



IN PARTNERSHIP WITH:  
**CNRS**

**Université Nice - Sophia  
Antipolis**

# Activity Report 2012

## Team WIMMICS

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

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

RESEARCH CENTER  
**Sophia Antipolis - Méditerranée**

THEME  
**Knowledge and Data Representation  
and Management**



## Table of contents

<b>1. Members</b> .....	<b>1</b>
<b>2. Overall Objectives</b> .....	<b>2</b>
2.1. Introduction	2
2.1.1. Context and Objectives	2
2.1.2. Research Topics	2
2.1.3. International and industrial relations	3
2.2. Highlights of the Year	3
<b>3. Scientific Foundations</b> .....	<b>3</b>
3.1. Analyzing and Modeling Users, Communities and their Interactions in a Social Semantic Web Context	3
3.2. Formalizing and Reasoning on Heterogeneous Semantic Graphs	4
<b>4. Application Domains</b> .....	<b>4</b>
4.1. Introduction	4
4.2. Linked Data on the Web and on Intranets	5
4.3. Assisting Web-based Epistemic Communities	5
<b>5. Software</b> .....	<b>5</b>
5.1. Corese	5
5.2. Semantic Web Import Plugin for Gephi visualization	6
5.3. ISICIL	6
<b>6. New Results</b> .....	<b>9</b>
6.1. Linked Data Access	9
6.2. ISICIL Platform	9
6.3. Natural Language Processing	10
6.4. Requirement Engineering	11
6.5. Regulation Engineering	11
6.6. Graph-based Knowledge Representation	12
6.6.1. Extracting Graph Patterns to Characterize RDF Data Sources	13
6.6.2. Rules for the Web of Data	13
6.7. Business Intelligence	14
6.8. Fuzzy Knowledge Representation	14
6.9. Emotion Modeling	14
6.10. DBpedia in French	15
6.11. Co-Construction of Community Ontologies	16
6.12. Semantic Wiki	16
6.13. Discovery Hub	16
6.14. Semantic Newsfeed Aggregation	17
6.15. Linked Justifications	17
6.16. Analyzing and Modeling Users, Communities and their Interactions in a Social Semantic Web Context	18
6.16.1. Analyzing and Modeling the Sharing and Articulation of Representations	18
6.16.2. Scenario Modeling and User Modeling for system design and evaluation	19
6.16.3. Exploring eye-tracking techniques for evaluating information organization aspects in Web applications	19
<b>7. Bilateral Contracts and Grants with Industry</b> .....	<b>20</b>
7.1. Alcatel Lucent Bell	20
7.2. SAP	20
<b>8. Partnerships and Cooperations</b> .....	<b>20</b>
8.1. Regional Initiatives	20
8.2. National Initiatives	20

8.2.1.	Ministry of Culture: DBpedia.fr	20
8.2.2.	ANR Datalift	20
8.2.3.	ANR Kolflow	21
8.2.4.	ANR OCKTOPUS	21
8.2.5.	CNRS Mastodons CrEDIBLE	21
8.2.6.	Inria Large scale initiative action PAL	21
8.2.7.	Follow up: GDR I3I	22
8.3.	International Initiatives	22
8.4.	International Research Visitors	22
<b>9.</b>	<b>Dissemination</b> .....	<b>22</b>
9.1.	Scientific Animation	22
9.2.	Teaching - Supervision - Juries	24
9.2.1.	Teaching	24
9.2.2.	Supervision	26
9.2.3.	Juries	27
9.2.4.	Invited Talks	27
9.3.	Popularization	28
<b>10.</b>	<b>Bibliography</b> .....	<b>29</b>

# Team WIMMICS

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

*Creation of the Team:* January 01, 2012 .

## 1. Members

### Research Scientists

Olivier Corby [Researcher (CR1) Inria]  
Fabien Gandon [Team Leader, Researcher (CR1) Inria, HdR]  
Alain Giboin [Researcher (CR1), Inria]  
Serena Villata [Research Position, Inria]

### Faculty Members

Michel Buffa [Associate professor, I3S, UNS]  
Catherine Faron-Zucker [Vice Team Leader, Associate professor, I3S, UNS]  
Nhan Le Thanh [Professor, I3S, UNS, HdR]  
Isabelle Mirbel [Associate professor, I3S, UNS, HdR]  
Peter Sander [Professor, I3S, UNS, HdR]  
Andrea Tettamanzi [Professor, I3S, UNS, HdR]

### External Collaborators

Valérie Dusaucy [PhD, University of Provence (Aix-Marseille I) and Ausy]  
Alexandre Monnin [PhD, IRI]

### Engineers

Julien Cojan [Development Engineer]  
Nicolas Delaforge [Development Engineer, till July]  
Erwan Demairy [Engineer Inria, till September]  
Christophe Desclaux [Development Engineer, from November]

### PhD Students

Pavel Arapov [UNS]  
Adrien Basse [University Gaston Berger, Saint-Louis, Sénégal]  
Franck Berthelon [UNS]  
Khalil Bouzidi [UNS, CSTB]  
Luca Costabello [Inria, UNS]  
Papa Fary Diallo [Inria, UNS, UGB]  
Corentin Follenfant [UNS, SAP]  
Rakebul Hasan [UNS]  
Maxime Lefrançois [Inria, UNS]  
Nicolas Marie [Alcatel Lucent Bell Labs]  
Oumy Seye [University Gaston Berger, Saint-Louis, Sénégal]  
Imen Tayari [Sfax, UNS]  
Nguyen Thi Hoa Hue [Vietnam]

### Post-Doctoral Fellows

Zeina Azmeh [UNS]  
Elena Cabrio [Inria]

### Visiting Scientist

Gessica Puri [PhD, University Genova, Italy]

### Administrative Assistant

Christine Foggia [TR Inria]

## 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 <sup>1</sup>) 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.

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:

---

<sup>1</sup> <http://dbpedia.org>

- 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 Bell Lucent and another joint Ph.D with SAP.

We are members of several groups of the W3C and we collaborate with LIRIMA.

## 2.2. Highlights of the Year

Fabien Gandon was general co-chair of the most important academic conference about the Web: WWW 2012, Lyon.

Best poster award at ISWC 2012 for Serena Villata and Fabien Gandon, *Towards Licenses Compatibility and Composition in the Web of Data* [75].

Minister of Culture signed the Semanticpedia Convention with Inria and Wikimedia France thanks to the DBpedia.fr project we initiated.

Serena Villata was recruited on a research position at Inria.

Fabien Gandon was appointed Advisory Committee Representative of Inria at W3C

## 3. Scientific Foundations

### 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 the 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 the 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 the 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 acceptance 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 for software to exploit them in their processing. 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

## 5.1. Corese

**Participants:** Olivier Corby [correspondant], Fabien Gandon.

Corese <sup>2</sup> (COnceptual REsource Search Engine) is a Semantic Web Factory. It enables users to load and process RDFS schemas, RDF metadata and to query the base of annotations thus created, by using the SPARQL Query Language.

Corese implements RDF, RDFS and SPARQL 1.1 Query Language & Update. Furthermore, Corese query language integrates original features such as approximate search, SQL or XPath. Approximate search consists of searching the best approximate answers to a query according to the ontology types. Corese also integrates a SPARQL-based Rule Language for RDF.

---

<sup>2</sup><http://wimmics.inria.fr/corese>

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 benefited from Inria software development support (ADT) with two software engineers. 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 50 applications, 24 PhD Thesis and is used for education by several institutions. It has been used as a Semantic Web Factory in such projects as Ontorule, Palette, SevenPro and SeaLife european projects, in e-WOK Hub, Neurolog, ISICIL and Kolflow ANR projects, BioMarker and KmP projects, Semantic Web Import Plugin for Gephi visualization and ECCO ontology editor. The work on Corese was published in [95], [96], [97], [94], [1], [5], [3], [2], [4].

This year we completed the KGRAM SPARQL 1.1 Query & Update interpreter.

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<sup>3</sup> plugin is intended to allow the import of semantic data into Gephi open graph visualization platform. 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.

Web pages:

<http://wiki.gephi.org/index.php/SemanticWebImport>

<https://gforge.inria.fr/projects/segviz-public>

## 5.3. ISICIL

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

The ISICIL software platform is made of several software components:

- XUL (XML-based User interface Language) extensions for the Firefox browser to assist the technology watch and business intelligence tasks by collecting relevant metadata according to the navigation context of the user.
- An application server based on Tomcat publishes services using the REST protocol to process requests of the users' applications and in particular the navigation extensions.

This architecture is summarized in Figure 1. Its major interest lies in the flexibility introduced by the loose coupling between REST services and navigators extensions or other applications.

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<sup>4</sup>, SCOT, and Newman's Tag Ontology<sup>5</sup> as shown in Figure 2. 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 3.

