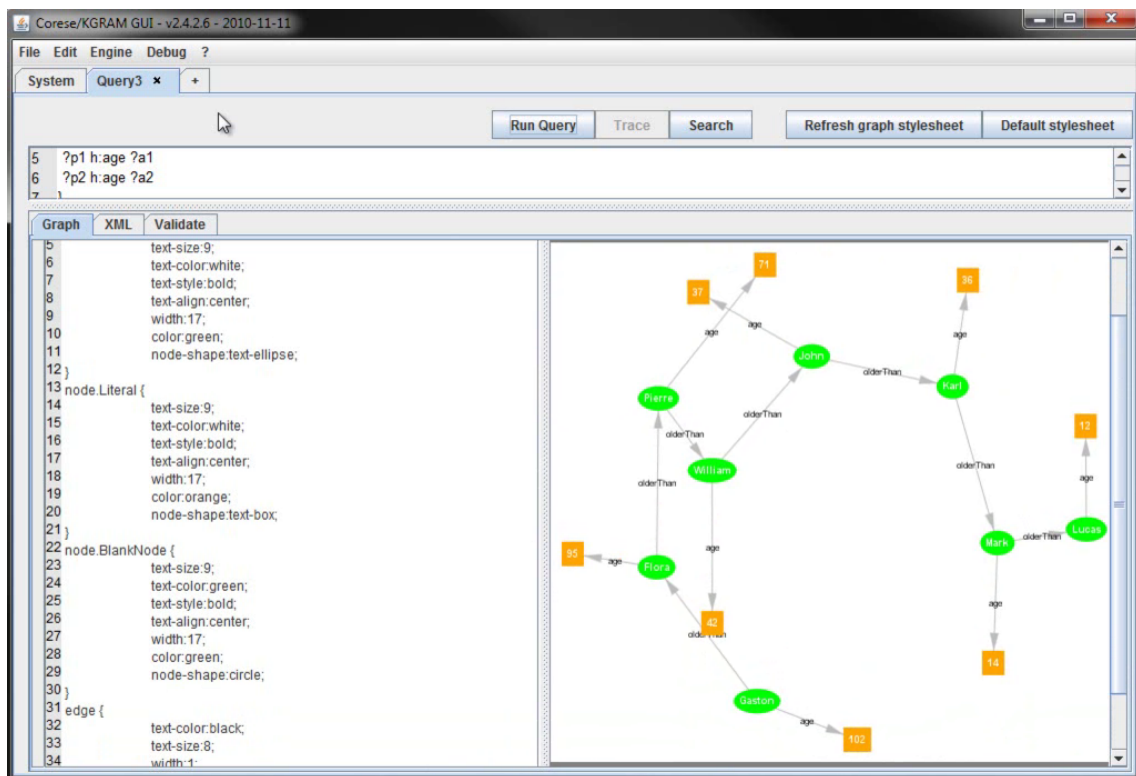
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[2]http://wiki.gephi.org/index.php/SemanticWebImport

Figure 1. Corese

Figure 2. Gephi

Web pages: http://wiki.gephi.org/index.php/SemanticWebImport
https://gforge.inria.fr/projects/segviz-public
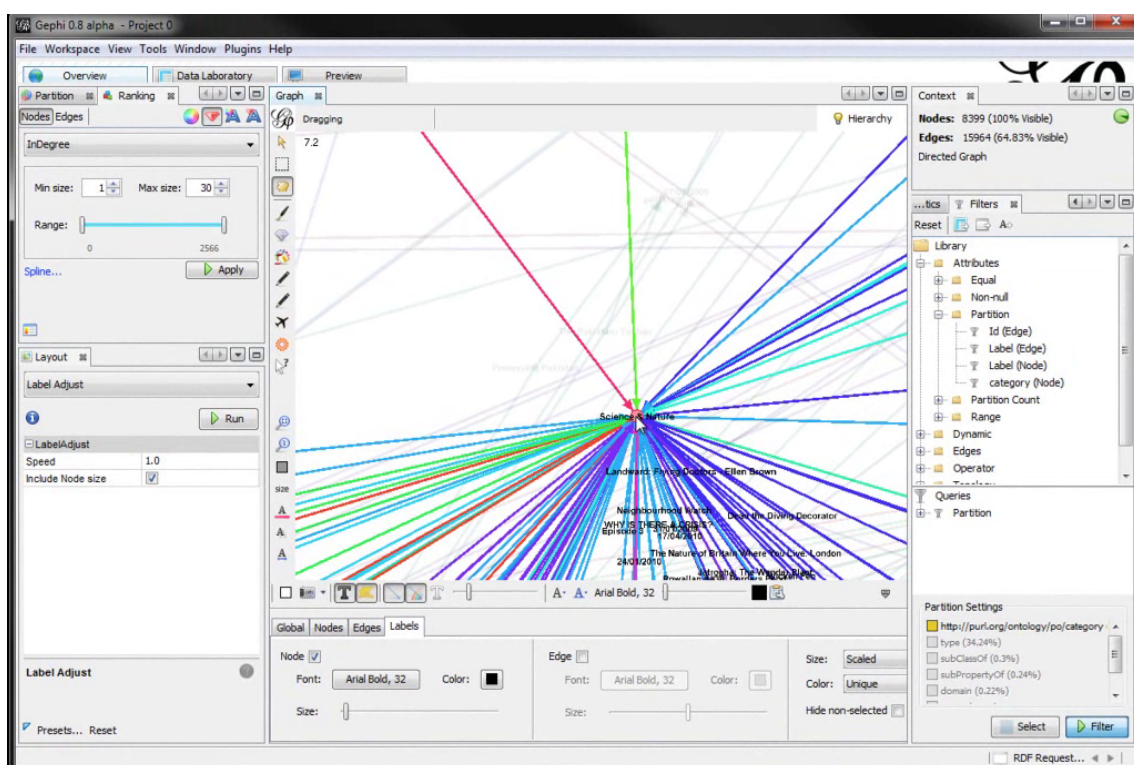
5.3. Datalift Linked Open Data Platform

Participants: Luca Costabello, Fabien Gandon, Serena Villata.

The Datalift platform aims at easing and automating publication of raw structured datasets on the Web of data. The platform proposes an extensible architecture and comes with modules enabling: data selection, schema selection and mapping; format and vocabulary conversion; storage, publication querying and access control; interlinking with other sources; visualization. The latest version of the code is maintained on the public forge of Inria [3].

Web page: http://www.datalift.org

5.4. Question Answering Wikiframework-based System

Participant: Elena Cabrio.

The QAKiS system (figure 3) implements question answering over DBpedia. QAKiS allows end users to submit a query to an RDF triple store in English and obtain the answer in the same language, hiding the complexity of the non-intuitive formal query languages involved in the resolution process. At the same time, the expressiveness of these standards is exploited to scale to the huge amounts of available semantic data. Its major novelty is to implement a relation-based match for question interpretation, to convert the user question into a query language (e.g. SPARQL). English, French and German DBpedia chapters are the RDF data sets to be queried using a natural language interface.

Web page: http://www.qakis.org

5.5. French Chapter of DBpedia

Participants: Julien Cojan, Fabien Gandon.

DBpedia is an international crowd-sourced community effort to extract structured information from Wikipedia and make this information available on the semantic Web as linked open data. The DBpedia triple stores then allow anyone to solve sophisticated queries against Wikipedia extracted data, and to link the different data sets on these data. The French chapter of DBpedia was created and deployed by Wimmics and is now an online running platform providing data to several projects such as: QAKIS, Izipedia, zone47, Sépage, HdA Lab., JocondeLab, etc.

The platform can be found at: http://www.dbpedia.fr.

It is part of the Semanticpedia convention: http://www.semanticpedia.org/.

5.6. Semantic Wiki

Participants: Pavel Arapov, Michel Buffa.

WikiNEXT is a semantic wiki prototype (figure 4) written in JavaScript, from database to server and client code. It is not in competition with wikis like Semantic Media Wiki, but more a test bed for new ideas. Every wiki page is an application that keeps a Web Socket open with the server, enabling incremental saves or collaborative editions using Google wave like algorithms. Using JavaScript on the whole chain of operations avoids data transformation from/to different formats like in traditional approaches (Objects, JSON/XML, and SQL). WikiNEXT uses JavaScript distributed objects and includes an IDE to write JS applications within wiki pages.

Web page: http://wikinext.gexsoft.com

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[3] https://gforge.inria.fr/projects/datalift/

Queried DBpedia

Which river does the Brooklyn Bridge cross?

Get answers   Clear

Your asked: Which river does the Brooklyn Bridge cross?

Pattern matching:
typed question: [River] does [Bridge] cross ?
had a best match with pattern: crosses [D:Bridge] bridge cross [R:River]
with score 10.136633333333

The query generated is:

```
select distinct *
where {
        <http://dbpedia.org/resource/Brooklyn_Bridge> <http://dbpedia
.org/ontology/crosses> ?v .
        ?v rdf:type <http://dbpedia.org/ontology/River> .
        OPTIONAL {?v <http://www.w3.org/2000/01/rdf-schema#label> ?l
 filter (lang(?l)="en")}
} limit 20
```