<sup>3</sup><http://wiki.gephi.org/index.php/SemanticWebImport>

<sup>4</sup><http://sioc-project.org>

<sup>5</sup><http://www.holygoat.co.uk/owl/redwood/0.1/tags>

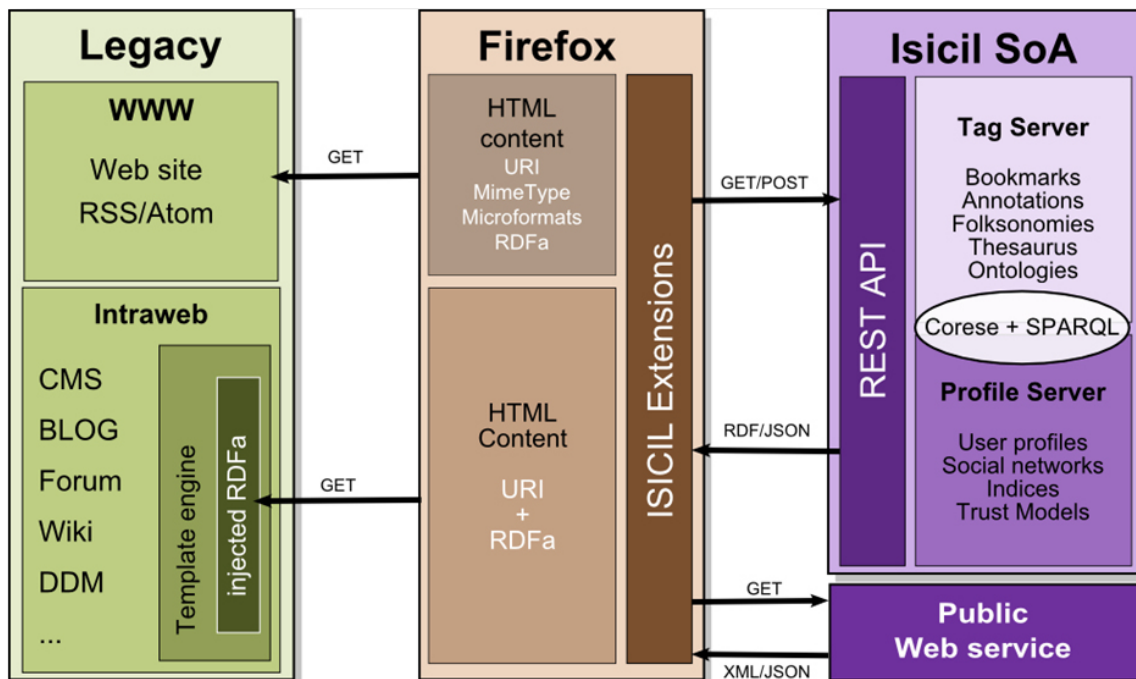


Figure 1. ISICIL Platform Architecture

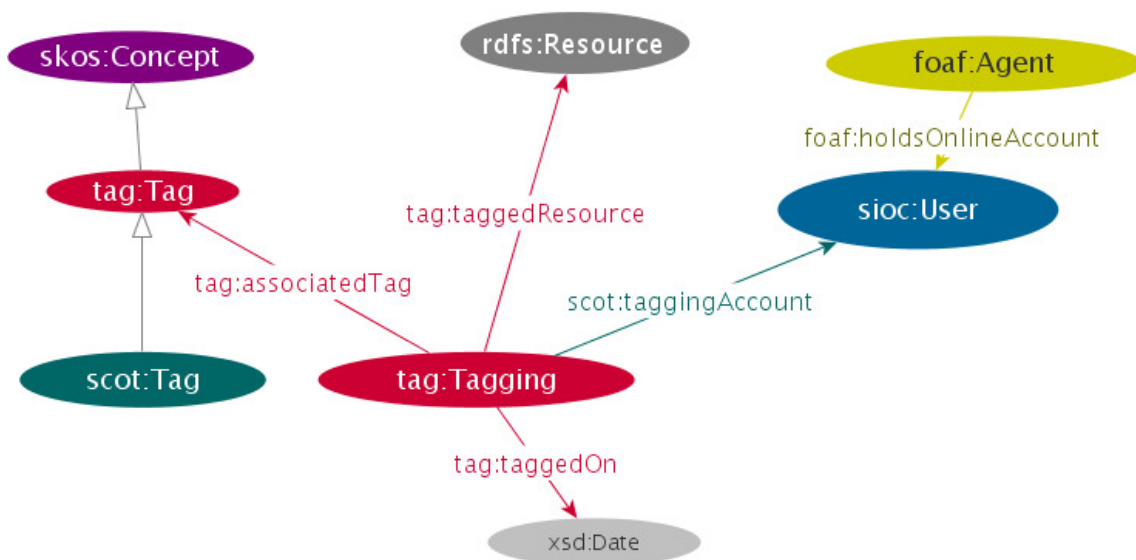


Figure 2. Model of tagging used in the Semantic Tag Server

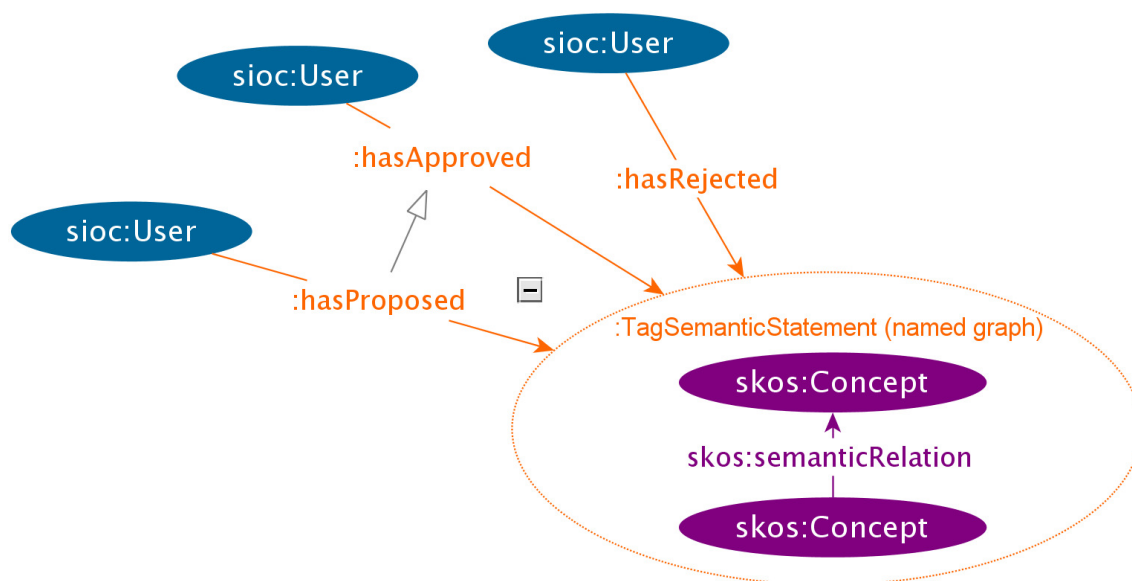


Figure 3. Folksonomy enrichment model

The functionalities of this server can be divided into three categories:

1. Tagging : creating a tag; get tag suggestions based on the input characters; create a tagging, i.e. a link between a resource, a user, and a tag.
2. Computing: an external library (exported as a java jar file) has been developed to perform computations on the tagging data. Two types of computations have been implemented:
  1. Spelling Variant detection.
  2. Related tag detection based on the computation of the similarity between tags [101].
3. Managing Semantic relations between tags: get semantically related tags, reject or propose new semantic relations.

We developed a Firefox extension to help users navigate within a folksonomy and organize semantically the tags. The main idea behind this tool is to combine organization tasks with everyday tasks in the least intrusive way, that is to say, without forcing the user in any way, and by providing a user friendly graphical interface. This tool, developed using the XUL framework <sup>6</sup>, is supported by the SRTag model and the Semantic Tag Server. Users are provided with search bar for navigating the folksonomy. When available, other tags are suggested and ordered according to their semantic relation with the searched tag (broader, narrower, related, spelling variant). Each suggestion can be either :

- clicked to search content tagged with this tag;
- rejected by clicking a checkbox;
- modified thanks to a drag-and-drop mechanism where a tag can be dropped in another category of semantic relation.

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

<sup>6</sup><http://developer.mozilla.org/en/XUL>

## 6. New Results

### 6.1. Linked Data Access

**Participants:** Serena Villata, Luca Costabello, Fabien Gandon.

We designed and developed a context-aware access control framework for the Web of Data called Shi3ld<sup>7</sup>. The framework protects access to SPARQL endpoints, and it adopts Semantic Web languages only, as in the philosophy of the Web of Data. The innovative feature of the proposed framework consists in evaluating the accessibility to the data considering the attributes of the users. These attributes are defined following three main dimensions: user, device, and environment. The evaluation of the model shows that access control comes with a cost but it guarantees the protection of the data published on the Web of Data. The results of this research activity have been published in international conferences in the area of Artificial Intelligence (ECAI, [35]) and the Web (WWW [61], HT [34]).

On the same line, we have proposed a framework for attaching the licenses to the data resulting from a query on the Web of Data. The rationale is that the licenses associated to the data returned by the query are selected, and using a number of rules their compatibility is assessed. If the licenses are evaluated compatible, then they are composed into a composite license which is released to the user together with the data. The results of this research have been published in the COLD international workshop [74] and in the ISWC international conference [75] (best poster award). These two research lines have been performed in the context of the DataLift ANR project.

The PhD thesis of Luca Costabello, directed by F. Gandon and I. Herman (CWI and Semantic Web Activity Lead at W3C) investigates Web of Data interaction from mobile environments. Two main research activities have been carried out in 2012: i) PRISSMA<sup>8</sup>, an adaptive rendering engine for RDF and ii) Shi3ld<sup>9</sup>, a context-aware access control framework for Linked Data.

The goal of PRISSMA is delivering an *adaptive* rendering engine for Linked Data resources. PRISSMA tweaks RDF visualization to the context in which the resource consumption is performed. Work in 2012 has been mainly focused on determining the algorithm that selects the best RDF visualization according to the real, sensed context. The uncertain and incomplete nature of context data, led to investigate strategies that model the task as an inexact RDF instance matching operation.

The second main research line carried out in 2012 led to the creation of Shi3ld, an access control framework for Linked Data SPARQL endpoints. Shi3ld authorization procedure and Access Policies, defined using Semantic Web languages only, have been enriched with the notion of mobile context, thus enabling context-based access control (e.g. geo-temporal authorization policies).

A collateral research line has been carried out as the follow-up of the 9th edition of the Summer School on Ontology Engineering and the Semantic Web<sup>10</sup>. We contributed to an exploration work on the problem of spamming in Linked Data, providing a classification of potential spamming techniques and populating and publishing a dataset containing spammed triples<sup>11</sup>. The dataset is useful to train anti-spamming mechanisms.

### 6.2. ISICIL Platform

**Participants:** Nicolas Delaforge, Michel Buffa, Fabien Gandon, Alain Giboin.

ISICIL is an ANR project studying social networks and Semantic Web communities to support corporate intelligence.

---

<sup>7</sup><http://wimmics.inria.fr/projects/shi3ld/>

<sup>8</sup><http://wimmics.inria.fr/projects/prissma>

<sup>9</sup><http://wimmics.inria.fr/projects/shi3ld>

<sup>10</sup><http://sssw.org/2012/>

<sup>11</sup><http://www-sop.inria.fr/members/Luca.Costabello/spam/>

First, ISICIL proposes a multidisciplinary design of a new form of corporate intelligence. The challenge of this project is to reconcile the new viral Web applications with formal representations of business processes and to integrate them into practical intelligence communities of actors working in the company. We designed, studied and experimented with new tools to support collaborative tasks in business intelligence by leveraging Web 2.0 interfaces (blog, wiki, social bookmarking) for interactions and Semantic Web technologies for interoperability and information processing. ISICIL also allowed to explore new scientific developments of the notion of epistemic cooperation (human interaction oriented toward the development and transmission of knowledge) and to identify usable technological solutions. An ergonomic approach, combining impregnation of ground truth data and freer technological inspirations from bibliographic and webographic sources, was proposed.

Secondly, ISICIL uses typed graphs as models underlying epistemic communities. The entire model relies on a unifying model based on RDF graphs to represent resources and community stakeholders. These models are integrated with bookmarking tools or "Web scraping" the results of which are tagged. The tags used are collected to form folksonomies and a semi-automatic thesaurus structure in these folksonomies. User feedback on this structure is captured when they use the search engine which offers tags related to their keywords and the user can accept, reject or adjust these suggestions. User profiles and links between them, considered as a network, are processed by a series of operators to propose a semantic analysis of social network, for example the computation of indicators of centrality parameterized by an ontology. Merged graphs of structured folksonomies and of social networks finally allow the detection and labeling of epistemic communities. Meanwhile we study how the analysis of user interactions can determine the trust and how to represent and control access to data and their semantics in a social network.

As part of the paradigm of Social Epistemology, ISICIL combined in an ergonomic approach, impregnation of ground truth data, a bibliometric study and technological inspirations to offer patterns and inferences exploiting the Semantic Web social networks to assist corporate intelligence. An open-source platform is available under CeCILL-C licence and was tested at ADEME and Orange. ISICIL is a proof of concept of the compatibility of the Semantic Web formalisms, practices and models of Web 2.0 and the philosophical framework of social epistemology.

The project has resulted in three PhD theses (Florie Bugeaud 2011, Guillaume Erétéo 2011 [98], Freddy Limpens 2010 [99]) and publications at the following conferences: ISWC 2009 IEEE / WIC / ACM Web Intelligence 2011, Web Science 2010, WWW 2011, ASWC 2009, COOP 2010, PRO-VE 2009, VSST 2010, EGC 2010, IC 2009 & 2011, Psycho Ergo Days 2010.

The ISICIL project participated to Colloque ANR STIC, January 4-6 2012.

### 6.3. Natural Language Processing

**Participants:** Elena Cabrio, Julien Cojan, Fabien Gandon, Maxime Lefrançois, Serena Villata.

We have proposed a combined framework of natural language processing and argumentation theory to support the users in their interactions within online debate platforms. The framework combines a natural language processing module which exploits the textual entailment approach and detects the arguments in natural language debates and the relationships among them, and an argumentation module which represents the debates as graphs and detects the accepted arguments. The results of this research have been published in one of the major conferences in the field of Artificial Intelligence (ECAI [30]), and in the areas of natural language processing (ACL [28]) and argumentation theory (COMMA [29]).

To enhance users interactions with the Web of Data, query interfaces providing an extensible mapping between natural language expressions, and concepts and relations in structured knowledge bases are becoming particularly relevant. As a result of the first year of her postdoc, Elena Cabrio (together with Julien Cojan) designed QAKiS (Question Answering wiKiframework-based System), that allows end users to submit a query in English to an RDF triple store 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.



In its current implementation, QAKiS addresses the task of Question Answering (QA) over structured knowledge bases (e.g. DBpedia) where relevant information is expressed also in unstructured form (e.g. Wikipedia pages). 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). A demo of the system is available online <sup>12</sup>. The results of this research have been published as a demo paper in the main conference of Semantic Web, ISWC [57], and in the special issue of the journal *Intelligenza Artificiale* [14]. QAKiS has been evaluated with respect to state-of-the-art systems taking part into the QALD-2 (Question Answering over Linked Data) challenge at ESWC, obtaining satisfactory results [59].

In the PhD Thesis of Maxime Lefrançois, we are interested in bridging the world of natural language and the world of the Semantic Web in particular to support multilingual access to the Web of Data, and management of interlingual knowledge bases. In 2011 we introduced the ULiS project that aimed at designing a pivot-based NLP technique called Universal Linguistic System, 100% using the Semantic Web formalisms, and being compliant with the Meaning-Text theory [102].

We showed that neither Description Logics nor Conceptual Graphs suit our needs, so this Ph.D. now focuses on the formalization of the Unit Graphs mathematical framework that is conceived to fill the gap between the highly linguistically precise Explanatory Combinatorial Dictionaries of the Meaning-Text Theory and the Dependency Grammars, and the highly mathematically grounded model of the Conceptual Graphs.

Maxime finally joined the Multilingual-Web-LT W3C Working Group, and left it when the charter got revised.

## 6.4. Requirement Engineering

**Participants:** Zeina Azmeh, Isabelle Mirbel, Serena Villata.

Requirements engineering is an essential process of software engineering, during which the complete behavior of a software system can be defined. The success of this process plays a crucial role in the success of the whole software project. A key issue of requirements engineering is stakeholders participation, which is facilitated through the emergence of online collaborative working tools. These tools create new opportunities of practice regarding requirements elicitation. Nevertheless, they result in an information overload lacking structure and semantics. Consequently, requirements analysis and selection become more challenging.

Our current proposition is embodied in an approach based on Semantic Web languages as well as concept lattices to identify relevant communities of stakeholders depending on their past participation. These communities can be used to enable efficient decision-making and handling of requirements.