#	result
1	East River

demo -- contact@dbpedia.fr

Figure 3. QAKIS
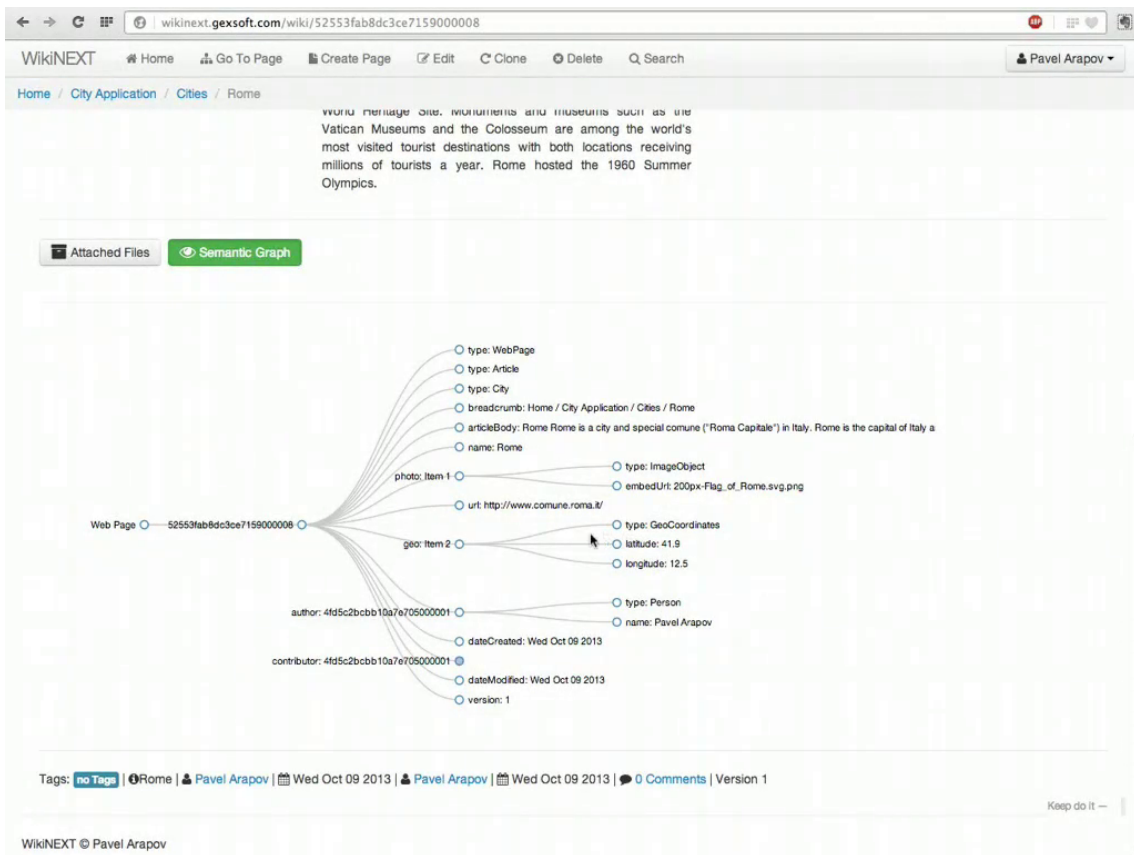
Figure 4. WikiNEXT

5.7. ISICIL

Participants: Nicolas Delaforge, Fabien Gandon [resp.].

In the context of the ISICIL ANR project, we have developed a Semantic Web server which provides core services to manage simple tagging of resources (internal or from the Web) and to assist the semantic enrichment of the folksonomy of our communities of users. This server's implementation is based on the ISICIL main framework. The tagging model combines already existing ontologies such as SIOC [4], SCOT, and Newman's Tag Ontology[5]. SRTag, the model of folksonomy enrichment, is based on a named graph mechanism in order to maintain diverging statements made between tags using SKOS (for thesaurus like relation between tags) or SCOT (for spelling variant relations), and is shown in figure 5.
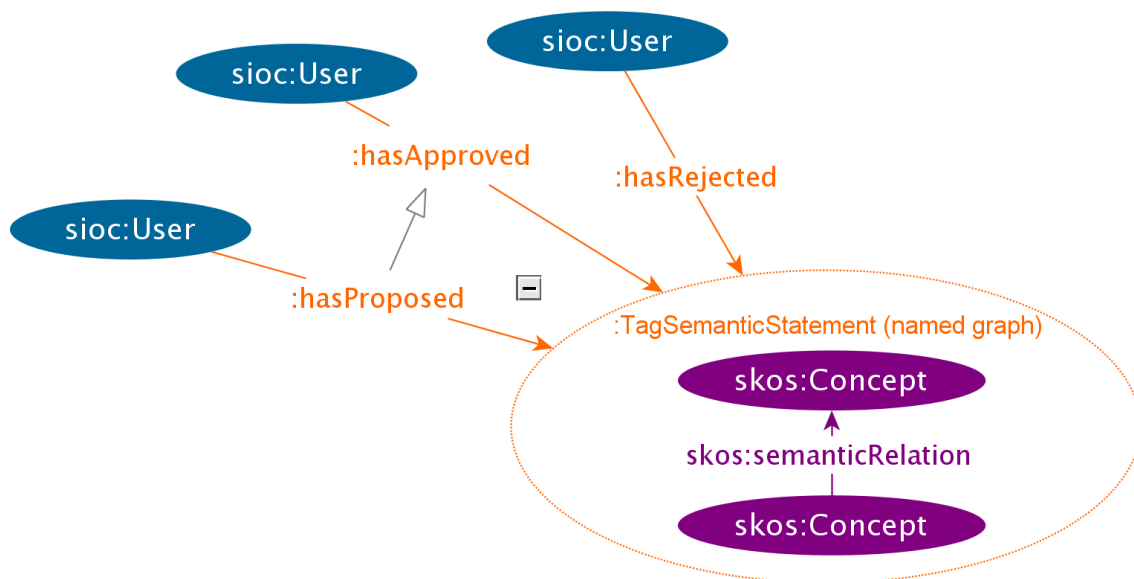
Figure 5. Folksonomy enrichment model

Web page: https://gforge.inria.fr/projects/isicil/

The code is now being refactored by the company Mnemotix, a SCOOP created as a spin-off of the project: http://www.mnemotix.com.

5.8. ZONE-project

Participant: Christophe Desclaux.

ZONE-project provides a new, innovative way to follow news (figure 6). At its core, the system is aggregating news items from various RSS feeds. Using the power of Semantic Web we are able to efficiently tag & annotate each news.Those tags are the basis of filters. Filters allow users to see only news that are relevant. For instance users can retrieve all news containing a tag, or on the contrary never see news containing specific tags. Basically it means that each user can create custom news feeds according to his interests. Though it may be tedious for John Doe to build its own filters, thus it will be possible to exchange filters with other users, or read specific news feeds built by other users. This will enable users to create news group feed focused on

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[4]http://sioc-project.org
[5]http://www.holygoat.co.uk/owl/redwood/0.1/tags

specific topics such as technology, heath, industry, transport, agriculture, communication, environment, etc. This project won the Inria BoostYourCode 2012 contest which was created in order to promote free & open source software.

Figure 6. ZoneReador

Web page: http://www.zone-project.org/
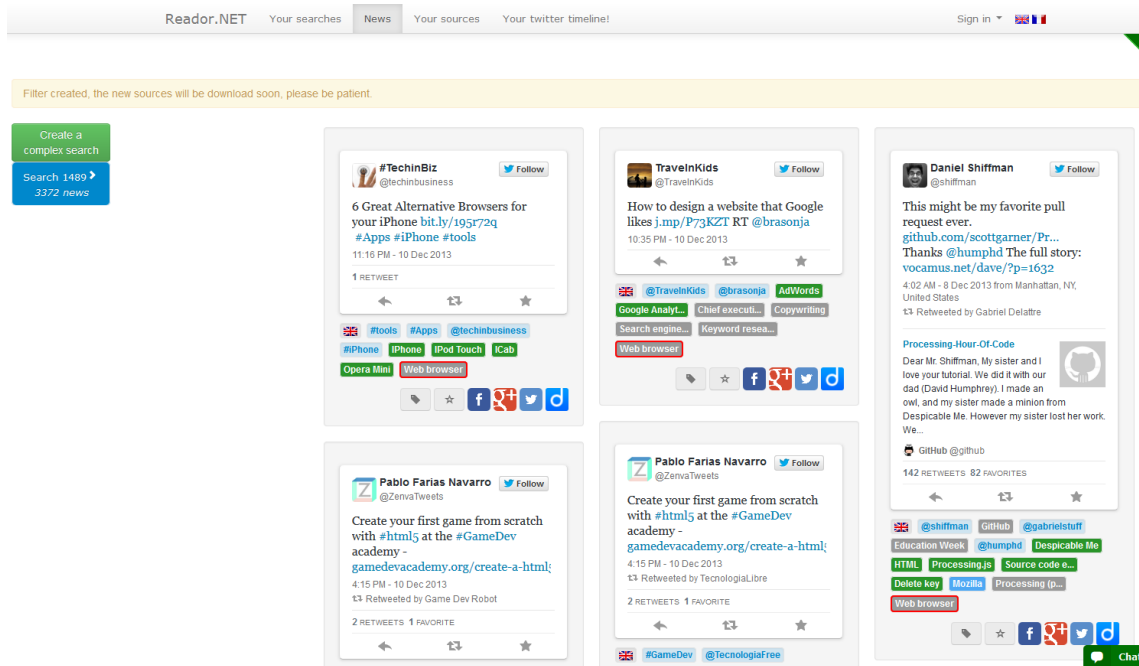
6. New Results

6.1. QAKiS: Question Answering wiKiframework-based System

Participants: Elena Cabrio, Julien Cojan, Amine Hallili, Serena Villata.

We worked on an extension of QAKiS, the system for open domain Question Answering over Linked Data, that allows to query DBpedia multilingual chapters. Such chapters can contain different information with respect to the English version, e.g. they provide more specificity on certain topics, or fill information gaps. QAKiS exploits the alignment between properties carried out by DBpedia contributors as a mapping from Wikipedia terms to a common ontology, to exploit information coming from DBpedia multilingual chapters (English, French and German), broadening therefore its coverage. We also worked on proposing an argumentation theory model to reason over the inconsistent information sets obtained from DBpedia multilingual chapters, and provide nevertheless a unique and motivated answer to the user.

A demo of the system is available online [6]. The results of this research have been published in [26], [27], [54], [34].

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[6] http://qakis.org/qakis2/

6.2. Combining Argumentation Theory and Natural Language Processing

Participants: Elena Cabrio, Serena Villata.

With the growing use of the Social Web, an increasing number of applications for exchanging opinions with other people are becoming available online. To cut in on a debate, the participants need first to evaluate the opinions of the other users to detect whether they are in favor or against the debated issue. An automated framework to detect the relations among the arguments represented by the natural language formulation of the users opinions is therefore needed. The work in this area proposes the use of natural language techniques to identify the arguments and their relations. In particular, the textual entailment approach is adopted, i.e. a generic framework for applied semantics, where linguistic objects are mapped by means of semantic inferences at a textual level. Textual entailment is then coupled with an abstract bipolar argumentation system which allows to identify the arguments that are accepted in the considered online debate.

The same framework is also experimented to support the management of argumentative discussions in wiki-like platforms. The results of this research have been published in [16], [28], [29].

6.3. Understanding Query Behavior and Explaining Linked Data

Participants: Fabien Gandon, Rakebul Hasan.

Our main research is to understand how to assist users in querying [63] and consuming [64] Linked Data. In querying Linked Data, we help users by providing information on how a query may behave. In addition, we provide information about the behavior of similar queries executed in the past. Users can use these information for query construction and refinement. Accurately predicting query behavior is also important for workload management, query scheduling, query optimization. In consuming Linked Data, we explain why a given piece of data exists and how the data was derived. Users can use these explanations to understand and debug Linked Data. Overall, we address the followings research questions:

    i. *How to predict query behavior prior to executing the query?*
    ii. *How to explain Linked Data?*

6.3.1. *Predicting query behavior*

To predict query behavior prior to query execution, we apply machine learning techniques on the logs of executed queries. We work with SPARQL queries and predict how long a query would take to execute. We use the frequencies and the cardinalities of SPARQL algebra operators of a query as its features. We also extract a compact set of features from the basic graph patterns belonging to the query. We achieve high accuracy ($R^2 = 0.837$) using the k-nearest neighbors regression. We also suggest similar queries from the query log using an efficient neighbors search. Users can use these suggestions to understand behaviors of similar past queries, and construct and refine their queries accordingly.