We exploited the idea of applying argumentation theory to deal with requirements engineering. In particular, the proposed framework detects consistent sets of goal-based requirements and maintains their consistency over time based on argumentation theory which allows to detect the conflicts among elements. More specifically, the framework relies on meta-argumentation, which instantiates abstract argumentation frameworks, where requirements are represented as arguments and the standard Dung-like argumentation framework is extended with additional relations between goal-based requirements. The results of this research have been published to the CLIMA international workshop [37].

## 6.5. Regulation Engineering

**Participants:** Khalil Bouzidi, Catherine Faron-Zucker, Olivier Corby.

Regulations in the Building Industry are becoming increasingly complex and involve more than one technical area, covering products, components and project implementations. They also play an important role in ensuring the quality of a building, and to minimize its environmental impact.

In a collaboration between CSTB and the I3S laboratory, we are carrying on research on the acquisition of knowledge from the technical and regulatory information contained in the REEF referential <sup>13</sup> and the automated processing of this knowledge with the final goal of assisting professionals in the use of these texts and the creation of new texts.

---

<sup>12</sup><http://dbpedia.inria.fr/qakis/>

<sup>13</sup><http://reef.cstb.fr>

We are applying this work in CSTB to help industrials in the writing of Technical Assessments. The problem is how to specify these assessments and standardize their structure using models and adaptive semantic services.

A Technical Assessment (in French: Avis Technique ou ATec) is a document containing technical information on the usability of a product, material, component or element of construction, which has an innovative character. We chose this Technical Assessment as a case study because CSTB has the mastership and a wide experience in these kinds of technical documents.

In 2012, we were particularly interested in the modeling of the regulatory constraints derived from the Technical Guides used to validate the Technical Assessment. These Guides are regulatory complements offered by CSTB to the various industrials to enable easier reading of technical regulations. They collect execution details with a wide range of possible situations of implementations.

Our work aims to formalize the Technical Guides in a machine-processable model to assist the creation of Technical Assessments by automating their validation.

Our first contribution is the use of standard SBVR (Semantics of Business Vocabulary and Business Rules) and SPARQL to reformulate the regulatory requirements of guides on the one hand in a controlled language and on the other hand in a formal language

Second, our model incorporates expert knowledge on the verification process of Technical Documents. We have organized the SPARQL queries representing regulatory constraints into several processes. Each component involved in the Technical Document corresponds to an elementary process of compliance checking. An elementary process contains a set of SPARQL queries to check the compliance of an elementary component. A full complex process for checking a Technical Document is defined recursively and automatically built as a set of elementary processes relative to the components which have their semantic definition in the OntoDT ontology that we have designed.

Finally, we represent in RDF the association between the SBVR rules and SPARQL queries representing the same regulatory constraints. We use annotations to produce a compliance report in natural language to assist users in the writing of Technical Assessments.

As a result, we have designed a Semantic Web application to support and guide the process of writing Technical Assessment. The current version has allowed us to validate our approach. Also, we have developed a base of SBVR rules to describe business requirements of guides. This rule base is implemented in SPARQL.

## 6.6. Graph-based Knowledge Representation

**Participants:** Olivier Corby, Catherine Faron-Zucker, Fabien Gandon, Isabelle Mirbel, Adrien Basse, Oumy Seye.

We have designed a method to build pretty-printers for RDF Abstract Syntax Trees and Graphs, built on top of SPARQL Query Language. Pretty-print rules are written as SPARQL select-where queries. The *where* clause matches the target subtree to be printed and the *select* clause returns the pretty-printed statement using an external *kg:pprint* function. This function recursively calls the pretty printer, looking for appropriate pretty-print queries for the target subtrees.

We have designed a syntactic extension to SPARQL in order to ease writing pretty-printing rules. Below, an example of template for a SPIN like AST is shown:

```
template {
  "select " ?s
  "\n"
  "where " ?w
}
where {
  ?in ast:select ?s ;
  ast:where ?w
```



}

We were able to write a pretty-printer for a SPIN like complete SPARQL 1.0 AST with 19 templates.

We have designed an extension to our KGRAM SPARQL interpreter that enables to consider an RDF Graph directly as a Query Graph. This enables to compute RDF subgraph matching.

We have completed SPARQL 1.1 implementation with the final version of Property Path (PP) and federated queries (service & bindings). In order to be able to query a SPARQL 1.0 endpoint with PP, we have written a compiler that translates PP into basic graph patterns.

The work on KGRAM is published in [33].

Alban Gaignard from the I3S Modalis team has designed a distributed version of KGRAM to query remote triple stores, in the context of Semantic Federation of Distributed Neurodata. This work is published in [63], [64].

We have implemented a prototype of C-SET Commutative Replicated Data Type for RDF in Corese with Pascal Molli and Luis Ibáñez from U. Nantes [69].

### 6.6.1. *Extracting Graph Patterns to Characterize RDF Data Sources*

This work takes place in the PhD Thesis of Adrien Basse.

Many Semantic Web applications address the issue of integrating data from distributed RDF triple stores. There are several solutions for distributed query processing such as SPARQL 1.1 Federation, which defines extensions to the SPARQL Query Language to support distributed query execution. Such extensions make it possible to formulate a query that delegates parts of the query to a series of services, but one issue remains: how to automate the selection of RDF triple stores containing relevant data to answer a query. This is especially true in the context of the Linking Open Data project where numerous and very heterogeneous datasets are interlinked, allowing for interesting queries across several sources. To decompose and send queries targeting only relevant stores, we need a means to describe each RDF triple store, i.e. an index structure which provides a complete and compact description of the content of the RDF triple store.

To know the content of a RDF triple store, we proposed to use graph patterns as basic structures for index items. In this thesis we present an approach to extract these graph patterns from RDF triple store. For this purpose, we extend Depth-First Search coding (DFS) [104] to RDF labeled and oriented multigraphs and we provide a join operator between two DFS codes so as to sequentially build the different levels of the index structure.

Insertion or deletion of annotations in the triple store may cause changes to the index structure. To handle updates in triple store, we proposed a procedure to identify exactly the changes in the first level of the index structure and propagate them to the following levels. The DFSR (Depth First Search for RDF) coding makes it possible for us to efficiently manipulate graph patterns, but is difficult to read (succession of integer numbers). To facilitate the reading of our index structure, we propose a visualization user-interface and algorithms to turn a DFS code into a more legible format like RDF. Our algorithm relies on Corese/KGRAM [95]. We have tested our algorithm on many datasets. During the building of index structures we keep a set of data in order to help us to better understand the progress of our algorithm and improve it.

### 6.6.2. *Rules for the Web of Data*

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

We have characterized the subset of SPARQL that can be expressed in RIF and, conversely, we have searched for the maximal RIF dialect that can be expressed as SPARQL construct-where queries. This work is published in [71], [72] where we present the implementation of a RIF dialect with a SPARQL Rule Engine in Corese/KGRAM.

We have designed online services for RIF-BLD parsers for presentation syntax and XML syntax <sup>14</sup>. We have also done an online service for RIF-BLD translation into SPARQL and RDF <sup>15</sup>.

<sup>14</sup><http://wimmics-ws.inria.fr/rifparser>

## 6.7. Business Intelligence

**Participants:** Corentin Follenfant, Olivier Corby, Fabien Gandon.

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

Industrial Business Intelligence proposes tools and methods to perform data analysis over heterogeneous enterprise sources. They allow one to harvest, federate, cleanse, annotate, query, organize and visualize data in order to support decision making with human-readable documents such as reports, dashboards, mobile visualizations. Authoring these dynamic documents requires proficiency in technical domains like relational modeling and SQL for one to produce relevant content: end users therefore praise example-driven and information retrieval (IR) systems that help them reusing existing content. Such systems need common structured metadata to enable comparison, search, matching and recommendation of (parts of) documents.

As target data sources are mainly tabular or relational, queries executed to feed the dynamic documents are SQL or derivatives. In [62] we proposed to model these queries as RDF named graphs, and use the graphs as documents annotations. Queries are represented through their abstract syntax trees (AST) represented with RDF graphs. The SQL-specific modeling contribution can therefore be applied to any generic query language. We identified two desirable features for IR systems that deal with queries repositories: search and rewriting, the latter allowing further annotation as well as reconciliation of source relational entities against LOD (Linked Open Data) repositories. On this basis we evaluated SPARQL 1.1 to perform SQL query analysis, i.e. pattern-matching search or rewriting, using in particular property paths. Resulting SPARQL queries are intuitive and concise.

Next steps include a quantitative evaluation by extracting RDF representations from a repository of SQL-fed documents, the production of a library of SPARQL queries that perform generic IR operations against RDF-modelled SQL queries, a formalization of the modeling and operations to compare them with generic tree manipulation methods. In further work we plan to investigate rewriting queries from different languages modelled with language-specific abstract syntax trees to generic abstract syntax trees and experiment cross-language query comparison with SPARQL.

## 6.8. Fuzzy Knowledge Representation

**Participant:** Andrea Tettamanzi.

Andrea Tettamanzi has joined the Wimmics research team in September 2012, after winning a position as a full professor at the University of Nice-Sophia Antipolis. He got a PhD in Computational Mathematics and Operations Research in 1995 from the University of Milan with a thesis on evolutionary algorithms; he became assistant professor at the University of Milan in 1998 and associate professor at the same university in 2002.

His research interests focus on combining different methods of computational intelligence, namely evolutionary algorithms, fuzzy logic, and neural networks, to solve real-world problems in the presence of imprecision, noisy data, and ill-defined optimization criteria, but also on the management of vagueness and uncertainty in knowledge representation, the automatic extraction of knowledge from data, possibility theory and its application to belief revision and goal generation in cognitive agents.

After joining Wimmics, Andrea Tettamanzi has continued work on previous collaborations with other members of the team, namely Serena Villata [76], and has begun exploring with the rest of the team several research axes that could benefit from his contribution.

## 6.9. Emotion Modeling

**Participants:** Franck Berthelon, Imen Tayari, Nhan Le Thanh, Peter Sander.

---

<sup>15</sup><http://wimmics-ws.inria.fr/riftsparql>

In the PhD Thesis of Imen Tayari, an algebraic vector representation model of emotional states was designed. This multidimensional model provides a powerful mathematical tools for the analysis and the processing of emotions. It permits to integrate information from different modalities (speech, facial expressions, gestures) in order to allow more reliable estimation of emotional states. Indeed our proposal aims at efficient recognition of emotional states even when they appear to be superposed or masked. Experiments show the efficiency of the proposed method in detecting basic emotion by giving high recognition rate. This work is published in [39], [41], [43], [40], [42].

In the PhD Thesis of Franck Berthelon, we are working in the domain of affective computing to create an emotion sensitive system. Interaction between human and computer can be improved via such a system because emotion is so important in everyday communication. Our research focuses on serious gaming, particularly on enabling a user and a virtual character to "share" an emotion. The two main problems that arise are:

- How to detect a user's emotions given that the stimulus comes from a virtual environment?
- How to give feedback based on the user's current emotion?

We propose to model emotions as a complex system where data are retrieved from physiological sensors such as heart rate, EMG or EEG. We need to map the multi-sensor data back into a dimensional model of emotion space. Finally, we aim to have an effect on the user's emotional state by varying the stimulus received from the virtual environment. This puts the user into different emotional situations determined by the task to accomplish, with an accompanying effect on their ability to carry out the task.

We developed an application for experimentation purposes; it aims to implement our model using an EEG headset (Emotiv EPOC). This application allows us to generate an emotional map from a slide show of emotion annotated picture. Based on the created map and the real time EEG data, this application can compute a user's instantaneous emotion.

In addition to the first development, we reuse experimental data from MIT to validate our model in a more controlled way. We take the same data, features, signal processing and feature reduction algorithm but instead of using the k-nearest neighbors (KNN) classification algorithm we use our model to identify and annotate discontinuities that represents emotion state changes in accordance with Klaus R. Scherer hypothesis [103].

We are continuing work on validating our model with quantitative results and applying those results on a more realistic system with the application we have developed.

## 6.10. DBpedia in French

**Participants:** Julien Cojan, Fabien Gandon.

The purpose of the project *DBpedia in French* is to extract data from Wikipedia in French and publish it under structured format. Wikipedia content is mainly meant to be read by human and is not suited for use in applications. DBpedia publishes the data extracted from Wikipedia articles in RDF W3C standard for the Semantic Web <sup>16</sup> thus readily available for many applications. For instance, DBpedia is used to generate indexes for cultural resources (e.g. HdA-lab project <sup>17</sup>), it can also be used for mobile applications thanks to the geographic data it contains, or to answer natural language questions, etc.

The original version of DBpedia is focused on the English chapter of Wikipedia. Last versions also contain elements extracted from other chapters, but only when related to a page in English. Articles with no equivalent in English are skipped, leading to a significant number of pages being ignored and so a significant amount of data is lost. For instance, about 49 000 persons and 180 000 places described in the French chapter have no corresponding article in English and are then missing in the English DBpedia. Moreover, the description of the same topic can be different from one chapter to another, reflecting cultural diversity.