6.3.2. *Explaining Linked Data*

The diverse and distributed nature of Linked Data presents opportunities for large-scale data integration and reasoning over cross-domain data. In this scenario, consumers of Linked Data may need explanations for debugging or understanding ontologies. A consumer may also want a short explanation to have an overview of the reasoning. We propose to publish the explanation related metadata as Linked Data. This enables us to explain derived data in the distributed setting of Linked Data. We present the *Ratio4TA* [7] vocabulary to describe explanation metadata and guidelines to publish these metadata as Linked Data. In addition, we summarize explanations using four measures: centrality, coherence, abstractness, and similarity. Users can specify their explanation filtering criteria - types of information they are interested in. We evaluate our summarization approach by comparing the summarized explanations generated by our approach and ground truth summarized explanations generated by humans. Our explanation summarization approach performs roughly with 60% to 70% accuracy for small summaries.

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[7] http://ns.inria.fr/ratio4ta/

6.4. Linguistic Knowledge Representation: the Unit Graphs Formalism

Participants: Fabien Gandon, Maxime Lefrançois.

As any community of interest, linguists produce knowledge. Generic needs arise with such produced knowledge: how to represent it, how to manipulate it, how to share it, how to query it, and how to reason with it. To answer these needs is the goal of the knowledge representation (KR) domain. Existing KR formalisms such as the Semantic Web formalisms are standard solutions, and their specialization to the linguistic domain is under active development. Yet, the description logic behind the OWL formalism fails to represent how the meaning of words combine to build up the meaning of sentences. To tackle this specific problem, we introduced the new so-called Unit Graphs KR framework that is portable to existing KR standards but that introduces its own formal logic. UGs are defined over a UG-support that contains: i) a hierarchy of unit types which is strongly driven by the actantial (from action) structure of unit types, ii) a hierarchy of circumstantial symbols, and iii) a set of unit identifiers. On these foundational concepts, we defined UGs, justified the introduction of a deep-semantic representation level for the Meaning–Text Theory, we represented lexicographic definitions of lexical units, and we introduced two formal semantics: one based on UGs closure and homomorphism, and one based on model theoretic semantics. The UGs formalism has been the object of 6 publications in [42], [43], [44], [45], [46], [47].

6.4.1. *Editor of Formal Lexicographic Definitions*

Participants: Fabien Gandon, Alain Giboin, Romain Gugert, Maxime Lefrançois.

A prototype of a GUI of an editor of formal dictionary definitions aimed at lexicographers was developed based on the formalism of Units Graphs and on Meaning-Text Theory. The development of the GUI was preceded by the elaboration of scenarios of how users would interact with Units Graphs objects. It was followed by user tests of the GUI with actual lexicographers unfolding the scenarios. This work is reported in [46].

6.5. Access Control and Presentation for Linked Data

Participants: Luca Costabello, Fabien Gandon, Serena Villata.

PRISSMA is an *adaptive* rendering engine for Linked Data resources. PRISSMA tweaks RDF visualization to the mobile context in which the resource consumption is performed. The work in 2013 has been focused on designing the algorithm that selects the best RDF visualization according to the real, sensed context. Such *selection algorithm* finds optimal error-tolerant subgraph isomorphisms between RDF graphs using the notion of graph edit distance and is sublinear in the number of context declarations in the system. The PRISSMA selection algorithm has been implemented as an Android library, and a test campaign assessed response time and memory consumption. A proof-of-concept, PRISSMA-equipped, mobile RDF browser has been developed to test PRISSMA in a real-world application.

We proposed an extension of Shi3ld, a context-aware access control framework for the Web of Data, developed last year. In particular, we showed how the Shi3ld attribute-based authorization framework for SPARQL endpoints has been progressively converted to protect HTTP operations on RDF. We started by supporting the SPARQL 1.1 Graph Store Protocol and shifted towards a solution without SPARQL for the Linked Data Platform. The resulting authorization framework provides the same functionalities of its SPARQL-based counterpart, including the adoption of Semantic Web languages only. Moreover, a user-friendly interface allowing non expert users to create Shi3ld access policies through a GUI has been designed and developed. These results have been published in [22], [36], [35].

Luca Costabello co-supervised a six-month master student internship related to the Shil3d project. The student, Iacopo Vagliano, from Politecnico di Torino (Italy) developed a Web application to manage Shi3ld access control policies.

6.6. Reasoning about Data Licensing in the Web of Data

Participants: Fabien Gandon, Serena Villata.

In the domain of Linked Open Data a need is emerging for developing automated frameworks able to generate the licensing terms associated to data coming from heterogeneous distributed sources. Together with Guido Governatori (NICTA, Australia) and Antonino Rotolo (University of Bologna, Italy), we proposed and evaluated a deontic logic semantics which allows to define the deontic components of the licenses, i.e., permissions, obligations, and prohibitions, and generate a composite license compliant with the licensing items of the composed different licenses. The AND-composition and OR-composition heuristics have been proposed to support the data publisher in choosing the licenses composition strategy which better suits her needs w.r.t. the data she is publishing. The approach has been evaluated using the SPINdle defeasible reasoner, where the proposed heuristics have been hard coded in the reasoner. The results of this research line have been published in [50], [38].

6.7. Semantic and Temporal Analysis of Online Communities

Participants: Catherine Faron Zucker, Fabien Gandon, Zide Meng.

This work is done in the PhD of Zide Meng in the OCKTOPUS ANR project.

Data Formalization: We use *FOAF* and *SIOC* schema to formalize a dataset from the popular question-answer site *StackOverflow* into RDF format. For some mis-matched vocabulary, we introduce *ugc* schema, which refer to user generated content. Moreover, in order to enrich the dataset, we link tag entity of our dataset to the corresponding entity in DBpedia by using cosine distance of two entities description to solve the disambiguation problem.

Analysis: After formalizing the dataset, we begin to exploit some graph mining algorithms, such as community detection algorithm, to analyse the dataset. We extract different kinds of graph from the RDF dataset, such as question-answer graph, co-answer graph, tag co-occurrence graph etc. We aim at finding useful information such as interest groups, experts and tag groups from this kind of question-answer site. By studying the state of the art of community detection algorithm, we analyse the advantage and disadvantage of different approaches, then try to introduce a better algorithm which could outperform others in this scenario.

Plan: During our analysis, we find out some difficult problems which haven't been well solved, such as question intent understanding and community evolution. We will use semantic technology, combining with social network analysis to solve this problem. In the future, we would develop an information management system for such dataset by using analysis algorithms we introduced to improve the performance of information retrieval on user generated content sites.

6.8. RDF Mining

Participant: Andrea Tettamanzi.

We started investigating an approach to RDF mining based on grammatical evolution and possibility theory: the aim is to mine large RDF graphs by automatically generating and testing OWL 2 axioms based on the known facts. This research effort brings together expertise on metaheuristics for machine learning and data mining, fuzzy logic and possibility theory for representing and handling uncertainty, and the core interests of the Wimmics team, namely, knowledge graphs and the Semantic Web.

Finally, an article describing work on the automatic design of multilayer feedforward neural networks with evolutionary algorithms carried out while still at the University of Milan, got published in [75].

6.9. Combination of Evolutionary and Semantic Web Techniques for Protein Design

Participants: David Simoncini, Andrea Tettamanzi.

Proteins are fundamental components of all living cells and are among the most studied biological molecules. They are involved in numerous diseases and being able to determine their 3D structures and interactions is essential to understand the mechanisms of cell functions. *De novo* computational protein design refers to the problem of finding a sequence of amino acids corresponding to a protein with the desired three-dimensional structure, or the desired biological function. It is a longstanding goal in computational structural biology and only a few examples of successful *de novo* computational protein designs can be found in the literature. Computational protein design has many industrial applications, such as biofuels, drug synthesis and food processing (through computational design of enzymes) or targetted drug delivery systems (through bio-nanotechnologies).

In this context, our research focuses on knowledge extraction from protein structure databases for the development of new computational protein design frameworks. Whereas most of the current methods ignore available structural information, our algorithm takes into account known profitable interactions between amino acids and uses this information to guide the energy minimization process and propose more realistic sequences of proteins.

6.10. Logical Foundations of Cognitive Agents

Participants: Andrea Tettamanzi, Serena Villata.

We carried on work on the logical foundations of cognitive agents in collaboration with Salem Benferhat of CRIL and Célia da Costa Pereira of I3S [25] and on the application of such theoretical framework to the problem of exploiting untrustworthy communication in vehicular ad-hoc networks, in collaboration with Ana L. Bazzan and Andrew Koster of the Federal University of Rio Grande do Sul in Brasil and Célia da Costa Pereira of I3S [41]; still related to the issue of trust in multi-agent systems, we took part, with Serena Villata and Célia da Costa Pereira of I3S in a joint investigation with a research team, led by Cristiano Castelfranchi, of the CNR-ISTC in Rome [19].

6.11. Requirement Engineering

Participants: Isabelle Mirbel, Zeina Azmeh.

The participation of stakeholders (and especially end-users) in requirement engineering is recognized as a key element in the development of useful and usable systems. But in practice, the involvement of end-users is often difficult to implement. Today's Web has given rise to several platforms serving the purpose of collaborative software development. Thanks to these environments, it is possible, among others, for anyone to suggest new requirements for a software under development. A lot of requirements are thus proposed by users and it becomes difficult, after a while, for the persons in charge of the software which development is hosted by the platform to understand this large set of new requirements in its entirety. An important limitation of these new approaches resides in the information overload, lacking structure and semantics.

In this context, we proposed an approach based on Semantic Web languages as well as concept lattices to identify relevant groups of stakeholders depending on their past participation. We also developed a tool supporting this approach. This work relies on Semantic Web languages and formal concept analysis. Semantic Web languages are used to annotate the data extracted from the plateform and to reason about it. Formal Concept Analysis is a theory of data analysis which identifies conceptual structures among data sets. We use it to classify users as well as requirements into lattices which can then be exploited as road maps to examine new requirements. The results of this research have been published in [24].

6.12. Management of Technical and Regulatory Knowledge

Participants: Khalil Bouzidi, Michel Buffa, Catherine Faron Zucker, Nhan Le Than.