<sup>16</sup><http://www.w3c.org/RDF/>

<sup>17</sup><http://hdalab.iri-research.org/hdalab/>

DBpedia in French publishes data extracted from the French Wikipedia in complement to the English DBpedia. Data are linked with the different chapters from the internationalization committee thus providing multilingual resources. In its release from October 2<sup>nd</sup>, DBpedia in French contains 130 million triples describing 1.3 million things, among them 260 000 places, 140 000 persons, 64 000 work pieces and 26 000 organizations.

This project is supported by the Semanticpedia collaboration platform <sup>18</sup> launched November 19<sup>th</sup> 2012 by Aurélie Filipetti, the French Ministry of Culture, Michel Cosnard, CEO of Inria, and Rémi Mathis, CEO of Wikimédia France. Inria currently hosts the project <sup>19</sup> and is the correspondent for the French chapter in DBpedia internationalization committee.

## 6.11. Co-Construction of Community Ontologies

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

PhD Thesis on Co-Construction of Community Ontologies and Corpus in a Limited Technological Environment.

To refresh the memory of people and revive many stories that accompany the creation and daily life of different Africa territories, the establishment of an online sociocultural encyclopedia was conceived. It will be an online platform based on a Geographical Information System (GIS) enriched by a semantic layer allowing access to different information.

In the last decade, we have seen the rise of two visions of the Web: on one side the Social Web or Web 2.0, which places users at the heart of the Web, they are no longer spectator but become editor of the content of Web pages. On another hand, the Semantic Web proposes knowledge representations (ontologies) that allow machines (software agent) to better understand data on the Web. Both aims were often opposed, but there are a lot of work trying to combine these visions.

In our work, oriented in this direction, we will try to create a new point of view of Community concept within the Web. Community is a group of people who share a common set of values and interests. This shift of view allows us to address a specific community as an atomic entity and focus this time on the sharing of knowledge between communities. The second challenge is to combine Social Web and Semantic Web technologies. Using Semantic Web in our social network, we have a semantic layer that provides access to various information contained in the network. Furthermore, the Semantic Web opens up a semantic approach to social network analysis, which also allows extracting new knowledge.

In this thesis, we study the implementation of an online platform to build and share the collective memory of citizens and revive many stories by using a semantic layer. Semantic Social Network Analysis will allow us to present data in eye-catching way and in another view. This platform will be updated by the actors and the citizens of these territories, and share their history and heritage through their "social network".

## 6.12. Semantic Wiki

**Participants:** Pavel Arapov, Michel Buffa.

A Wiki is a Web site that lets users create and edit content collaboratively. A Wiki engine is a programming base to create Wiki sites. In this PhD Thesis, our approach to the creation of a Wiki engine is to use an application on the Wiki pages and semantic meta-data. Our vision for the Wiki pages is that a Wiki page is an application. We do not work with static data on the Internet neither in a Wiki, now it is a Web application that contains the source code of the application interface, as well as the data for display. Application is able to retrieve and update data based on Linked Data principles on each page load, updating their sources as needed and showing only relevant information. This work is published [51], [52].

## 6.13. Discovery Hub

**Participants:** Nicolas Marie, Fabien Gandon, Damien Legrand.

---

<sup>18</sup><http://semanticpedia.org>

<sup>19</sup><http://fr.dbpedia.org>

Nicolas Marie is PhD student in collaboration with Alcatel-Lucent Bell Labs (Cifre). He is the project leader of Discovery Hub: a discovery engine on the top of DBpedia using real-time spreading activation.

We continue the CRE and CIFRE PhD Thesis (2011-2013) initially on Social objects, object-centered sociality, and object-centered social networks to propose mobile context-based notification application in a semantic and pervasive Web. The work evolved toward exploratory search, discovery and recommendation. Web growth, both in size and diversity, and users' growing expectations increase the need for innovative search approaches and technologies. Exploratory search systems are built specifically to help user in cognitive consuming search tasks like learning or investigation. Some of these systems are built on the top of linked data and use its semantic richness to provide cognitively-optimized search experiences. This work addresses the question of real-time linked data processing for exploratory search purposes. This live aspect offers advantages in terms of query expressivity and data dynamicity-handling.

To achieve this goal we propose a real-time semantic spreading activation algorithm (RTSA) which process linked data on-the-fly. This live aspect offers advantages in data dynamicity handling and query expressivity. Approximation strategies, algorithm behavior study and user evaluation related to RTSA algorithm are currently performed. The work includes a study of its behavior on DBpedia and a validation of its relevance through a user evaluation. Finally we also implemented a real deployment introducing the Discovery Hub prototype. It is an exploratory search engine offering advanced querying, browsing and explanation strategies for discovery purposes.

This algorithm is deployed in the Discovery Hub prototype <sup>20</sup>, a discovery engine interfaced with services. Discovery Hub aims to help users to make numerous discoveries starting from its interests. The application works on DBpedia data including local version like fr.dbpedia.org (hosted by Inria/Wimmics). It also makes extensive use of the Corese/KGRAM Semantic Web Factory. Application front-end was designed and developed by Damien Legrand during an internship.

The application was presented during the Semanticpedia day, organized by official French language delegation <sup>21</sup>.

Nicolas Marie is also active in the Web Science community [36].

## 6.14. Semantic Newsfeed Aggregation

**Participant:** Christophe Desclaux.

Christophe was this year in his last year of engineering school at Polytech UNS in the KIS speciality. During his end of course project he worked on the RSS feed aggregation using Named Entities Recognition. He presented his research project to the student contest *Boost Your Code* organized by Inria. The aim of the contest is to offer to a junior engineer a one year full time contract to work on an innovating OpenSource project. Christophe won the contest and is now part of the Wimmics team since november 2012. The ZONE project <sup>22</sup> provides a specialized tool for monitoring domain. ZONE semantically increases news for a better classification for the user. Christophe will work in collaboration with the team on documents clustering, natural language processing and RDF datastores.

## 6.15. Linked Justifications

**Participants:** Rakebul Hasan, Fabien Gandon.

Semantic Web applications use inferential capabilities and distributed data in their reasoning. Users often find it difficult to understand how these applications produce their results. Hence, users often do not trust the results these applications produce. Explanation-aware Semantic Web applications provide explanations of their reasoning. Explanations enable users to better understand reasoning of these application. Users can use this additional information about reasoning to make their trust decisions.

<sup>20</sup><http://semreco.inria.fr/>

<sup>21</sup>[http://www.dgllff.culture.gouv.fr/Actualites/Programme\\_Semanticpedia.pdf](http://www.dgllff.culture.gouv.fr/Actualites/Programme_Semanticpedia.pdf)

<sup>22</sup><http://zone-project.org>

The emergence of Linked Data offers opportunities for large-scale reasoning over heterogeneous and distributed data. Explaining reasoning over Linked Data requires explaining how these distributed data were produced. Publishing also the explanation related metadata as Linked Data enables such explanations. Justifications are metadata about how a given piece datum is obtained. We introduce the concept of Linked Justifications and provide guidelines to publish justifications as Linked Data in [67]. We published the *Ratio4TA*<sup>23</sup> (interlinked justifications for triple assertions) vocabulary to describe justifications. *Ratio4TA* extends W3C PROV Ontology<sup>24</sup> to promote interoperability.

In [89], [66], we analyze the existing explanation-aware Semantic Web systems. The existing systems inherit explanation features from explanation-aware expert systems. These explanations are targeted to expert users, such as knowledge engineers, with detailed information about all the execution steps of reasoners of these applications. Unlike the expert systems, users of Semantic Web applications have diverse background - from expert knowledge engineers who are interested in every details of the reasoning, to regular users who do not have any background in reasoning, logic, or ontologies. These non-expert users might feel overwhelmed with all the execution details of reasoners. To address this issue, we propose summarized and relevant explanations to users. Users can specify their explanation goals - types of information they are interested in. We take into consideration the explanation goals when we present explanations and summarize explanations. We use centrality and similarity matrices to summarize and provide relevant explanations.

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

### 6.16.1. Analyzing and Modeling the Sharing and Articulation of Representations

**Participants:** Alain Giboin, Gessica Puri.

#### Comparing and Bridging Models of Representation Sharing Processes

Context: Follow-up to the RefCom joint research action of the GDR CNRS Psycho-Ergo, in collaboration with Pascal Salembier (UTT, France).

We continued our work on comparing and bridging models of representation sharing processes (see Edelweiss activity report 2011) in order to achieve mutual intelligibility between researchers working on such models. We extended at the European level the test and application of the grid we elaborated for collaboratively comparing and bridging the conceptualizations [86], [65].

#### Methods and tools for articulating developers, domain experts, users and usage analysts' representations

##### Reconciling informal and formal representations through the ECCO collaborative ontology editor

Context: Follow-up to the ANR project e-WOK HUB, in collaboration with Priscille Durville (a former Inria expert engineer, currently engineer at Xerox), Sandrine Grataloup and Olivier Morel (BRGM), Michel Perrin (ENSMP)

In a new publication [81], we reported the method we designed and proposed to geologists and knowledge engineers to help them jointly define domain ontologies from textual documents. The method is instrumented through a collaborative ontology editor (ECCO) which integrates two tools for automatic analysis of natural language. ECCO allows articulating the informal representations formulated by geologists in natural language and the knowledge engineers' fully formalized ontology-based representations that can be processed automatically by a semantic search engine like Corese.

#### Frameworks and Toolsets

Context 1: Capitalizing methods and tools developed in the Wimmics (formerly Edelweiss) team

<sup>23</sup><http://ns.inria.fr/ratio4ta/>

<sup>24</sup><http://www.w3.org/TR/prov-o/>



We started to integrate into a general framework the methods and tools developed in the Wimmics (formerly Edelweiss) team to help developers, domain experts, users and usage analysts reconcile their views in order to design user-adapted social semantic applications. A preliminary presentation of the framework was given in the interdisciplinary seminar mentioned in Section "Invited Talks".

Context 2: PhD thesis of Gessica Puri and Wimmics projects related to visualization and manipulation of links.

We are currently developing 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 [90]. A first version of the toolset is being validated by developers of the team.

### 6.16.2. Scenario Modeling and User Modeling for system design and evaluation

**Participants:** Alain Giboin, Gessica Puri.

In the context of different design projects, we applied, adapted or renewed some of our scenario and user modeling methods.

Context 1: ISICIL project. In collaboration with Rubiela Silva (UNS & Ademe), Claire Prendleloup (Ademe), Mylène Leitzelman (Telecom ParisTech)

In order to evaluate the usefulness and usability of the ISICIL platform (see 6.2) for one of the communities of potential users of the platform (the French Environment and Energy Management Agency), we adapted in particular: (a) a technique for modeling collectives and their related scenarios to prepare testing situations as close as possible to real situations met by the potential users; and (b) an existing set of collective heuristics, i.e., heuristics formerly designed to evaluate groupware; see, e.g. [93]. We also proposed the technique of *Online collaborative sessions* supported by the ISICIL communication functionalities (chat and comments) as a writing-based version of the *think out loud* protocol. These techniques are partly described in [91], [92].

Context 2: PAL project, in collaboration with David Daney (Coprin), Rémi Barraquand (Prima), Nadine Mandran (Pôle d'Ingénierie Multidisciplinaire du Laboratoire d'Informatique de Grenoble)

In this work we applied and adapted techniques for articulating system-oriented scenarios (coming from robotics and computer vision specialists) and user-oriented scenarios. These scenarios were intended to guide the design of useful and usable services improving the autonomy and quality of life for elderly and fragile persons. An output of this work has been the organization of workshop where PAL researchers were invited to specify the scenarios motivating the development of their services.

Context 3: Projects *Socio-cultural encyclopedia of Senegalese communities* and *Global Warming Platform – Papa Fary Diallo* (Wimmics PhD student), Fatou Kamara and Moussa Lo (Université Gaston-Berger, Saint-Louis, Sénégal)

We started to apply techniques for modeling groups of users and their related scenarios to the design of social semantic applications aimed at (a) communities wanting to adapt these applications to their own culture, and (b) at communities including persons from different specialties (geographers, mathematicians) and laypersons which want to collaborate on global warming issues.

Context 4: Discovery Hub project, PhD thesis of Nicolas Marie, in collaboration with Florentin Rodio (Alcatel Lucent); also related to the PhD thesis of Gessica Puri.

In order to perform a user-oriented evaluation of the Discovery Hub recommender system (see 6.13 and [100]), we used techniques allowing to define more realistic scenarios of interaction with the recommender system from the user's point of view, and to analyze users' cognitive processes when they interact with the system (e.g., when they select recommended items or when they assess the quality of a recommendation with and without explanations).