In the framework of a long-term collaboration with CSTB (Centre Scientifique et Technique du Bâtiment) on the management of technical and regulatory knowledge based on Semantic Web models and techniques, Catherine Faron Zucker and Nhan Le Than co-supervised the PhD thesis of Khalil Riad Bouzidi which has been defended on September 2013.

In the continuation of this work, Catherine Faron Zucker and Michel Buffa got involved with CSTB and three other partners on a project proposal submitted to ANR on the recommendation of technical documents in a social network of building professionals, based on the capitalization and sharing of best search practices.

6.13. Co-Construction of Community Ontologies and Corpus in a Limited Technological Environment

Participants: Olivier Corby, Papa Fary Diallo, Isabelle Mirbel.

In this thesis, we study the implementation of an online platform to build and share the collective memory of citizens in Senegal and revive stories by using a semantic layer. During the first year of this thesis, the first step has been to describe some Use Cases about the platform we would like to develop. We started to define what community means in our work which are group of people with a shared history, culture, ethnicity or interest and want to exchange or collaborate via the Web to share their knowledge of this area.

Our communities are characterized by three components: 1) a common socio-cultural interest, 2) exchange, collaboration and sharing among members and 3) use of the Internet to interact. Thanks to the use cases, we define two main types of users. A community member who is an user who participates in the construction of information and who has interactions with other users. The second type is a simple user who visits the platform for having information, he can be a tourist who want to have information about Senegalese communities activities.

With these use cases, we determine some features that the platform should have. Community members should have, among other thing, a place where they interact to collaborate. To have a "living" community, the system must notify the members of the community about new entries on their focus. Also, to have a catchy presentation, we plan to use maps with different kinds of information.

The second step has been to do a state of the art of online communities. This review allows us to find different definitions and typologies which differ from the study domain – anthropologist, sociologist, psychologist – or the objective – demographic, technological environment, members characteristic. The broadest definition takes into account our concept of community in the context of a knowledge-sharing platform is that of Porter [80]. Despite the fact that numerous typologies are proposed, none is completely consistent with our vision of community. However, the "Toronto School" proposes a category in the classification based on the knowledge transmission called "knowledge-building community" applied in the education area. We think that this type of community could be generalized in the field of socio-constructivisme development, which our communities belong to, for sharing socio-cultural knowledge.

Then, the second phase of this review has been to present the WestAfricapedia project which takes place in this thesis. The main objective is to enhance and sustain the socio-cultural heritage of Senegalese communities through a framework of sharing and co-construction of sociocultural knowledge. Thus we distinguish two main types of communities: knowledge-building community extended in the culture area and exchange information community that has sub-categories such as sports community, commercial community, etc.

6.14. Semantic Wiki

Participants: Pavel Arapov, Michel Buffa.

We worked on Semantic Web tools, more particularly on WikiNEXT, a semantic application wiki. WikiNEXT lies on the border between application wikis and modern Web based IDEs like jsbin [8], JSFIDDLE[9], cloud9 IDE[10], etc. It has been initially created for writing documents that integrate data from external data sources of the Web of Data, such as DBPedia.org or FreeBase.com, or for writing interactive tutorials (e.g. an HTML5 tutorial, a semantic Web programming tutorial) that mix text and interactive examples in the same page. The system combines some powerful aspects from (i) wikis, such as ease of use, collaboration and openness, (ii) semantic Web/wikis such as making information processable by machines and (iii) Web-based IDEs such as instant development and code testing in a Web browser.

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[8]http://www.jsbin.com
[9]http://www.jsfiddle.net
[10]http://www.cloud9ide.com

WikiNEXT can be used for writing documents/pages as well as for writing Web applications that manipulate semantic data, either locally or coming from the Web of Data. These applications can be created, edited or cloned in the browser and can be used for integrating data visualizations in wiki pages, for annotating content with metadata, or for any kind of processing. WikiNEXT is particularly suited for teaching Web technologies or for writing documents that integrate data from the Web of data.

6.15. Semantic Aggregation

Participant: Christophe Desclaux.

Christophe spent one year in the Wimmics team (October 2012 to October 2013) as an invited engineer funded by the BoostYourCode contest he won in 2012. The aim of the BoostYourCode contest (organized by Inria) is to offer to a junior engineer a one year full time contract to work on an innovating OpenSource project.

We worked on an RSS feed aggregation tool using Named Entities Recognition. Reador.NET [11] provides a specialized tool for monitoring news from various sources like RSS, twitter or facebook feeds. Reador.NET semantically increases news for a better classification for the user. We worked on document clustering, natural language processing, RDF datastores and building efficient SPARQL queries.

6.16. Semantic Mappings

Participants: Thi Hoa Hue Nguyen, Nhan Le Thanh.

This PhD thesis is about semantic mappings with a control flow-based business workflow: an approach to develop control flow applications using knowledge-based systems.

Although software systems employed to create and execute automatically business processes have been becoming more and more available and advanced, each system is built to deal with a particular workflow type. In addition, these systems require a great deal of time and effort of expert programmers as well as the knowledge of domain experts to set up. Therefore, it is desirable to develop an alternative approach.

Our objective is to represent control flow-based business workflow patterns (CBWPs) in knowledge base by a declarative approach. We first propose an ontological model to represent Coloured Petri Nets (CPNs) with OWL DL. On this basis, we define a meta-knowledge base for CBWPs management. We then develop a graphical interface to design and simulate CBWPs. Our ongoing work is to develop a middleware prototype for mapping and using a CBWP with a user's knowledge base in order to illustrate the feasibility of our approach [49].

6.17. Emotional and Social Web

6.17.1. Modeling, Detection and Annotation of Emotional States using an Algebraic Multidimensional Vector Space

Participants: Nhan Le Thanh, Imen Tayari.

In this research work, we presents a generic solution of emotional data exchange between heterogeneous multi-modal applications. This proposal is based on a new algebraic representation of emotions and it is composed of three distinct layers: the psychological layer, the formal computational layer and the language layer. Moreover, our proposal provides powerful mathematical tools for the analysis and the processing of these emotions and it enables the exchange of the emotional states regardless to the modalities and sensors used in the detection step. The validation of the proposed solution is done with K-nearest neighbor classification algorithm for detecting and evaluating emotion from Eight-Emotion Sentics Data.

6.17.2. Social radio: a Case Studies of Social Network Services

Participants: Amosse Edouard, Nhan Le Thanh.

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[11]http://www.reador.net

In this project, we carry out some case studies of social radio that is an information service on social networking. Two case studies are conducted on the topics of traffic incidents and geo-epidemiologies. These case studies allow us to study a formal model of spatiotemporal annotations on social network.

6.17.3. Participatory Mapping and Social Bookmarking

Participants: Michel Buffa, Alain Giboin.

In continuation of ISICIL, collaboration began this year between the ITCS-HSS research teams Wimmics and Tech-CICO (UTT), in association with Mnemotix and Wannago startups, in order to design a platform of participatory mapping in the field of sustainable tourism. This platform will enable the various actors in the field (tourists, tourism service providers, scientific experts of fauna, flora and geology, associations, and so on) exchange knowledge about the site and thus enhance the site attraction. This platform is called "socio-semantic" because it offers a unique combination of Semantic Web and Social Web technologies.

The article [51] details one of the planned scenarios of use of the platform and illustrates some proposed functionalities such as Webmarks (Wimmics and Mnemotix) and multiple viewpoints (Tech-CICO). The article also shows how ICT and HSS researchers will collaborate to analyze the innovative uses of the platform on the first fields of application (in Provence- Alpes-Côte d'Azur Region).

6.17.4. Modeling Team Processes

Participants: Pierre Robillard, Isabelle Mirbel, Zeina Azmeh, Alain Giboin, Mathieu Lavallée.

Recent studies outline the importance of software development teams' interactions, suggesting that poor team dynamics can lead to poor software. The relationship between "soft" issues like team dynamics and "hard" issues like software quality is difficult to observe, however. To bridge the gap between these two kinds of issues, and to help development teams prevent quality issues through the planning of relevant team activities, we worked on an assessment method of the quality of team dynamics based on a taxonomy of episodes of interactions encountered in software development teams [83] – the CoDyMA (Collaborative Dynamics Measurement and Analysis) method. We proposed an analysis procedure of episodes based on the Formal Concept Analysis (FCA) approach. This procedure uses as input the data (namely the accounts of face-to-face interactions) reported by the developers in their activity diary. The entries are coded in terms of interaction episodes and artifact types to produce a FCA lattice. The observed lattice is compared to a prescribed lattice, and adjustments can be proposed to the team if necessary. The procedure was applied to data from a case study. This work is described in a paper submitted for publication.

6.17.5. Modeling Users and Groups of Users

Participants: Isabelle Mirbel, Zeina Azmeh, Alain Giboin.

6.17.5.1. Emphasizing Dysfunctional Group Dynamics in Collaboration Personas: Specification of an Approach

Comparing Collaboration Personas and Individual Personas for the design and evaluation of collaboration software, Judge, Matthews, and Whittaker [79] found that practitioners preferred collaboration personas, but required that the method put more emphasis on problematic or dysfunctional group dynamics. Because Judge et al. only outlined a possible approach to meet this requirement, we decided to contribute to the specification of the approach. In [37] we report the first steps of this specification work.

6.17.5.2. Using Formal Concept Analysis to elicit Personas

Personas are built from a clustering of behavioral variables common to a set of users. Behavioral variables are ways in which users behavior differ (e.g., goals and attitudes); it is important to elicit them because they have an impact on the system to be designed. Today, the clustering is mainly performed manually. To automate it, we started this year to explore the use of Formal Concept Analysis tools.

6.17.6. Modeling Multimodal Grounding Processes in Design Teams

Participants: Aurore Defays, Alain Giboin.

Grounding is the process used by participants to a collective activity to coordinate both the content and process of their communication to be successful [71]. Grounding is also defined as the process of elaborating and maintaining the Common Ground (i.e., mutual knowledge, mutual beliefs, and mutual assumptions) necessary to participants' mutual understanding [72]. So far, grounding has been studied mainly from a unimodal point of view, i.e., from the point of view of the verbal modality (oral or written). Some authors have begun to study grounding from a bimodal viewpoint; for example [78] have studied the use of verbal and gestural modalities necessary to ensure mutual understanding in interactions between Japanese airline pilots and an American flight instructor. In the context of her PhD thesis in Ergonomics applied to architectural design digital tools, Aurore Defays extended the study of grounding to actual multimodality (with n modality: oral, written, gestures, gazes, etc.).

With Aurore Defays, we focused this year on improving the methodology of analysis of multimodal grounding proposed in [74]. To do this, we relied on the data of an existing study by Defays on remote collaboration between dyads and triads of architects interacting through a collaborative digital studio (the Distributed Collaborative Digital Studio, DSDC). Our initial research question was: Is a multimodal shared representation preferable to a unimodal representation to collaborate effectively? Analyzing the data, this question was gradually transformed into: Which modalities are relevant to build the common ground necessary for a particular type of collaboration to succeed?