### 6.16.3. Exploring eye-tracking techniques for evaluating information organization aspects in Web applications

**Participants:** Valérie Dusaucy, Alain Giboin.

Context: collaboration with Valérie Dusaucy (PhD student, University of Aix-Marseille & CIFRE Société Ausy) and Franck Ferront (ergonome, Société Ausy)

We designed an experiment to explore the potentiality of eye-tracking techniques for evaluating information organization aspects in Web applications from a user's point of view, and to compare it to other evaluation techniques such as heuristic evaluation. The experiment, which takes place in the Ubiquarium of the I3S Laboratory, is in progress.

## 7. Bilateral Contracts and Grants with Industry

### 7.1. Alcatel Lucent Bell

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*.

## 8. Partnerships and Cooperations

### 8.1. Regional Initiatives

Nhan Le Thanh is animator of a multidisciplinary working group (PSP) on personalized eHealth in the Alpes-Maritimes department.

### 8.2. National Initiatives

#### 8.2.1. 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 project 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>

#### 8.2.2. 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>



### 8.2.3. 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 efficient. 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>

### 8.2.4. ANR OCKTOPUS

This new ANR project is starting in December 2012. 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.

We believe that this approach will maximize the scientific, economic and social impact of OCKTOPUS by giving high visibility to the research results produced by our academic partners, and by providing a direct route to transfer these results to the internet marketplace through Alcméon's commercial products.

Partners: Alcméon, CRG, Inria Wimmics.

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

### 8.2.5. CNRS Mastodons CrEDIBLE

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 [33], [63], [64].

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

### 8.2.6. Inria Large scale initiative action PAL

Wimmics entered this year the Inria large scale initiative Personal Assistant Living (PAL), devoted to the assistance to elderly and fragile people. Our contribution in PAL is described in section 6.16.2.

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

### 8.2.7. Follow up: GDR I3I

In the continuation of a specific action (AS) *Interopérabilité des Systèmes d'Information et Ingénierie des Modèles*, funded by GDR I3I in 2011, C. Faron-Zucker worked in 2012 on a synthesis work on the contributions of model driven engineering to the interoperability of information systems [45]. She was specially involved on model and data integration issues which can also be found in the CrEDIBLE project.

## 8.3. International Initiatives

### 8.3.1. Participation In International Programs

#### LIRIMA, Senegal

The Wimmics team participates to the LIRIMA <sup>25</sup>.

We have a collaboration with Moussa Lo, Computer Science department of university Gaston Berger at Saint-Louis in Senegal. We participate to a AUF funded project: *Social Semantic Web Platform for Knowledge Sharing in West-africa Communities*

#### U. of Annaba, Algeria

Catherine Faron-Zucker is responsible in France of a scientific collaboration project with the LabGed laboratory of university of Annaba funded by CNRS and DPGRF (Algeria). This project aims to study the personalization and socialization of ubiquitous e-learning systems based on Semantic Web models and techniques. In this framework, she co-supervise with Algerian colleague Hassina Seridi two PhD students at LabGed.

In 2012, Khaled Halimi continued the development of a personal learning system with the aim of providing for each user a personal space according to his/her profile, providing intelligent recommendations based on the analysis of the user's interactions, relations and activities, recommending to students the best learning paths according to the recommendation of the best collaborators and the best learning resources, making all users aware of what happens in the system.

Samia Beldjoudi is working on the personalization of resource recommendations based on the analysis of tag-based user profiles; in 2012 she focused on social interactions between the folksonomy's members in order to extract the meaning of terms and overcome the problems of tags' ambiguity and spelling variations [25].

## 8.4. International Research Visitors

### 8.4.1. Visits of International Scientists

#### 8.4.1.1. Internships

*Eric Toguem (October 8th to November 27th)*

Subject: *Distributed LOD*

Institution: *University Yahoundé (Cameroun)*

*Fatou Kamara (November 5th to 15th)*

Subject: *Semantic Distance*

Institution: *University Gaston Berger (Saint-Louis, Senegal)*

## 9. Dissemination

### 9.1. Scientific Animation

#### Zeina Azmeh

---

<sup>25</sup><http://www.lirima.uninet.cm/>

Reviewer for the 9th international conference on Concept Lattices and their Applications (CLA 2012), and Program Committee member of the 3rd international conference on Cloud Computing and Services Science (CLOSER 2013).

**Michel Buffa** Program Committee member of WWW Demo track, WWW Workshop on Semantic Web Collaborative Spaces (SWCS).

#### **Elena Cabrio**

Program Committee member of the *1st Joint Conference on Lexical and Computational Semantics (\*SEM 2012)*, and of *Semantic Relations-II. Enhancing Resources and Applications workshop*, at LREC 2012 (Language Resources and Evaluation Conference). Moreover, she was part of the Evaluation Committee assigning the Best PhD Dissertation Award of ATALA 2012 (French computational linguistics member association).

#### **Olivier Corby**

Program committee member of EKAW, IC, CNRIA, IIS, CWC ECAI Workshop, IJMSO, More-BI, SOS DLWD, WWW demo track.

With Catherine Faron-Zucker and Johan Montagnat (I3S, Modalis), organization of a three days workshop for the CrEDIBLE Mastodons CNRS Research Program (15 to 17 october)<sup>26</sup>.

He is member of W3C SPARQL 1.1 WG.

#### **Catherine Faron-Zucker**

Reviewer, Program Committee member of:

IJHCS, KEOD, AKDM, Special Track on Peer Reviewing (PR) of the Int. Conf. on Knowledge Generation, Communication and Management (KGCM), KSE, IC, EGC Maghreb, JEESI, CNRIA.

Reviewer for ANR, Crédit Impôt Recherche DRRT Ile-de-France, "Bonus Qualité Recherche" (BQR) for scientific council of university Paris 13.

#### **Fabien Gandon**

Reviewer:

Journals: Advances in Knowledge Discovery and Management, Semantic Web Journal special issue on Linked Datasets Descriptions.

Conferences: AINA, EGC, ESWC, FutureTech, Hypertext, IC, ISWC, RFIA, SAC, SemWeb.Pro, TOTh, WebS, WebScience, WI.

He was general co-chair of WWW at Lyon.

Workshops:

AImWD, LDOW, MARAMI, MSM, SocialComNet, SOS, SPIM, SSNAD, SWCS.

#### **Alain Giboin**

Member of the program committee of COOP, DeViNT, IC, I-SEMANTICS.

Reviewer for the International Journal of Human-Machine Studies.

Reviewer for the ANR CONTINT program.

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

Co-organizer – with Pascal Salembier (Université de Technologie de Troyes, France), Carla Simone (Università Milano Bicocca, Italy), and Cyril Bossard (UFR STAPS de Brest, France) – of the Workshop *Do We Really Need to Share to Cooperate?*, in conjunction with COOP'2012, The 10th International Conference on the Design of Cooperative Systems, Marseille, France, May 29th.

<sup>26</sup>[https://credible.i3s.unice.fr/doku.php?id=atelier\\_15-17\\_octobre](https://credible.i3s.unice.fr/doku.php?id=atelier_15-17_octobre)

**Nhan Le Thanh**

Program committee member of the 2nd International Conference on Model & Data Engineering (MEDI2012) and the 4th International Conference on Knowledge and Systems Engineering (KSE 2012).

**Isabelle Mirbel**

Member of the editorial board of the journal *Ingénierie des Systèmes d'Information* (Hermès).

Co editor of a special issue of the *International Journal of Information System Modeling and Design* (IGI Global) Volume 4, 2012.

PC member 24th International Conference on Advanced Information Systems Engineering (CAISE 2012).

PC member for the workshop *Ontologies et Jeux de Données pour évaluer le web sémantique (OJD)* in conjunction with 23ièmes journées francophones d'ingénierie des connaissances.

Reviewer for the *Requirements Engineering Journal* (Springer).

Reviewer for ODBase 2012.

PC member Doctoral Consortium of INFORSID 2012.

Co-chair of the doctoral consortium of *24th International Conference on Advanced Information Systems Engineering*.

**Andrea Tettamanzi**

Program co-chair of the "EvoFin" track of the EvoApplications 2013 conference and as the chair of Evo-Transfer, a technology-transfer event, now in its 2nd edition, in the framework of Evo\* 2013. Referee for the Information Sciences journal, the Computational Intelligence journal, and the Journal of Data Semantics. Program committee member of the IAT 2012 and PPSN 2012 conferences.

**Serena Villata**

Co-organizer and co-chair of the first workshop on "Artificial intelligence meets the Web of Data (AImWD)" which was co-located with the European Conference on Artificial Intelligence (ECAI-2012).

Program committee member of international journals, conferences and workshops in computer science. In particular, among others: Journal of Logic and Computation, Synthese, Journal of Approximate Reasoning, AAMAS-2012, AImWD-2012.

She is part of the W3C Working Group on the Linked Data Platform which has the aim to develop the specifications for HTTP interaction with Linked Data.

**9.2. Teaching - Supervision - Juries****9.2.1. Teaching**

**Semantic Web:** 36h. L2, IUT Nice UNS, France.

Participants: Olivier Corby, Catherine Faron-Zucker.

**Semantic Web:** 45h. Master 2, IFI KIS PolyTech Nice, UNS, France.

Participants: Olivier Corby, Catherine Faron-Zucker, Fabien Gandon.

**Knowledge Engineering:** 20h. Master 2, IFI KIS PolyTech Nice, UNS, France.

Participants: Catherine Faron-Zucker, Fabien Gandon, Andrea Tettamanzi.

**Semantic Web:** 2h. Ecole Centrale Paris.

Participant: Fabien Gandon.

**Semantic Web:** 3h. ENS Cachan.

Participant: Fabien Gandon.

**Semantic Web:** 3h. Miage UNS

Participant: Fabien Gandon.

- Semantic Web:** 8h. URFIST Rennes.  
Participant: Fabien Gandon.
- Human-Computer-Interaction (HCI) Design and Evaluation:** 35h. Master 2, PolyTech Nice, UNS.  
Participant: Alain Giboin
- Post WIMP interaction paradigms and interface evolution:** 4h. Master 2 Polytech UNS.  
Participant: Alain Giboin.
- Task and Activity Analysis for HCI design and evaluation:** 6h, Master 2 *Sociology and Ergonomics of Digital Technologies*, UNS  
Participant: Alain Giboin
- Place of Ergonomics in Agile Projects:** 2h. Licence Pro IDSE, IUT, UNS.  
Participant: Alain Giboin.
- Web Services:** 36h. MASTER MIAGE 2, UNS.  
Participant: Serena Villata
- Web Services:** 42h. MASTER MIAGE 2, UNS.  
Participant: Zeina Azmeh.
- Object Oriented Design: UML & OCL:** 36h. L3 MIAGE, UNS.  
Participant: Maxime Lefrançois.
- Object Oriented Programming: Java:** 18h. L3 MIAGE, UNS.  
Participant: Maxime Lefrançois.
- Enterprise Components Architecture: Java EE 6, EJB 3.1, JSF 2.0:** 13h. M2 MIAGE UNS  
Participant: Maxime Lefrançois.
- XML Technologies:** 36h. Master 1 MIAGE, UNS.  
Participant: Elena Cabrio.
- Web Programing:** 30h. DUT Info S1 et S2 at IUT, UNS.  
Participant: Nhan Le Thanh.
- Design tools and Programming with relational DBMS:** 105h. DUT S3 Info at IUT, UNS.  
Participant: Nhan Le Thanh.
- Theoretical basis of Computation:** 45h. DUT S4 Info at IUT, UNS.  
Participant: Nhan Le Thanh.
- Logical Data Models and languages:** 24h. Licence Pro Info LP3 at UNS.  
Participant: Nhan Le Thanh.
- Design and Development of DBMS services:** 24h. Licence Pro Info LP3 at UNS.  
Participant: Nhan Le Thanh.
- Architecture of Software Engineering:** 12h. Licence Pro Info LP3 at UNS.  
Participant: Nhan Le Thanh.
- Introduction to the Web:** 37h. Licence 1, UFR Sciences UNS.  
Participant: Andrea Tettamanzi.
- Algorithmics, Object Oriented Programming, Python:** 50h. Licence 2, UFR Sciences UNS.  
Participant: Andrea Tettamanzi.
- Distributed Systems:** 18h. Master MIAGE 1, UFR Sciences UNS.  
Participant: Andrea Tettamanzi.
- Web 2.0, Web Services, HTML5:** 40h. Master 2 UNS.  
Participant: Michel Buffa.
- Distributed Web Development:** 40h. Master 2 UNS.  
Participant: Michel Buffa.

**Web Technologies:** 40h. Master 1 UNS.

Participant: Michel Buffa.

**Java Certification:** 25h. Master 2 UNS.

Participant: Michel Buffa.

**Plasticity of User Interfaces, HTML5:** 8h. Master 2 Polytech UNS.

Participant: Michel Buffa.

**New Interaction Means, HTML5:** 8h. Master 2 Polytech UNS.

Participant: Michel Buffa.

**Linux shell:** 66h. IUT UNS.

Participant: Franck Berthelon.

**Linux:** 24h. IUT UNS.

Participant: Khalil Bouzidi.

**DBMS and J2EE:** 22h. IUT UNS.

Participant: Khalil Bouzidi.

**Langages for documents : XML, XSD et XSL:** 32H. Master 2 UNS.

Participant: Catherine Faron-Zucker.

**Network Programming:** 12h. Master 1 UNS.

Participant: Catherine Faron-Zucker.

**Object Oriented Programming and Algorithmics:** 130h. Licence 3 UNS.

Participant: Catherine Faron-Zucker.

**Statistical Data Analysis:** 39h. Licence 3 UNS.

Participant: Catherine Faron-Zucker.

**HTML5 :** W3C Online Course, delivers a W3C certification.

Participant: Michel Buffa.

**HTML5 :** Tutorial at WWW Conference, April 2012, Lyon, France.

Participant: Michel Buffa.

**Argumentation for Agent Societies:** Summer School at EASSS 2012.

Participant: Serena Villata.

### 9.2.2. Supervision

PhD:

Adrien Basse, *Extracting Graph Patterns to Characterize RDF Data Sources*, University Gaston Berger, Saint-Louis, Sénégal, december 10th, Fabien Gandon;

PhD in progress :

**Pavel Arapov**, *Semantic Application Wiki*, UNS, Michel Buffa, Nhan Le Thanh ;

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

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

**Luca Costabello**, *Mobile Access to the Web of Data* Inria, UNS, Fabien Gandon, Ivan Herman;

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

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

**Rakebul Hasan**, *Explanations for Social Semantic Web*, UNS, Fabien Gandon;

**Maxime Lefrançois**, *Collaborative multilingual management of interlingual knowledge bases*, Inria, UNS, Fabien Gandon, Christian Boitet;

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

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

**Imen Tayari**, *Representation, Annotation and Detection of Emotions in Multimodal Signals* , Sfax, UNS, Nhan Le Thanh and Chokri Ben Amar;

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

### 9.2.3. *Juries*

Fabien Gandon was jury member of

HdR:

Talel Abdesslem, *Complex data management: spatio-temporal data, XML and the Web*, Télécom ParisTech, January 4th, (Reviewer).

PhD Thesis:

Antoine Seilles, *Structuration de débats en ligne à l'aide d'Annotations socio-sémantiques. Vers une analyse de réseaux sociaux centrés sur l'interaction*, January 25th, LIRMM, (Reviewer).

Benoit Mathern, *Découverte interactive de connaissances à partir de traces d'activité : Synthèse d'automates pour l'analyse et la modélisation de l'activité de conduite automobile*, March 12th, LIRIS, (Reviewer).

David Rouquet, *Multilinguisation d'ontologies dans le cadre de la recherche d'information translingue dans des collections d'images accompagnées de textes spontanés*, IMAG, April 6th, (Examiner).

Damien Leprovost, *Découverte et analyse des communautés implicites par une approche sémantique en ligne : l'outil WebTribe*, LE2I Université de Bourgogne, November 30th , (Examiner).

Milan Stankovic, *Web Social Sémantique: Applications dans l'innovation sur le Web*, December 7th, university Paris-Sorbonne (Reviewer).

Alice Hermann, *Création et mise à jour guidée d'objets dans une base de connaissances*, December 17th, IRISA INSA Rennes, (Examiner).

### 9.2.4. *Invited Talks*

**Michel Buffa:**

*HTML5 for audio applications*, invited talk for the "Le Web des fonctions" conference, organized by the "Centre de Création Musicale" GRAME, Lyon, France, June 27th.

*Social Network Analysis and Semantic Web*, invited talk at the Summer School about "Knowledge Dynamics, Industry Evolution, Economic Development", organized by GREDEG (UNS and CNRS), July 9-13th, Nice.

#### **Elena Cabrio & Serena Villata**

*Natural Language Arguments: A Combined Approach*, invited talk at the 12th International Workshop On Computational Models of Natural Argument (CMNA 12), co-located with ECAI 2012, Montpellier, France, August.

*Natural Language Arguments: Results and Challenges*, invited talk at University of Liverpool - Department of Computer Science, December 12th,

#### **Olivier Corby:**

Invited Speaker at RISE Workshop (Recherche d'Information Sémantique) held at EGC, Bordeaux, January 31st: *Un peu de (Web) sémantique pour la recherche d'information*.

Invited Speaker at Xerox Research Center, Grenoble, May 29th: *Corese Semantic Web Factory*.

#### **Fabien Gandon:**

Conference SIIE <sup>27</sup>, *Semantic and Social Intraweb for Corporate Intelligence and Watch*. February 18th.

Séminaire D'Alembert <sup>28</sup>, *Web sémantique et social : nouvelles pratiques de recherche et circulation des savoirs sur le Web 3.0*, March 14th.

SophiaConf <sup>29</sup>, *DataLift: Un catalyseur pour le Web de données*, July 4th.

Ercim ABCDE, *Wimmics research presentation*, October 25th.

Journées de la Recherche IGN, *Web sémantique et Web social: deux étapes vers les données liées d'un Web ubiquitaire*, March 9th.

IST Seminar <sup>30</sup>, *L'avenir du Web au prisme de la ressource*, September 30th-October 5th.

#### **Alain Giboin:**

*The culture of sharing in social medias (networks): How do computer scientists and usage analysts reconcile their views to design user-adapted social medias?* - Interdisciplinary seminar *Culture, numérique & culture numérique*, CERI, Avignon, April 5.

This seminar included another invited talk - *Le numérique et l'humain* - given by Claude Kirchner, Délégué général à la recherche et au transfert pour l'innovation (Inria).

## 9.3. Popularization

#### **Fabien Gandon**

ENS Lyon Visit, Wimmics researchs presentation, November 8th.

Inria Industrie Finance meeting <sup>31</sup>, April 3rd.

Scientific mediation séminaire (SMS), January 23rd.

Textes et documents pour la classe (TDC 1042 "Internet"), *Web : tout est lié*.

Lycée Audiberti, Antibes, *Les quatre aveugles et l'éléphant Web*, May 10th.

Aniversary SAER, *Les labyrinthes du Web*, June 12th.

#### **Michel Buffa & Maxime Lefrançois**

Participation to *Fête de la science*, October 10th-14th.

<sup>27</sup><http://siec2012.loria.fr>

<sup>28</sup><http://www.centre-dalembert.u-psud.fr/#S4>

<sup>29</sup><http://www.sophiaconf.fr>

<sup>30</sup><http://www.inria.fr/ist2012>

<sup>31</sup><http://www.inria.fr/centre/saclay/innovation/rii-finance/programme>



## 10. Bibliography

### Major publications by the team in recent years

- [1] O. CORBY. *Web, Graphs & Semantics*, in "Proc. of the 16th International Conference on Conceptual Structures (ICCS'2008)", Toulouse, July 2008, p. 43-61.
- [2] O. CORBY, R. DIENG-KUNTZ, C. FARON-ZUCKER. *Querying the Semantic Web with Corese Search Engine*, in "Proc. of the 16th European Conference on Artificial Intelligence (ECAI'2004), Prestigious Applications of Intelligent Systems", Valencia, Spain, R. L. DE MANTARAS, L. SAITTA (editors), August 22-27 2004, p. 705-709.
- [3] O. CORBY, R. DIENG-KUNTZ, C. FARON-ZUCKER, F. GANDON. *Searching the Semantic Web: Approximate Query Processing based on Ontologies*, in "IEEE Intelligent Systems & their Applications", January-February 2006, vol. 21, n<sup>o</sup> 1, p. 20-27.
- [4] O. CORBY, R. DIENG-KUNTZ, C. HEBERT. *A Conceptual Graph Model for W3C Resource Description Framework*, in "Conceptual Structures: Theory, Tools and Applications, Proc. of the 8th Int. Conference on Conceptual Structures (ICCS'2000)", Darmstadt, Allemagne, B. GANTER, G. W. MINEAU (editors), Springer-Verlag, LNAI n. 1867, August 13 -17 2000, p. 468-482.
- [5] O. CORBY, C. FARON-ZUCKER. *RDF/SPARQL Design Pattern for Contextual Metadata*, in "Proc. of IEEE/WIC/ACM International Conference on Web Intelligence", Silicon Valley, USA, November 2007.
- [6] A. DELTEIL, C. FARON-ZUCKER. *A Graph-Based Knowledge Representation Language*, in "Proceedings of the 15th European Conference on Artificial Intelligence (ECAI 2002)", Brighton, Lyon, France, F. VAN HARMELEN (editor), IOS Press, July 21- 26 2002, p. 297-301.
- [7] R. DIENG-KUNTZ, O. CORBY, F. GANDON, A. GIBOIN, J. GOLEBIEWSKA, N. MATTA, M. RIBIÈRE. *Knowledge Management: Méthodes et outils pour la gestion des connaissances, 3rd edition*, DUNOD, Octobre 2005.
- [8] G. ERÉTÉO, M. BUFFA, F. GANDON, O. CORBY. *Analysis of a Real Online Social Network using Semantic Web Frameworks*, in "Proc. International Semantic Web Conference, ISWC", Washington, USA, October 2009, General Interest paper.
- [9] F. GANDON, O. CORBY, A. GIBOIN, N. GRONNIER, C. GUIGARD. *Graph-based Inferences in a Semantic Web Server for the Cartography of Competencies in a Telecom Valley*, in "Proc. International Semantic Web Conference, ISWC", Galway, Springer, Lecture Notes in Computer Science, November 6-10 2005.
- [10] A. GIBOIN. *Conversational Remembering in Teams of Road Accident Analysts: Using a Model of Collective Memory for Designing an Organizational Memory System*, in "Le Travail Humain", 2000, vol. 63, n<sup>o</sup> 3, p. 227-257.
- [11] K. KHELIF, R. DIENG-KUNTZ, P. BARBRY. *An Ontology-based Approach to Support Text Mining and Information Retrieval in the Biological Domain*, in "Journal of Universal Computer Science (JUCS), Special Issue on Ontologies and their Applications", December 2007, vol. 13, n<sup>o</sup> 12.

- [12] I. MIRBEL, J. RALYTE. *Situational Method Engineering : Combining Assembly-Based and Roadmap-driven Approaches*, in "Requirement Engineering Journal", 2006, vol. 11, n<sup>o</sup> 1, p. 58–78.

## Publications of the year

### Doctoral Dissertations and Habilitation Theses

- [13] A. BASSE. *Extracting Graph Patterns to Characterize RDF Data Sources*, University Gaston Berger, Saint-Louis, Sénégal, UNS, December 2012.

### Articles in International Peer-Reviewed Journals

- [14] E. CABRIO, J. COJAN, A. PALMERO APROSIO, F. GANDON. *Natural Language Interaction with the Web of Data by Mining its Textual Side*, in "Intelligenza Artificiale. Special Issue on Natural Language Processing in the Web Era", 2012, vol. 6.2, to appear.
- [15] S. VILLATA, G. BOELLA, DOV M. GABBAY, J. HULSTIJN, L. VAN DER TORRE. *A Logic of Argumentation for Specification and Verification of Abstract Argumentation Frameworks*, in "Annals of Mathematics and Artificial Intelligence", 2012.
- [16] S. VILLATA, G. BOELLA, DOV M. GABBAY, L. VAN DER TORRE. *A Socio-Cognitive Model of Trust using Argumentation Theory*, in "International Journal of Approximate Reasoning", 2012.
- [17] S. VILLATA, G. BOELLA, DOV M. GABBAY, L. VAN DER TORRE. *Modelling Defeasible and Prioritized Support in Bipolar Argumentation*, in "Annals of Mathematics and Artificial Intelligence", 2012.
- [18] S. VILLATA, L. COSTABELLO, N. DELAFORGE, F. GANDON. *A Social Semantic Web Access Control Model*, in "Journal on Data Semantics", November 2012, <http://link.springer.com/article/10.1007/s13740-012-0014-9>.

### Articles in Non Peer-Reviewed Journals

- [19] K. BOUZIDI, B. FIES, C. FARON-ZUCKER, A. ZARLI, N. LE THANH. *Semantic Web Approach to Ease Regulation Compliance Checking in Construction Industry*, in "Future Internet", 2012, vol. 4, n<sup>o</sup> 3, p. 830–851.
- [20] A. MONNIN, H. HALPIN. *The artifactualization of reference and "substances" on the Web. Why (HTTP) URIs do not (always) refer nor resources hold by themselves*, in "American Philosophical Association Newsletter on Philosophy and Computers", 2012, n<sup>o</sup> 11, [http://www.apaonline.org/APAOnline/Publication\\_Info/Newsletters/APAOnline/Publications/Newsletters/HTML\\_Newsletters/Vol11N2Spring2012/Computers.aspx#Monnin](http://www.apaonline.org/APAOnline/Publication_Info/Newsletters/APAOnline/Publications/Newsletters/HTML_Newsletters/Vol11N2Spring2012/Computers.aspx#Monnin).
- [21] A. MONNIN, H. HALPIN. *Towards a Philosophy of the Web: Foundations and Open Problems*, in "Metaphilosophy", 2012, vol. 43, n<sup>o</sup> 4, special issue "Towards a Philosophy of the Web".
- [22] A. MONNIN. *Philosophie et ingénierie du Web*, in "Implications Philosophiques", 2012, <http://www.implications-philosophiques.org/actualite/une/philosophie-et-ingenierie-du-web/>.
- [23] A. MONNIN. *L'ingénierie philosophique comme design ontologique : retour sur l'émergence de la "ressource"*, in "Archéologie des nouvelles technologies, revue Réel-Virtuel : enjeux du numérique", 2012, n<sup>o</sup> 3, <http://reelvirtuel.univ-paris1.fr/index.php?revue-en-ligne/3-monnin/2/>.