6.17.7. *The "Design Thinking" Toolset: Application to Discovery Hub*
Participants: Gessica Puri, Alain Giboin, Nicolas Marie, Damien Legrand.

Last year was developed a "design thinking" toolset (including a framework) for helping developers think in terms of a user's point of view when they design and evaluate link visualization and manipulation applications such as graph visualization applications [81]. The toolset was used this year to perform a qualitative evaluation of Discovery Hub, so contributing to the development of a new version of the discovery engine.

The ShowCaseMachine project led by Damien Legrand won the 11th Challenge *Jeune Pousses* at Telecom Valley in Sophia Antipolis.

6.18. Graph-based Knowledge Representation

6.18.1. *SPARQL Based Pretty Printing Language*
Participant: Olivier Corby.

We have designed SPARQL Template, a pretty-printing rule language for RDF graphs. It enables to pretty print RDF graphs representing Abstact Syntax Trees of languages such as SPIN or OWL RDF syntax. We have implemented a pretty printing engine that interprets SPARQL Template.

An example of template for a OWL "someValuesFrom" statement is shown below. The SPARQL 1.1 "where" part specifies the conditions to apply the rule on a focus node "?in". The template part specifies the result of the pretty print of the focus node. Variables in the template part are recursively replaced by the result of their pretty print.

```
template {
  "someValuesFrom(" ?p " " ?c ")"
}
where {
  ?in a owl:Restriction ;
    owl:onProperty ?p ;
    owl:someValuesFrom ?c
}
```

We have introduced named templates that are called explicitely using a "kg:template" extension function.

The pretty printing language and engine have been validated on five RDF AST [12]: SPIN, OWL 2, SQL, Turtle and a mockup of mathematical expressions pretty printed into Latex. The SPIN pretty printer is used in the PhD Thesis of Oumy Seye on "Rules for the Web of Data" and the SQL pretty printer is used in the PhD Thesis of Corentin Follenfant on "Usage semantics of analytics and Business Intelligence tools".

6.18.2. *Federated Semantic Data Query*

Participants: Olivier Corby, Alban Gaignard.

Another activity of the team addresses the data explosion challenges faced in e-Science. Semantic Web technologies are well adopted to represent the knowledge associated to both e-Science data and processing tools. A PhD thesis [76], addressing the distributed knowledge production and sharing in collaborative e-Science platforms, has successfully been defended this year. Moreover, we have been participating in the organization of the second edition of the CrEDIBLE workshop [13], gathering international experts to discuss the challenges of federating distributed biomedical imaging data and knowledge.

In this area, the main scientific results are (i) a software architecture for transparently querying multiple data sources through the SPARQL language [73], (ii) a set of querying strategies and optimizations dedicated to limit the cost of distributed query processing, while still considering enough expressivity (full SPARQL 1.1 support, including named graphs, property path expressions, optional, aggregates, etc.).

Performance-oriented experiments have been conducted on the Grid'5000 distributed computing infrastructure to compare our approach with state-of-the-art engines such as FedX [85], Splendid [77], or DARQ [82]. Experiments, based on the FedBench benchmark [84] show performances between DARQ, Splendid, and FedX, while still high expressivity.

Since distributed query processing lead to complex and costly processes, we started to collect provenance information which opens interesting perspectives towards enhanced trust and reproducibility in Linked Data querying and reasoning.

These distributed query processing strategies have been implemented and integrated into Corese through two main components, namely a data source federator, and a data source endpoint. A prototype Web application has also been developed to demonstrate our approach. End-users can configure and launch distributed SPARQL querying and finally visualize SPARQL results and their associated provenance.

6.18.3. *Rules for the Web of Data*

Participants: Olivier Corby, Catherine Faron Zucker, Oumy Seye.

This work takes place in the PhD Thesis of Oumy Seye.

The objective of this year is to foster knowledge reuse on the Web based on the principles of Linked Data. Our approach is to consider rule bases like data sources that can be published, shared and queried as Linked Data, thus enabling the selection and reuse of relevant and useful shared rules in any particular context or application. We propose to select rules by querying either metadata annotating rules, rules content or both. To make rules content queryable, we use RDF representations of SPARQL rules with the SPIN format [14].

This idea joins the principles of the Semantic Web that encourages the sharing and reuse of knowledge. We used the SPIN syntax (which allows the representation of a SPARQL query in RDF) obtained with the SPIN pretty printer of Corese. We have subsequently been able to select rules of interest with Corese. The proposal enables to search rules based on their content. This allows us to help users extract relevant set of rules for their data, and thus leverage more easily shared rules. This idea can be used to build a search engine for rules on the Web or a tool for automatically connect rules with semantic data.

In the remainder of this work, we will focus on updating harvested rules. A poster on this work was presented for the GLC pole day July 8, and at the summer school ESWC September 2.

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[12] ftp://ftp-sop.inria.fr/wimmics/soft/pprint
[13] http://credible.i3s.unice.fr
[14] http://www.w3.org/Submission/spin-overview/

6.18.4. Semantic Web and Business Intelligence

Participants: Corentin Follenfant, Olivier Corby, Fabien Gandon.

This PhD Thesis is done with a CIFRE industrial grant from SAP Research.

The bilateral contract with SAP aims at converging Semantic Web and Business Intelligence through a framework applying the read/write Web principles to the business knowledge carried within Business Intelligence reports. These reports often provide a dynamic view upon numerical data from various enterprise sources, mainly relational databases. Reports are authored with a complex process that can be reduced to writing, directly or through different layers of user interfaces, SQL queries that will query the sources and feed the dynamic reports. In order to simplify the query authoring process, complementary approaches are envisioned.

Our approach proposes to model the queries as knowledge through their abstract syntax trees (ASTs) with Semantic Web tools, query and manipulate them through appropriate standards, respectively RDF/S and SPARQL. Indeed RDF enables us to model the actual structure of the ASTs by integrating the knowledge related to syntax and semantics of the SQL queries: types can be captured with XML Schema Datatypes, while more specific business knowledge can also be designed according to the source business models and annotate various entities referenced within the SQL queries. Regarding the query and manipulation part, a library of SPARQL queries was designed to perform generic AST manipulation (generic from a DSL perspective), and is usable to search, extract, edit, prune or graft parts of RDF-modelled ASTs.

While this year was mostly dedicated to manuscript writing, additional experiments were run to demonstrate the validity of our model: a large set of ANSI SQL queries generated with a TPC-DS benchmark was converted to its RDF representation. Inversely, a generic pretty printer system developed into the Corese engine was validated by the internship of Abdoul Macina who developed a set of rules to have the pretty printer turn RDF-modelled SQL queries back to their concrete syntactic form. This enables iterative query design by leveraging AST patterns rather than manually editing brute syntax.

7. Bilateral Contracts and Grants with Industry

7.1. Alcatel Lucent Bell Labs

We initiated a Research Contract (CRE) and CIFRE PhD Thesis (2011-2013) on Social objects, object-centered sociality, and object-centered social networks to propose mobile context-based notification application in a semantic and pervasive Web. This work will explore spreading algorithms in typed graphs.

7.2. SAP

We have a PhD Thesis (Cifre) with SAP Research on *Usage semantics of analytics and Business Intelligence tools*.

7.3. SynchroNext

Catherine Faron Zucker, Elena Cabrio and Fabien Gandon constructed a scientific collaboration project with the SynchroNext company which led to the acceptation of a CIFRE PhD Thesis by the ANR. Amine Hallili started his PhD Thesis in November 2013.

8. Partnerships and Cooperations

8.1. Regional Initiatives

8.1.1. ePSP

Participants: Alain Giboin, Nhan Le Than, Michel Buffa.

Nhan Le Than animates the ePSP interdisciplinary working group at Nice Sophia Antipolis University on the topics of personalized eHealth [15].

8.1.2. *HCI Group of Pôle GLC at I3S UNS*
Participant: Alain Giboin.

The HCI Group brings together researchers from Pôle GLC teams conducting or wishing to conduct research related to HCI. The group specifically addresses the issues of how to conduct user experiments to evaluate the UIs of the software developed in GLC. The group establishes collaborations between researchers in the design and implementation of experiments. Collaboration took place this year between the teams Rainbow and Wimmics on the assessment of (1) an application composition process driven by the composition of UIs, and (2) the prototype OntoCompo supporting this process.The prototype allows a composition mainly driven by the direct manipulation of UI elements, the other components (task model and software components) being hidden, but still being linked to the UI elements. A user testing of both the process and the prototype has been designed and implemented [70].

8.1.3. *Collaboration Agorantic-Inria*
Participant: Alain Giboin.

Agorantic is a Federative Structure for Research of the Université d'Avignon et des Pays du Vaucluse, conducting studies on "Culture, heritage and digital societies". Agorantic is interested in how worlds of culture and heritage interact with the Web and digital technology, leading, e.g., to: new forms of knowledge sharing and access to culture, heritage and territories; new forms of writing, mediation and use of cultural events and heritage; new forms of mobility and of territorial representation. Collaboration began this year between ITCS and HSS teams from Agorantic and Inria Sophia Antipolis, including Wimmics, conducting interdisciplinary ITCS-HSS research. This initial collaboration resulted in setting up a proposal of a project for analyzing, designing, and evaluating a system recommending visit tours to museum visitors (individuals and groups).

8.1.4. *MSHS : Axe-2 "TIC, Usages et Communautés"*
Participants: Alain Giboin, Aurore Defays, Fabien Gandon.

Axis-2 of the Maison des Sciences Humaines et Sociales (MSHS) du Sud-Est (Nice) is interested in the relationships between ICT, Practices and Communities. Axis-2 objective is to make explicit two aspects of the relationship between digital technology and community building: (1) networks and (2) artifacts. Two Axis-2 groups-projects address these aspects: (1) the group-project "Social networks and digital networks" and the group-project "Artifacts and coordination." The first group-project examines how the Internet allows reconstructing the dynamics of interaction networks by making explicit interaction phenomena that could not be observed and treated before the event of Big Data. The second group-project studies the impact of cognitive technologies on the social and cognitive coordination between individuals in organizational and community contexts. Wimmics was involved in the second group-project. In this group, we reported our work on the analysis and modeling of the representations shared by members of a group (also called common ground or common frame of reference).

8.1.5. *MSHS : SyCoViSo project, Systèmes Cognitifs et Formes de Vie Sociale*
Participants: Alain Giboin, Elena Cabrio, Fabien Gandon.