### International Conferences with Proceedings

- [24] P. BARONI, G. BOELLA, F. CERUTTI, M. GIACOMIN, L. VAN DER TORRE, S. VILLATA. *On Input/Output Argumentation Framework*, in "Proc. 4th International Conference on Computational Models of Argument, COMMA", Vienna, Austria, September 2012, p. 358-365, <http://dx.doi.org/10.3233/978-1-61499-111-3-358>.
- [25] S. BELDJOUDI, H. SERIDI-BOUCHELACHEM, C. FARON-ZUCKER. *Personalizing and Improving Tag-Based Search in Folksonomies*, in "Proc. 15th International Conference on Artificial Intelligence: Methodology, Systems, and Applications, AIMS", Varna, Bulgaria, LNCS, Springer, September 2012, vol. 7557, p. 112-118.
- [26] K. BOUZIDI, C. FARON-ZUCKER, B. FIES, O. CORBY, N. LE THANH. *Towards a Semantic-based Approach for Modeling Regulatory Documents in Building Industry*, in "Proc. 9th European Conference on Product & Process Modelling, ECPPM", Reykjavik, Iceland, July 2012.
- [27] M. BUFFA, N. DELAFORGE, G. ERETEO, F. GANDON, A. GIBOIN, F. LIMPENS. *ISICIL: Semantics and Social Networks for Business Intelligence*, in "Proc. 39th International Conference on Current Trends in Theory and Practice of Computer Science, SOFSEM", Špindlerův Mlýn, Czech Republic, January 2013, to appear.
- [28] E. CABRIO, S. VILLATA. *Combining Textual Entailment and Argumentation Theory for Supporting Online Debates Interactions*, in "Proc. of the 50th meeting of the Association for Computational Linguistics, ACL", Korea, July 2012, p. 208-2012, <http://www.aclweb.org/anthology/P12-2041>.
- [29] E. CABRIO, S. VILLATA. *Generating Abstract Arguments: a Natural Language Approach*, in "Proc. 4th International Conference on Computational Models of Argument, COMMA", Vienna, Austria, September 2012, p. 454-461, <http://dx.doi.org/10.3233/978-1-61499-111-3-454>.
- [30] E. CABRIO, S. VILLATA. *Natural Language Arguments: a Combined Approach*, in "Proc. European Conference on Artificial Intelligence, ECAI", Montpellier, August 2012, p. 205-210, <http://dx.doi.org/10.3233/978-1-61499-098-7-205>.
- [31] S. COLOMBO TOSATTO, G. BOELLA, L. VAN DER TORRE, S. VILLATA. *Abstract Normative Systems: Semantics and Proof Theory*, in "Proc. 13th International Conference on Principles of Knowledge Representation and Reasoning, KR", Rome, Italy, June 2012, <http://www.aaai.org/ocs/index.php/KR/KR12/paper/view/4553>.
- [32] S. COLOMBO TOSATTO, G. BOELLA, L. VAN DER TORRE, S. VILLATA. *Visualizing Normative Systems: an Abstract Approach*, in "Proc. 11th International Conference on Deontic Logic in Computer Science, DEON", Bergen, Norway, July 2012, p. 16-30, [http://dx.doi.org/10.1007/978-3-642-31570-1\\_2](http://dx.doi.org/10.1007/978-3-642-31570-1_2).
- [33] O. CORBY, A. GAINARD, C. FARON-ZUCKER, J. MONTAGNAT. *KGRAM Versatile Data Graphs Querying and Inference Engine*, in "Proc. IEEE/WIC/ACM International Conference on Web Intelligence", Macau, China, December 2012.
- [34] L. COSTABELLO, S. VILLATA, N. DELAFORGE, F. GANDON. *SHI3LD: an Access Control Framework for the Mobile Web of Data*, in "23rd ACM Conference on Hypertext and Social Media", Milwaukee, USA, June 2012, p. 311-312, <http://doi.acm.org/10.1145/2309996.2310049>.

- [35] L. COSTABELLO, S. VILLATA, F. GANDON. *Context-Aware Access Control for RDF Graph Stores*, in "Proc. European Conference on Artificial Intelligence, ECAI", Montpellier, August 2012, p. 282-287, <http://dx.doi.org/10.3233/978-1-61499-098-7-282>.
- [36] C. J. HOOPER, N. MARIE, E. KALAMPOKIS. *Dissecting the Butterfly: Representation of Disciplines*, in "Proc. Web Science Conference Series, Web Science", Evanston, Illinois, USA, June 2012.
- [37] I. MIRBEL, S. VILLATA. *Enhancing Goal-based Requirements Consistency: an Argumentation-based Approach*, in "Proc. 13th International Workshop on Computational Logic in Multi-Agent Systems, CLIMA", Montpellier, France, Springer LNCS, August 2012, <http://hal.inria.fr/hal-00724782>.
- [38] T.-A.-L. PHAM, N. LE THANH. *Decomposing Ontology in Description Logics by Graph Partitioning*, in "Proc. 8th International Conference on Computing and Information Technology, IC2IT IEEE Conference", Pattaya City, Thailand, May 2012, p. 157-162.
- [39] I. TAYARI MEFTAH, N. LE THANH, C. BEN AMAR. *Detecting Depression Using a Multidimensional Model of Emotional States*, in "Proc. First International Conference on Global Health Challenges", Venice, Italy, October 2012, p. 101-107.
- [40] I. TAYARI MEFTAH, N. LE THANH, C. BEN AMAR. *Detecting Depression using Multimodal Approach of Emotion Recognition*, in "Proc. International Conference on Complex Systems, ICCS", Agadir, Morocco, November 2012.
- [41] I. TAYARI MEFTAH, N. LE THANH, C. BEN AMAR. *Emotion Recognition using KNN Classification for User Modeling and Sharing of Affect States*, in "Proc. 19th International Conference on Neural Information Processing, ICONIP", Doha, Qatar, LNCS, November 2012, vol. 7663, p. 234-242.
- [42] I. TAYARI MEFTAH, N. LE THANH, C. BEN AMAR. *Multimodal Approach for Emotion Recognition Using an Algebraic Representation of Emotional States*, in "Proc. 8th International Conference on Signal Image Technology & Internet Based Systems, SITIS", Naples, Italy, November 2012, p. 541-546.
- [43] I. TAYARI MEFTAH, N. LE THANH, C. BEN AMAR. *Multimodal Recognition of Emotions Using a Formal Computational Model*, in "Proc. International Conference on Complex Systems, ICCS", Agadir, Morocco, November 2012, p. 130-135.
- [44] S. TONELLI, E. CABRIO. *Hunting for Entailing Pairs in the Penn Discourse Treebank*, in "Proc. of the 24th International Conference on Computational Linguistics (COLING 2012)", Mumbai, India, December 2012.

### **National Conferences with Proceeding**

- [45] A. AUTHOSERRE, F. BERTRAND, M. BLAY-FORNARINO, P. COLLET, H. DUBOIS, S. DUCASSE, S. DUPUY-CHESSA, C. FARON-ZUCKER, C. FAUCHER, J.-Y. LAFAYE, P. LAHIRE, O. LE GOAER, J. MONTAGNAT, A.-M. PINNA-DÉRY. *Interopérabilité des Systèmes d'Information : approches dirigées par les modèles*, in "Proc. 30ème Congrès Informatique des Organisations et Systèmes d'Information et de Décision, INFORSID", Montpellier, France, May 2012.
- [46] K. BOUZIDI, C. FARON-ZUCKER, B. FIES, O. CORBY, N. LE THANH. *Aide à la rédaction de documents réglementaires dans le domaine du bâtiment*, in "Proc. 23e Journées Francophones d'Ingénierie des Connaissances, IC", Paris, June 2012.

- [47] M. BUFFA, N. DELAFORGE, G. HUSSON. *SweetDeki : le wiki sémantique couteau suisse du réseau social ISICIL*, in "Proc. 12e Conférence Internationale Francophone sur l'Extraction et la Gestion de Connaissance, EGC", Bordeaux, February 2012.
- [48] N. DELAFORGE, F. GANDON. *Webmarks : Le marquage d'intérêt sur le Web de données*, in "Proc. 12e Conférence Internationale Francophone sur l'Extraction et la Gestion de Connaissance, EGC", Bordeaux, February 2012.
- [49] C. DESCLAUX, S. URLI, M. BLAY-FORNARINO, C. FARON-ZUCKER. *Vers la construction de workflows pour le filtrage sémantique de nouvelles*, in "Proc. Conférence en Ingénierie du Logiciel, CIEL", Rennes, France, June 2012.
- [50] C. DOMINGUES, O. CORBY, F. SOUALAH-ALILA. *Raisonnement sur une ontologie cartographique pour concevoir des légendes de cartes*, in "Proc. 12e Conférence Internationale Francophone sur l'Extraction et la Gestion de Connaissance, EGC", Bordeaux, February 2012.

### Conferences without Proceedings

- [51] P. ARAPOV, M. BUFFA. *WikiNext, a JavaScript Semantic Wiki*, in "Developer Track S6 - Application Development, WWW Conference", Lyon, April 2012, [http://www2012.wwwconference.org/proceedings/nocompanion/DevTrack\\_011.pdf](http://www2012.wwwconference.org/proceedings/nocompanion/DevTrack_011.pdf).
- [52] P. ARAPOV, M. BUFFA. *WikiNext, a JavaScript Wiki with Semantic Features*, in "PhD Symposium and Demo session of the International Conference Wikisym", Linz, Austria, August 2012, <http://www.wikisym.org/ws2012/bin/download/Main/Program/wikisym12submission44.pdf>.
- [53] A. ASSAF, E. LOUW, A. SENART, C. FOLLENFANT, R. TRONCY, D. TRASTOUR. *Improving Schema Matching with Linked Data*, in "1st Int. Workshop on Open Data, WOD", Nantes, May 2012, <http://arxiv.org/abs/1205.2691>.
- [54] A. BASSE, F. GANDON, I. MIRBEL, M. LO. *Codage DFSR: Extraction de motifs de graphe pour une représentation compacte du contenu de sources RDF*, in "Atelier Sources Ouvertes et Services - Données Liées pour un Web de Données (SOS-DLWD'12) 12th Conference Internationale Francophone sur l'Extraction et la Gestion des Connaissances (EGC 2012)", Bordeaux, France, 2012, p. 39-48.
- [55] A. BASSE, F. GANDON, I. MIRBEL, M. LO. *Représentation compacte du contenu de sources RDF*, in "12e Conférence Internationale Francophone sur l'Extraction et la Gestion de Connaissance, EGC, Poster session", 2012, p. 551-552.
- [56] K. BOUZIDI, C. FARON-ZUCKER, B. FIES, O. CORBY, N. LE THANH. *Modélisation de documents réglementaires dans le domaine du bâtiment*, in "12e Conférence Internationale Francophone sur l'Extraction et la Gestion de Connaissance, EGC, Poster session", Bordeaux, February 2012.
- [57] E. CABRIO, J. COJAN, A. PALMERO APROSIO, B. MAGNINI, A. LAVELLI, F. GANDON. *QAKiS: an Open Domain QA System based on Relational Patterns*, in "11th International Semantic Web Conference, ISWC, Demo paper", Boston, USA, November 2012, [http://iswc2012.semanticweb.org/sites/default/files/paper\\_24.pdf](http://iswc2012.semanticweb.org/sites/default/files/paper_24.pdf).

- [58] E. CABRIO, B. MAGNINI, A. IVANOVA. *Extracting Context-Rich Entailment Rules from Wikipedia Revision History*, in "ACL Workshop on the People's Web meets NLP: Collaboratively Constructed Semantic Resources and their Applications to NLP", Korea, July 2012, p. 34-43, <http://www.aclweb.org/anthology/W12-4006>.
- [59] E. CABRIO, A. PALMERO APROSIO, J. COJAN, B. MAGNINI, F. GANDON, A. LAVELLI. *QAKiS @ QALD-2*, in "ESWC Workshop Interacting with Linked Data", Heraklion, Greece, June 2012, <http://ceur-ws.org/Vol-913/>.
- [60] L. COSTABELLO, S. VILLATA, N. DELAFORGE, F. GANDON. *Linked Data Access goes Mobile: Context-Aware Authorization for Graph Stores*, in "5th Linked Data on the Web, LDOW WWW Workshop", Lyon, April 2012.
- [61] L. COSTABELLO, S. VILLATA, N. DELAFORGE, F. GANDON. *Ubiquitous Access Control for SPARQL Endpoints: Lessons Learned and Future Challenges*, in "WWW Poster session, Companion Volume", Lyon, April 2012, p. 487-488, <http://doi.acm.org/10.1145/2187980.2188090>.
- [62] C. FOLLENFANT, O. CORBY, F. GANDON, D. TRASTOUR. *RDF Modelling and SPARQL Processing of SQL Abstract Syntax Trees*, in "Programming the Semantic Web, ISWC Workshop", Boston, USA, November 2012, <http://www.inf.puc-rio.br/~psw12/6.pdf>.
- [63] A. GAIGNARD, J. MONTAGNAT, C. FARON-ZUCKER, O. CORBY. *Fédération multi-sources en neurosciences : intégration de données relationnelles et sémantiques*, in "Workshop IC pour l'Interopérabilité Sémantique dans les applications en e-Santé, 23e Journées Francophones d'Ingénierie des Connaissances, IC", Paris, June 2012.
- [64] A. GAIGNARD, J. MONTAGNAT, C. FARON-ZUCKER, O. CORBY. *Semantic Federation of Distributed Neurodata*, in "Data-and Computer-Intensive Clinical and Translational Imaging Applications (DCICTIA), MICCAI Workshop", Nice, October 2012, <http://hal.archives-ouvertes.fr/hal-00746765>.
- [65] A. GIBOIN, P. SALEMBIER, C. SIMONE, C. BOSSARD. *Do We Really Need to Share to Cooperate? An Introduction to the Workshop*, in "Workshop: Do We Really Need to Share to Cooperate?, in conjunction with COOP'2012, The 10th Design of Cooperative Systems: "From research to practice: Results and open challenges"", Marseille, France, May 2012.
- [66] R. HASAN, F. GANDON. *A Brief Review of Explanation in the Semantic Web*, in "7th Workshop on Explanation-aware Computing (ExaCt 2012), ECAI Workshop", Montpellier, August 2012.
- [67] R. HASAN, F. GANDON. *Linking Justifications in the Collaborative Semantic Web Applications*, in "SWCS: Semantic Web Collaborative Spaces, WWW Workshop", Lyon, April 2012.
- [68] A. HASNAIN, M. AL-BAKRI, L. COSTABELLO, Z. CONG, I. DAVIS, T. HEATH. *Spamming in Linked Data*, in "3rd International Workshop on Consuming Linked Data, COLD", Boston, USA, November 2012, <http://hal.inria.fr/hal-00751205>.
- [69] L. D. IBÁÑEZ, H. SKAF-MOLLI, P. MOLLI, O. CORBY. *Synchronizing Semantic Stores with Commutative Replicated Data Types*, in "SWCS: Semantic Web Collaborative Spaces, WWW Workshop", Lyon, April 2012, [https://sites.google.com/site/swcs2012/swcs2012\\_submission\\_13.pdf](https://sites.google.com/site/swcs2012/swcs2012_submission_13.pdf).

- [70] F. SCHARFFE, J. EUZENAT, S. VILLATA, R. TRONCY, F. HAMDI, B. BUCHER, F. COTTON, F. GANDON, Z. FAN, L. BIHANIC, G. KEPEKLIAN, G. ATEMEZING, P.-Y. VANDENBUSSCHE, B. VATANT. *Enabling linked-data publication with the Datalift Platform*, in "AAAI 2012 Workshop on Semantic Cities", 2012.
- [71] O. SEYE, O. CORBY, C. FARON-ZUCKER. *RIF-SPARQL: définition et implémentation d'un dialecte RIF à l'aide d'un moteur SPARQL*, in "12e Conférence Internationale Francophone sur l'Extraction et la Gestion de Connaissance, EGC, Poster session", Bordeaux, February 2012.
- [72] O. SEYE, C. FARON-ZUCKER, O. CORBY, C. FOLLENFANT. *Bridging the Gap between RIF and SPARQL: Implementation of a RIF Dialect with a SPARQL Rule Engine*, in "Artificial Intelligence meets the Web of Data, ECAI Workshop", Montpellier, August 2012.
- [73] S. TONELLI, E. CABRIO, E. PIANTA. *Key-concept Extraction from French Articles with KX*, in "JEP-TALN-RECITAL 2012, Atelier DEFT 2012: DEfi Fouille de Textes", Grenoble, France, June 2012, p. 15-24, <http://aclweb.org/anthology-new/W/W12/W12-1102.pdf>.
- [74] S. VILLATA, F. GANDON. *Licenses Compatibility and Composition in the Web of Data*, in "3rd International Workshop on Consuming Linked Data, COLD", CEUR Workshop Proceedings, 2012, vol. 905.
- [75] S. VILLATA, F. GANDON. *Towards Licenses Compatibility and Composition in the Web of Data*, in "11th International Semantic Web Conference, ISWC, Poster session", November 2012, Best Poster Award.
- [76] S. VILLATA, F. PAGLIERI, A. TETTAMANZI, R. FALCONE, C. DA COSTA PEREIRA, C. CASTELFRANCHI. *Trusting the Messenger and the Message*, in "15th International Workshop on Trust in Agent Societies, TRUST 2012", June 2012.

### Scientific Books (or Scientific Book chapters)

- [77] M. BUFFA, C. FARON-ZUCKER. *Ontology-Based Access Rights Management, to appear in*, in "Advances in Knowledge Discovery and Management, Best of EGC 2010", Studies in Computational Intelligence, Springer, 2012, vol. 2.
- [78] N. DELAFORGE, F. GANDON, A. MONNIN. *L'avenir du Web au prisme de la ressource*, in "Le document numérique à l'heure du web de données", L. CALDERAN, B. HIDOINE, J. MILLET (editors), Collection Sciences et techniques de l'information, ADBS éditions, 2012.
- [79] N. DELAFORGE, A. MONNIN. *Modéliser la ressource Web, contextualiser la référence*, in "Vers un nouvel archiviste numérique", M. TRELEANI (editor), L'Harmattan-INA, collection "Les médias en actes", 2012.
- [80] F. GANDON, C. FARON-ZUCKER, O. CORBY. *Web sémantique: comment lier données et schémas sur le Web ?*, Dunod, May 2012, ISBN: 978-2-10-057294-6.
- [81] A. GIBOIN, S. GRATALOUP, O. MOREL, P. DURVILLE, M. PERRIN. *Ontology Building Methodologies: Reconciling Natural Language Representations and Formal Language Representations*, in "Shared Earth Modeling, Knowledge Based Solutions for Building and Managing Subsurface Structural Models", M. PERRIN, J.-F. RAINAUD (editors), Technip Editions, 2012, to appear.



- [82] P. GIROUX, O. CORBY, J.-F. RAINAUD, F. HUSSON. *Earth Modeling using Web Services*, in "Shared Earth Modeling, Knowledge Based Solutions for Building and Managing Subsurface Structural Models", M. PERRIN, J.-F. RAINAUD (editors), Technip Editions, 2012, to appear.
- [83] F. LIMPENS, M. BUFFA, F. GANDON. *A complete life-cycle for the semantic enrichment of folksonomies*, in "Advances in Knowledge Discovery and Management", F. GUILLET, P. PINAUD, G. VENTURINI, D. ZIGHED (editors), Springer, Studies in Computational Intelligence, 2012, to appear.
- [84] A. MONNIN. *Du cycle de vie des données au cycle de vie des objets*, in "Le document numérique à l'heure du web de données", L. CALDERAN, B. HIDOINE, J. MILLET (editors), Collection Sciences et techniques de l'information, ADBS éditions, 2012.

### Books or Proceedings Editing

- [85] M. CROITORU, S. RUDOLPH, N. WILSON, J. HOWSE, O. CORBY (editors). *Graph Structures for Representation and Reasoning, 2nd International Workshop GKR, 2011, Revised Selected Papers*, Lecture Notes in Artificial Intelligence, Springer, 2012, vol. 7205.
- [86] A. GIBOIN, P. SALEMBIER, C. SIMONE, C. BOSSARD (editors). *Workshop: Do We Really Need to Share to Cooperate?, in conjunction with COOP'2012, The 10th Design of Cooperative Systems: "From research to practice: Results and open challenges"*, May 2012.
- [87] A. MILLE, F. GANDON, J. MISSELIS, M. RABINOVICH, S. STAAB (editors). *Proc. of the 21st World Wide Web Conference, WWW 2012*, ACM, 2012, <http://dl.acm.org/citation.cfm?id=2187980>.

### Research Reports

- [88] A. BASSE, F. GANDON, I. MIRBEL, M. LO. *Incremental Characterization of RDF Triple Stores*, Inria, April 2012, n<sup>o</sup> RR-7941, <http://hal.inria.fr/hal-00691201>.
- [89] R. HASAN, F. GANDON. *Explanation in the Semantic Web: a Survey of the State of the Art*, Inria, May 2012, n<sup>o</sup> RR-7974, <http://hal.inria.fr/hal-00702277>.
- [90] G. PURI. *A Design Thinking Toolset for Developers of Interactive Information Visualization Applications*, Inria, Sophia Antipolis, December 2012.
- [91] R. SILVA. *Accompagnement de l'expérimentation d'un outil de veille collaborative*, University of Nice - Sophia Antipolis, July 2012, Master Thesis.
- [92] R. SILVA. *Tests d'usage de la plate-forme ISICIL à l'ADEME : Evaluation socio-ergonomique*, Projet ANR ISICIL, Sophia Antipolis, France, September 2012, Livrable final sur les expérimentations de la plate-forme ISICIL.

### References in notes

- [93] K. BAKER, S. GREENBERG, C. GUTWIN. *Heuristic Evaluation of Groupware Based on the Mechanics of Collaboration*, in "Proceedings of the 8th IFIP Working Conference on Engineering for Human-Computer Interaction (EHCI'01)", Toronto, Canada, May 2001.



- [94] O. CORBY, C. FARON-ZUCKER. *Implementation of SPARQL Query Language based on Graph Homomorphism*, in "Proc. of the 15th International Conference on Conceptual Structures (ICCS'2007)", Sheffield, UK, July 2007, p. 472-475.
- [95] O. CORBY, C. FARON-ZUCKER. *KGRAM: une machine abstraite de graphes de connaissances*, in "Proc. EGC, Extraction et Gestion des Connaissances, RNTI E-19", Hammamet, Tunisia, January 2010, p. 423-428.
- [96] O. CORBY, C. FARON-ZUCKER. *La machine abstraite KGRAM et son langage GRAAL pour l'interrogation de graphes de connaissances*, in "Proc. LMO, Langages et modèles à objets", Pau, France, March 2010, p. 67-81.
- [97] O. CORBY, C. FARON-ZUCKER. *The KGRAM Abstract Machine for Knowledge Graph Querying*, in "Proc. IEEE/WIC/ACM International Conference", Toronto, Canada, September 2010, p. 338-341.
- [98] G. ERÉTÉO. *Semantic Social Network Analysis*, Telecom ParisTech, April 2011, <http://hal.inria.fr/tel-00586677/en>.
- [99] F. LIMPENS. *Multi-points of View Semantic Enrichment of Folksonomies*, University of Nice - Sophia Antipolis, October 2010.
- [100] N. MARIE, F. GANDON, M. RIBIÈRE. *Pervasive Sociality : Advanced Social Objects Recommendation*, in "3rd International Conference on Web Science (Poster session)", Koblenz, Germany, Web Science trust, June 2011, <http://journal.webscience.org/516/>.
- [101] B. MARKINES, C. CATTUTO, F. MENCZER, D. BENZ, A. HOTH, G. STUMME. *Evaluating Similarity Measures for Emergent Semantics of Social Tagging*, in "18th International World Wide Web Conference", April 2009, p. 641-641.
- [102] IGOR A. MEL'ČUK, A. POLGUÈRE. *A Formal Lexicon in The Meaning-Text Theory (or How to do Lexica With Words)?*, in "Computational Linguistics", 1987, vol. 13, n° 3-4, p. 261-275.
- [103] KLAUS R. SCHERER. *Emotions as Episodes of Subsystem Synchronization Driven by Nonlinear Appraisal Processes*, in "Emotion, Development and Self-Organization: : Dynamic Systems Approaches to Emotional Development", M. D. LEWIS, I. GRANIC (editors), Cambridge University Press, 2000, p. 70-99.
- [104] X. YAN, J. HAN. *gSpan: Graph-Based Substructure Pattern Mining*, in "ICDM'02", Maebashi, Japan, 2002, p. 721-724.