SyCoViSo is a project of the MSHS Sud-Est that brings together researchers in HSS and ITCS. Several Inria teams are involved in this project, including Wimmics. SyCoViSo goal is to analyze and model internal and external cognitive processes involved in various forms of social life. SycoViso consisted originally of eight thematic groups; Wimmics was a member of the "Artifacts, interaction and social networks" group. Following the two SyCoViSo scientific days organized in June 2013, the project was given a second level of organization with three areas having a cross-disciplinary potential: (1) Computational modelling; (2) Classification of artefacts lying beyond the skin; (3) Unconscious factors impacting decision making: emotions, beliefs, morale, etc. Wimmics interest focused in particular on computational modeling of linguistic exchanges occurring in social networks and online communities.

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[15]http://epsp.unice.fr/

8.2. National Initiatives

8.2.1. ANR Labcom SMILK

SMILK (Social Media Intelligence and Linked Knowledge) is a joint laboratory (Labcom, 2013-2016) between the Wimmics team and the Research and Innovation unit of VISEO (Grenoble). Natural Language Processing, Linked Open Data and Social Networks as well as the links between them are at the core of this LabCom. The purpose of SMILK is both to develop research and technologies in order to retrieve, analyze, and reason on textual data coming from Web sources, and to make use of LOD, social networks structures and interaction in order to improve the analysis and understanding of textual resources. Topics covered by SMILK include: use of data and vocabularies published on the Web in order to search, analyze, disambiguate and structure textual knowledge in a smart way, but also to feed internal information sources; reasoning on the combination of internal and public data and schemes, query and presentation of data and inferences in natural formats.

8.2.2. Ministry of Culture: DBpedia.fr

This project named "DBpedia.fr" proposes the creation of a French chapter of the base DBpedia used in many English applications, in particular for the publication of cultural collections. Because DBpedia is focused on the English version of Wikipedia it ignores some of the French topics and their data. This projects aims at extracting a maximum of RDF data from the French version and providing a stable and scalable end-point for them. We now consider means to improve both the quantity and the quality of the data. The DBpedia.fr project was the first project of the Semanticpedia convention signed by the Ministry of Culture, the Wikimedia foundation and Inria.

Web site: http://wimmics.inria.fr/projects/dbpedia

8.2.3. ANR Datalift

DataLift is an ANR project (2010-2013). Its goal is to design a platform to publish and interlink datasets on the Web of data. Datalift will both publish datasets coming from a network of partners and data providers and propose a set of tools for easing the datasets publication process. DataLift brings raw structured data coming from various formats (relational databases, CSV, XML, ...) to semantic data interlinked on the Web of Data.

Partners: Inria Exmo & Wimmics, LIRMM, Eurecom, Mondeca, Atos, IGN, INSEE, FING

Web site: http://www.datalift.org

8.2.4. ANR Kolflow

Kolflow is an ANR project (2011-2014), it proposes to extend collective intelligence with smart agents relying on automated reasoning. Smart agents can significantly reduce the overhead of communities in the process of continuously building knowledge. Consequently, continuous knowledge building is much more effcient. Kolflow aims at building a social semantic space where humans collaborate with smart agents in order to produce knowledge understandable by humans and machines.

Partners: Inria Orpailleur & Wimmics, Silex U. Claude Bernard Lyon, GDD U. of Nantes

Web site: http://kolflow.univ-nantes.fr

8.2.5. ANR OCKTOPUS

OCKTOPUS is an ANR project (2012-2015). The objective of OCKTOPUS is to increase the potential social and economic benefit of the large and quickly growing amounts of user-generated content, by transforming it into useful knowledge. We believe that it is possible to considerably improve upon existing generic Information Retrieval techniques by exploiting the specific structure of this content and of the online communities which produce it. Specifically, we will focus on a multi-disciplinary approach in order to address the problem of finding relevant answers to questions within forums and question-answer sites. To create metrics and predictors of content quality and use them to improve the search experience of a user, we will take advantage of:

- the experience of the CRG (the management research institute of Ecole Polytechnique and CNRS) to understand better the incentives of, and interactions between individuals who produce online content within large communities;

- the experience of the Wimmics research team to analyze the structural and temporal aspects of the complex typed social graphs found within these communities;

- the ability of Alcméon (a start-up developing a search application dedicated to user-generated content) to integrate and test the results of OCKTOPUS within a common demonstration framework, in order to assess their practical usefulness when applied to concrete large-scale datasets.

Partners: Alcméon, CRG, Inria Wimmics.

Web site: http://ocktopus.alcmeon.com

8.2.6. *CNRS Mastodons CrEDIBLE*

Participants: Olivier Corby, Catherine Faron Zucker, Alban Gaignard.

We participate to the CrEDIBLE research project funded by the MASTODONS program of the interdisciplinary mission of CNRS which objective is to bring together scientists from all disciplines involved in the implementation of systems sharing of distributed and heterogeneous medical imaging, provide an overview of this area and to evaluate methods of state of the art and technology that affect this area. In this framework, we participated to the organization of a 3-days workshop and we worked with members of the I3S Modalis team on the distribution of algorithms in the Corese/KGRAM engine.

Catherine Faron Zucker was chairman of one of its session and worked with members of the I3S Modalis team on a survey of existing approaches for the translation of relational data to RDF data.

Web site: https://credible.i3s.unice.fr

8.2.7. *Inria Large Scale Initiative Action PAL*

Participants: Alain Giboin, Célia Ormea.

In collaboration with David Daney (Coprin), Rémy Ramadour (Coprin), Rémi Barraquand (Prima), Marie Babel (Lagadic).

For the second year, Wimmics participated in the large-scale initiative action PAL (Personally Assisted Living) to develop technologies and services to improve the autonomy and quality of life for elderly and frail persons. Wimmics was involved in two main actions: (1) a socio-ergonomic field study to inform the design of a device (such as a robotic shopping trolley) assisting elderly and frail persons to do their shopping autonomously; the results of this study are documented in Célia Ormea Master Thesis; (2) the development and the application of a procedure to collaboratively elaborate a shared scenario to structure the demonstration of the platform integrating the different PAL services.

Web site: http://pal.inria.fr

8.3. International Initiatives

8.3.1. *Informal International Partners*

Université de Montréal, Canada

HERON (Higher Educational Research ON tutoring systems) Laboratory (Head: Claude Frasson).

Topic of the collaboration: Social exchanges and emotions in mediated polemics – Analysis and data.

Polytechnique Montréal, Canada

Software Engineering Laboratory (Head: Pierre Robillard).

Topic of the collaboration: Modeling of software development processes and teams for quality assessment purposes.

Annaba University, Algeria

The funding of the scientific collaboration project with the LabGed laboratory of university of Annaba (Algeria) by CNRS and DPGRF (Algeria) ended last year but continued in 2013 through the co-supervising of two PhD students from the university of Annaba with our Algerian colleague Hassina Seridi. Samia Beldjoudi works on the personalization of resource recommendation and Khaled Halimi on the personalization and socialization of ubiquitous e-learning systems based on Semantic Web models and techniques.

In 2013 Khaled Halimi visited the team for three months and started writing his thesis during this period. Catherine Faron Zucker received his PhD advisor Hassina Seridi in december with the project of setting a collaboration within the PICS CNRS program in 2014.

8.3.2. *Inria International Labs*

We participate to the LIRIMA where we have a long term collaboration with University Gaston Berger at Saint-Louis, Senegal. We host two PhD students: Papa Fary Diallo and Oumy Seye.

Catherine Faron Zucker participated to the LIRIMA scientific days in September in Marocco [16].

8.3.3. *Participation In other International Programs*

Our team is strongly involved in W3C activities:

- Fabien Gandon in the Advisory Committee representative for Inria.
- Olivier Corby participates to SPARQL 1.1 standardization working group.
- Fabien Gandon and Olivier Corby participate to RDF 1.1 standardization working group.
- Serena Villata participates to the LDP (Linked Data Platform) standardization working group.

8.4. International Research Visitors

8.4.1. *Visits of International Scientists*

Oscar Rodriguez Rocha:

Exploiting the Semantic Web, UGC and Context-Awareness to enhance mobile services for end-users, January 25.

Claude Frasson: *The Emotional Brain*, March 3.

Alberto Barrón Cedeño: *"Uncovering" Good Feedback Instances from an On-line Machine Translation Systems*, April 26.

Luis Ibáñez: *Live Linked Data: making Linked Data writable with massive optimistic replication and Conflict-Free Replicated Data Types*, June 10.

Bernardo Magnini: *The KNOWLEDGE STORE: an Integrated Framework for Ontology Population*, September 6.

Alessio Palmero Aprosio: *Extending Linked Open Data resources exploiting Wikipedia as source of informations*, October 7.

Pierre Robillard, Professor, Department of Computer Engineering, Polytechnique Montréal, Canada.

Stefan Decker, From Networked Knowledge to Insight(s), November 29.

8.4.1.1. Internships

Aurore Defays, PhD student in Ergonomics at the University of Liège, Belgium.

Gessica Puri, PhD student at the Architecture Faculty of Genoa, Italy.

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[16]http://www.lirima.uninet.cm/index.php/en

9. Dissemination

9.1. Scientific Animation

Michel Buffa:

was Program Committee member of WWW Workshop about Semantic Web Collaborative Spaces (SWCS).

Elena Cabrio:

was Program Committee chair of CLEF 2013 lab Multilingual Question Answering over Linked Data (QALD-3), and of the 2nd Workshop on Argumentation in Artificial Intelligence and Philosophy: computational and philosophical perspectives (ARGAIP 2013).

She was PC member of the Extended Semantic Web Conference (ESWC 2013), the Association for Computational Linguistics conference (ACL 2013), the Workshop on Web of Linked Entities (WoLe 2013) WWW 2013, the Joint Symposium on Semantic Processing (JSSP-2013).

Olivier Corby :

was Program Committee member of: Conférence de Recherche en Informatique (CRI), Cooking with Computer Workshop at IJCAI, 3rd International Workshop on Graph Structures for Knowledge Representation and Reasoning (GKR'13) at IJCAI, 2nd International Workshop on Querying Graph Structured Data at EDBT/ICDT, Journées Ingénierie des Connaissances (IC);

was reviewer for: ISWC, workshop *Des Sources Ouvertes au Web de Données* (SOS-DLWD) at Plateforme IA;

was reviewer of a project proposal for the ANR;

was invited to give a talk on Semantic Web at a workshop organized by the AnaEE program (CNRS, INRA) [17], december 5-6.

Catherine Faron Zucker :

coorganized a scientific journey on e-learning environments and artificial intelligence, sponsored by the national AFIA and ATIEF associations [18],

is chairwoman of the French conference on Knowledge Engineering IC 2014 which will take place on May 2014 [19].

was invited for a talk and a tutorial on the Web of Data and the Semantic Web at JDEV2013 (Journées nationales du Développement Logiciel JDEV); the audience was CNRS, Inria and INRA engineers [20],

was invited for a talk on the Web of Data and ontology at a workshop organized by the AnaEE program at the station for experimental ecology; the audience was CNRS and INRA engineers and researchers.

is member of the board of the French association for Artificial Intelligence (AFIA) and participates to its monthly meetings.

She was member of the program committee of:

Int. Semantic Web Conference (ISWC), Int. Joint Conference on Artificial Intelligence (IJCAI), Int. Conf. on Knowledge Engineering and Ontology Development (KEOD), Int. Conf. on Knowledge and Systems Engineering (KSE), Conférence nationale d'Ingénierie des Connaissances (IC), Workshop on Graph Structures for Representation and Reasoning (GKR), Colloque National (sénégalais) sur la Recherche en Informatique et ses Applications (CNRIA).

Fabien Gandon was:

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[17] http://www.anaee-s.fr/
[18] http://www.irit.fr/EIAH2013/index.php?page=journee-eiah-ia
[19] http://www.irit.fr/IC2014
[20] http://devlog.cnrs.fr/jdev2013

Publicity chair for ESWC 2013,

Reviewer for Journals: Intellectica,

Reviewer for Conferences: EGC [21] ESWC [22] Hypertext [23] IC [24] ICWSM [25] IJCAI [26] ISWC (Senior PC) [27] SAC [28] TOTh [29] VLDB [30] WebSci [31] WI [32] WWW [33]

Reviewer for Workshops: MSM [34] PrivOn [35] QetR [36] SPIM [37] SSN Semantic social networks [38] SemanticCities [39] SWCS [40] WebS [41].

Reviewer for project proposals at Digiteo-DigiCosme,

Reviewer of a book for Morgan Kaufmann, an imprint of Elsevier.

Alain Giboin was :

Member of the steering committee of the COOP conference series (International Conferences on the Design of Cooperative Systems),

Member of the program committee of COOP 2014,

Member of the organizing committee of COOP 2014,

Member of the program committee of IC 2013, 24èmes Journées francophones d'Ingénierie des Connaissances, 3-5 July 2013, Lille, France and I-SEMANTICS 2013, The 9th International Conference on Semantic Systems, 4-6 September 2013, Graz, Austria,

Member of the organizing committee of the colloquium eSP 2013 (e-Santé de Proximité), 31 May 2013, Roquefort-les-Pins.

Nhan Le Than organized the First National Workshop on *e-Plateforme de Santé de Proximité* Roquefort-Les-Pins, May 31, (eSP 2013) [42]. He was AERES expert to examine the diploma projects of the "Marne la Vallée Paris-Est University".

Isabelle Mirbel was Program Committee member of:

25th International Conference on Advanced Information Systems Engineering (CAISE 2013), 21st European Conference on Information Systems (ECIS 2013), Seventh IEEE International Conference on Research Challenges in Information Science Doctoral Consortium.

Andrea Tettamanzi served as Program co-chair of the "EvoFin" track of the EvoApplications 2013 conference, and as the chair of EvoTransfer, a technology-transfer event, now in its 2nd edition, in the framework of Evo* 2013, which took place in Vienna in April this year, and is serving in the same capacities for the next

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[21] http://www.irit.fr/EGC2013/
[22] http://2013.eswc-conferences.org/
[23] http://ht.acm.org/ht2013/
[24] http://pfia2013.univ-lille1.fr/doku.php%3Fid=fr:ic.html
[25] http://www.icwsm.org/2013/
[26] http://ijcai13.org/
[27] http://iswc2013.semanticweb.org/
[28] http://users.marshall.edu/~hanh/SWA2013/
[29] http://www.porphyre.org/toth
[30] http://www.vldb.org/2013/
[31] http://www.websci13.org/
[32] http://cs.gsu.edu/wic2013/wi
[33] http://www2013.org/
[34] http://oak.dcs.shef.ac.uk/msm2013/
[35] http://privon.semanticweb.org/
[36] http://www.irit.fr/QetR/2013/
[37] http://2013.spim-workshop.org/
[38] http://ufrsciencestech.u-bourgogne.fr/~abrouk/SSN/
[39] http://research.ihost.com/semanticcities13/index.html
[40] http://www.swcs2013.org/
[41] http://www.faw.jku.at/wwoess/webs/webs.html
[42] http://hal.inria.fr/ESP13

edition of 2014 in Granada. He is program co-chair for the area of fuzzy systems for IBERAMIA, the latin American conference on artificial intelligence.

He has served as a referee for the Information Sciences journal, the Applied Soft Computing Journal, the Computational Intelligence journal, the Transactions on Knowledge and Data Engineering, and the Genetic Programming and Evolvable Machines journal.

Finally, he has served or is serving in the program committees of GECCO 2013, GeLiDD 2013, IAT 2013, IJCAI 2013, and PPSN 2014 conferences.

Serena Villata was Program Chair of the 2nd Artificial Intelligence meets the Web of Data workshop (AImWD-2013) co-located with the ESWC-2013 conference, and of the 2nd Workshop on Argumentation in Artificial Intelligence and Philosophy: computational and philosophical perspectives (ARGAIP 2013), co-located with the AI*IA-2013 Conference. She was PC member of the AAMAS-2013, IJCAI-2013, COREDEMA-2013, TAFA-2013, CLIMA XIV, PRIMA-2013, EUMAS-2013, ICAART-2013. She served as a reviewer for the following international journals: ACM Transactions on Intelligent Systems and Technology, Journal of Logic and Computation, Argument & Computation, Journal of Biomedical Informatics.

9.1.1. *Invited Talk*

Fabien Gandon:

Semantics and Social Networks for Business Intelligence, SOFSEM, January 28-31.

Le Web 3.0, la culture, les langues, Expolangues conference, February 2, Ministère de la Culture et de la Communication.

Le labyrinthe des évolutions du Web, Centre des Jeunes Dirigeants, Cannes Sophia Antipolis, April 10.

Semantic and Social (Intra) Webs, ICEIS, 2013: http://www.iceis.org

Panel *Information Systems in the Enterprise of the future: what place for Models, Services, and Semantics?*, ICEIS, 2013: http://www.iceis.org Panel "Open Data in Science", conference i-KNOW 2013.

Quand le lien fait sens, Conference BLEND, Lyon, October 2.

Données de la culture et culture de la donnée, Conférence Automne Numérique, *Transmettre la culture à l'ère numérique*, November 7, Ministère de la Culture et de la Communication, Microsoft Campus.

Le Web au prisme de la ressource, Séminaire Nouvelles formes d'éditorialisation, IRI, la revue Sens Public et l'Université de Montréal, centre Georges Pompidou, November 28.

Bridging formal semantics and social semantics on the Web, SMAP 2013, December 12, http://www.smap2013.org

9.2. Teaching - Supervision - Juries

9.2.1. *Teaching*

Licence : **Nhan Le Thanh**, *Web programing*, 30h, L1 & L2, IUT UNS.

Licence : **Nhan Le Thanh**, *Design tools and programming relational DBMS*, 105h, L2, IUT UNS.

Licence : **Nhan Le Thanh**, *Theoretical basis of Computation*, 45h, L2, IUT UNS.

Licence : **Olivier Corby, Catherine Faron Zucker**, *Semantic Web*, 36h, L3, IUT UNS.

Licence : **Catherine Faron Zucker**, *Programmation par Objets et algorithmique*, 130h, L3, UNS.

Licence : **Catherine Faron Zucker**, *Statistics for Data Analysis*, 39h, L3, UNS.

Licence : **Maxime Lefrançois**, *Java*, 45H, L2, IUT UNS.

Licence : **Maxime Lefrançois**, *SGBD Java*, 68H, L2, IUT UNS.

Licence : **Maxime Lefrançois**, *UML*, 48H, L2, IUT UNS.

Licence : **Maxime Lefrançois**, *Multimedia Web*, 10H, L3, IUT UNS.

Licence : **Maxime Lefrançois**, *Semantic Web*, 20H, L3, IUT UNS.

Licence : **Nhan Le Thanh**, *Logical Data Models and languages*, 24h, L3, IUT UNS.

Licence : **Nhan Le Thanh**, *Design and Development of DBMS services*, 24h, L3, IUT UNS.

Licence : **Nhan Le Thanh**, *Architecture of Software Engineering*, 12h, L3, IUT UNS.

Licence : **Isabelle Mirbel**, *Databases*, 63h, L3, UNS.

Licence : **Andrea Tettamanzi**, *Introduction au Web*, 37h, L1, UNS.

Licence : **Andrea Tettamanzi**, *Algorithmique – Programmation Objet – Python*, 50h, L2, UNS.

Master : **Michel Buffa**, *Web Technologies*, 40h, M1, UNS.

Master : **Michel Buffa**, *Distributed Web Development*, 40h, M2, UNS.

Master : **Michel Buffa**, *Java Certification*, 25h, M2, UNS.

Master : **Michel Buffa**, *Plasticity of User Interfaces, HTML5* 8h, M2, Polytech UNS.

Master : **Michel Buffa**, *New Interaction Means, HTML5*, 8h, M2, Polytech UNS.

Master : **Elena Cabrio, Catherine Faron Zucker, Fabien Gandon, Andrea Tettamanzi, Serena Villata**, *Knowledge Engineering*, 20h, M2, PolyTech Nice, UNS.

Master : **Elena Cabrio**, *XML Technologies*, 16h, M1, MIAGE UNS.

Master : **Olivier Corby, Fabien Gandon, Catherine Faron Zucker**, *Semantic Web*: 45h, M2, PolyTech Nice, UNS.

Master : **Catherine Faron Zucker**, *Document Langages: XML, XSD & XSL*, 24h, M1, UNS.

Master : **Catherine Faron Zucker**, *Document Langages: XML, XSD & XSL*, 32h, M2, UNS.

Master : **Catherine Faron Zucker**, *HTML 5*, 18h, M1, UNS.

Master : **Catherine Faron Zucker**, *Network Programing*, 12h, M1, UNS.

Master : **Fabien Gandon**, *Web Sémantique ou comment se déploient sur le Web les données liées et la sémantique de leurs schémas*, 2H, M2, Ecole Centrale Paris.

Master : **Alain Giboin**, *Human-Computer-Interaction (HCI) Design and Evaluation*: 35h, M2, PolyTech UNS.

Master : **Alain Giboin**, *Task and Activity Analysis for HCI design and evaluation*, 6h, M2, Sociology and Ergonomics of Digital Technologies, UNS.

Master : **Alain Giboin**, *Economics and ICT: Ergonomics*, 15h, M2, UNS.

Master : **Isabelle Mirbel**, *Requirement Engineering*, 42h M1, UNS.

Master : **Isabelle Mirbel**, *Advanced databases*, 78h, M1, UNS.

Master : **Andrea Tettamanzi**, *Distributed Systems*, 18h, M1, UNS.

Master : **Andrea Tettamanzi**, *Concurrency and Parallelism*, 18h, M1, UNS.

Catherine Faron Zucker is responsible of the course of study *Knowledge and Information Systems* in Master 2 IFI from University of Nice Sophia Antipolis and the fifth year of the computer Science department of the engineer school Polytech Nice Sophia.

She is tutoring 3 internships of the Polytech engineering school at UNS and 4 apprentices in Master (30h).

Together with **Isabelle Mirbel, Elena Villata** supervises the "Projet de Fin d'Etudes" (PFE) of two students (i.e. Abdoul Macina (Master KIS) and Margot Bastaert (Master AL)). The subject is the design and development of a socio-semantic recommendation system for a carpooling application.

Nhan Le Thanh is responsible of Licence LPSIL IDSE (Informatique Distribuée et Systèmes d'information d'Entreprise) at UNS.

Isabelle Mirbel was *Vice-Dean* of Science departement at UNS in charge of Professional Insertion and *Vice-Head* of MIAGE at UNS.

Andrea Tettamanzi has participated in the successful submission of a proposal for an Erasmus Mundus student and staff mobility project with East Asia (EMMA East 2014, EACEA Project no. 2013-2539), wich was awarded by the European Commission a funding of EUR 3,049,575 over three years. He is now serving as deputy co-ordinator of this project, which started on October 1.

9.2.2. Tutorial

Michel Buffa:

HTML5, Online course for W3DevCapus.com, the online classrooms provided by the W3C. Sessions happened in March 2013, June 2013, September 2013 and last 6 weeks.

HTML5/JavaScript, ISN days for high school math teachers.

HTML5 course given to CNRS engineers (2-4 december 2013).

HTML5, W3C tutorial, 22nd International World Wide Web Conference (WWW 2013), May 2013, Rio de Janeiro, Bresil.

HTML5, JDEV, 4-6 September, Ecole polytechnique.

Les nouveautés de HTML5, Blend Web Mix conference, 1-2 October 2013, Lyon, France.

Les possibilités de HTML5, conférence Paris Web, 10-12 October 2013, Paris, France.

Fabien Gandon:

An Introduction to Semantic Web and Linked Data, W3C tutorial, 22nd International World Wide Web Conference (WWW 2013), May, Rio de Janeiro, Bresil.

9.2.3. PhD Supervision

PhD: **Franck Berthelon**, *Emotional State Detection from Electroencephalogram Data for "Serious Games"*, UNS, December 16, Peter Sander ;

PhD: **Khalil Bouzidi**, *Semantic Web Approach to Support the Creation of Technical Regulatory Documents in Building Industry*, UNS, CSTB, September 11, Nhan Le Thanh, Catherine Faron Zucker, Bruno Fies.

PhD: **Luca Costabello**, *Mobile Access to the Web of Data*, Inria, UNS, November 29, Fabien Gandon, Ivan Herman.

PhD: **Imen Tayari**, *Representation, Annotation and Detection of Emotions in Multimodal Signals* , Sfax, UNS, April 12, Nhan Le Thanh and Chokri Ben Amar.

PhD in progress : **Pavel Arapov**, *Semantic Application Wiki*, UNS, Michel Buffa, Nhan Le Thanh ;

PhD in progress : **Amel Ben Othmane**, *Temporal and semantic analysis of information retrieved from short and spatio-temporal messages in Social Networks*, UNS, Nhan Le Than ;

PhD in progress : **Papa Fary Diallo**, *Co-Construction of Community Ontologies and Corpus in a Limited Technological Environment*, Inria, UNS, UGB, Isabelle Mirbel, Olivier Corby, Moussa Lo;

PhD in progress : **Amosse Edouard**, *Studies of spatial semantic aspect, real time filtering mechanisms and semantic enrichment of short messages on dynamic spatio-temporal social networks*, UNS, Nhan Le Thanh ;

PhD in progress : **Corentin Follenfant**, *Usage semantics of analytics and Business Intelligence tools*, UNS, SAP, Fabien Gandon, Olivier Corby, David Trastour;

PhD in progress : **Amine Hallili**, *Assistant Conversational Agents with Natural Language and Intuition*, UNS, Catherine Faron, Fabien Gandon;

PhD in progress : **Rakebul Hasan**, *Explanations for Social Semantic Web*, UNS, Fabien Gandon;

PhD in progress : **Maxime Lefrançois**, *Collaborative Multilingual Management of Interlingual Knowledge Bases*, Inria, UNS, Fabien Gandon, Christian Boitet;

PhD in progress : **Nicolas Marie**, *Pervasive sociality through social objects*, Alcatel Lucent Bell Labs, Fabien Gandon, Myriam Ribière;

PhD in progress : **Zide Meng**, *Temporal and semantic analysis of richly typed social networks from user-generated-content sites on the Web*, UNS, Fabien Gandon, Catherine Faron Zucker;

PhD in progress : **Thi Hoa Hue Nguyen**, *Semantic Mappings with a Dataflow-based scientific worflow : an approach to develop dataflow applications using knowledge-based systems*, Vietnam, Nhan Le Thanh;

PhD in progress : **Tuan Anh Pham**, *Study and integrate the mechanism of workflow control in MVC architecture: design and implement an APM (Activity Process Management) platform for dynamic information systems on the networks*, UNS, Nhan Le Thanh;

PhD in progress : **Oumy Seye**, *Rules for the Web of Data*, University Gaston Berger, Saint-Louis, Sénégal, Olivier Corby, Catherine Faron Zucker, Moussa Lo.

9.2.4. Internship

Nafissa Belhoussine, *Highlighting Stakeholders Communities in Collaborative Software Development Platforms*, M2 MIAGE MBDS, UNS, from Feb until Aug.

Amel Ben Othmane, *WikiNEXT comme Plateforme de démonstration pour des applications Web sémantiques*, Master2 MBDS UNS, from Apr until Sep.

Thibaut Comte, *Reador : Conception de l'IHM d'un agrégateur et analyseur de news*, Licence Miage, UNS, from May until Aug.

Antoine Dailly, *A Study on Semantic Similarity Metrics for a Question Answering System*, L3, École Normale Supérieure de Lyon, from June until August.

Romain Gugert, *Scénarisation d'interactions avec les objets du formalisme des Graphes d'Unités et prototypage d'un éditeur de définitions lexicographiques formelles*, Master 2 IAD C2IHM, University Pierre et Marie Curie (Paris VI), from Apr until Sep.

Amine Hallili, *Study and development of a question answering system for French*, Master MIAGE UNS, from March until Aug.

Damien Legrand, *Discovery Hub User Interface* from Mar until Aug.

Abdoul Macina, *SPIN and SQL Pretty Printing*, Master 1 UNS, from Jun until Aug.

Bastien Maria, *Connecteur API twitter et API du journal "The Guardian"* Master 1 UNS, from May until Aug.

Célia Ormea, *Caddie ou cabas comme dispositif d'assistance aux personnes âgées et fragilisées : étude d'un point de vue ergonomique*, Master "Sociologie et Ergonomie des technologies numériques", UNS, from Mar until Aug.

Vivek Sachidananda, *QAKiS System Multimedia Answers Visualization*, in collaboration with R. Troncy Eurecom, from Sept.

Nicolas Sartori, *Visualizing Stakeholders Communities in Collaborative Software Development Platforms*, L3 MIAGE UNS, from May until Aug.

Iacopo Vagliano, *Web Application for Shi3ld Access Control Policies* from Mar until Sep, Politecnico di Torino, Italy.

9.2.5. Juries

Fabien Gandon was member of Juries:

Andrei Vlad Sambra: *Data Ownership and Interoperability for a Decentralized Social Semantic Web*, PhD Thesis, Telecom SudParis, University Pierre et Marie Curie.

Gaoussou Camara: *Conception d'un système de veille épidémiologique à base d'ontologies – Application à la schistosomiase au Sénégal*, PhD Thesis, University Pierre et Marie Curie and University Gaston Berger.

Benjamin Renoust: *Analysis and Visualisation of Edge Entanglement in Multiplex Networks*, PhD Thesis, University of Bordeaux.

Rallou Thomopoulos : *Aide à la décision dans les filières agroalimentaires*, HdR, Université Montpellier II.

Nhan Le Thanh was reviewer of the PhD thesis of Emilien Bondu, *Contribution à la veille stratégique : Système d'aide à la capitalisation et à l'exploitation de connaissances expertes*, INSA Rouen, November 5.

Catherine Faron Zucker was jury member of the PhD thesis of Alban Gaignard, was member of a selection committee of the University of Grenoble (UPMF) for the recruitment of an associate professor.

Isabelle Mirbel was Reviewer of PhD Thesis:

Cheikh Ahmed Tidiane Niang, *Vers plus d'automatisation dans la construction de systèmes médiateurs pour le Web sémantique - une application des logiques de description*, University Gaston Berger, Saint-Louis, Sénégal, July 5th.

Michal Krzysztof Szczerbak, *Collaborative situation awareness*, Télécom Bretagne, September 18th.

Camille Pradel, *D'un langage de haut niveau à des requêtes graphes permettant d'interroger le Web sémantique*, Université Toulouse 3 Paul Sabatier, December 12th.

9.3. Popularization

Julien Cojan presented *DBpedia: Wikipédia pour les machines* at café-in seminar, Inria Sophia Antipolis, June 27, [43]

Fabien Gandon:

Le Web sémantique comment ça marche ?, Mines d'Alès, Nîmes, Communication science et société, February 12.

Web sémantique: ou comment se déploient sur le Web les données liées et la sémantique de leurs schémas, Total, February 27.

Le Web de Demain, médiation scientifique, Lycée Guillaume Apollinaire Nice, March 26.

Le Web Sémantique, interview Graphemeride, April 15.

Le Web sémantique, Sophia/Metropole Mag, June.

Web de données et Web sémantique, ressources ubiquitaires pour nos villes et territoires Innovative City Convention, June 18-19.

Web: terra incognita, Nuit des chercheurs, Alès, September 27.

Interview for the magazine *Documentaliste SI* Doc-SI n°3-2013 Webinaire *Roger Pédauque II*, October 10.

Maxime Lefrançois participated to the Science Festival - October 10th to 14th, 2012 - with the Association des Jeunes Chercheurs des Alpes Maritimes (AJC06). He conceived and animated scientific experiences on different energy sources.

We welcomed a scholar for a visit of one week, December 16-20.

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