Activity Report 2015

Project-Team WIMMICS

Web-Instrumented Man-Machine Interactions, Communities and Semantics

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Project-Team WIMMICS

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

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Wimmics is a joint team with I3S (CNRS, University of Nice Sophia Antipolis) and is located on the University Campus of Sophia Antipolis [1].

1. Members

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[1] *http://wimmics.inria.fr/venue*

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2. Overall Objectives

2.1. Presentation

2.1.1. Context and Objectives

The Web became a virtual place where persons and software interact in mixed communities. These large scale mixed interactions create many problems that must be addressed with multidisciplinary approaches [57]. One particular problem is to reconcile formal semantics of computer science (e.g. logics, ontologies, typing systems, protocols, etc.) on which the Web architecture is built, with soft semantics of people (e.g. posts, tags, status, relationships, etc.) on which the Web content is built.

Wimmics is a joint research team between Inria Sophia Antipolis - Méditerranée and I3S (CNRS and Université Nice Sophia Antipolis) that proposes models and methods to bridge formal semantics and social semantics on the Web. [56]

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. Some sub-graphs are small and local (e.g. a user's 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. And 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 do need the means to combine them and to perform multi-criteria analysis on their combination. Wimmics contributes to this understanding by: (1) proposing multidisciplinary approaches to analyze and model the many aspects of these intertwined information systems, their communities of users and their interactions; (2) formalizing and reasoning on these models using graphs-based knowledge representation from the semantic Web to propose new analysis tools and indicators, and support new functionalities and better management. In a nutshell, the first research direction looks at models of systems, users, communities and interactions while the second research direction considers formalisms and algorithms to represent them and reason on their representations.

2.1.2. Research Topics

The research objectivs of Wimmics can be grouped according to four topics we identify in reconciling social and formal semantics on the Web:

Topic 1 - users modeling and designing interaction on the Web: The general research question addressed by this objective is "*How do we improve our interactions with a semantic and social Web ?*". Wimmics focuses on specific sub-questions: "How can we capture and model the users' characteristics?" "How can we represent and reasons with the users' profiles?" "How can we adapt the system behaviors as a result?" "How can we design new interaction means?" "How can we evaluate the quality of the interaction designed?"

Topic 2 : communities and social interactions analysis on the Web: The general question addressed in this second objective is "*How can we manage the collective activity on social media?*". Wimmics focuses on the following sub-questions: "How do we analyze the social interaction practices and the structures in which these practices take place?" "How do we capture the social interactions and structures?" "How can we formalize the models of these social constructs?" "How can we analyze and reason on these models of the social activity ?"

Topic 3 : vocabularies, semantic Web and linked data based knowledge representation on the Web: The general question addressed in this third objective is "*What are the needed schemas and extensions of the semantic Web formalisms for our models?*". Wimmics focuses on several sub-questions: "What kinds of formalism are the best suited for the models of the previous section?" "What are the limitations and possible extensions of existing formalisms?" "What are the missing schemas, ontologies, vocabularies?" "What are the links and possible combinations between existing formalisms?" In a nutshell, an important part of this objective is to formalize as typed graphs the models identified in the previous objectives in order for software to exploit them in their processing (in the next objective).

Topic 4 : analyzing and reasoning on heterogeneous semantic graphs on the Web The general research question addressed in this last objective is "*What are the algorithms required to analyze and reason on the heterogeneous graphs we obtained?*". Wimmics focuses on several sub-questions: "How do we analyze graphs of different types and their interactions?" "How do we support different graph life-cycles, calculations and characteristics in a coherent and understandable way?" "What kind of algorithms can support the different tasks of our users?".

3. Research Program

3.1. Users Modeling and Designing Interaction on the Web

Wimmics focuses on interactions of ordinary users with ontology-based knowledge systems with a preference for semantic Web formalisms and Web 2.0 applications. We specialize interaction design and evaluation methods to Web application tasks such as searching, browsing, contributing or protecting data. The team is especially interested in using semantics in assisting the interactions. We propose knowledge graph representations and algorithms to support interaction adaptation for instance for context-awareness or intelligent interactions with machine. We propose and evaluate Web-based visualization techniques for linked data, querying, reasoning, explaining and justifying. Wimmics also integrates natural language processing approaches to support natural language based interactions. 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. We extend the user modeling technique known as *Personas* where user models 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 specialize *Personas* approaches to include aspects appropriate to Web applications. Wimmics also extends user models to capture very different aspects (e.g. emotional states).

3.2. Communities and Social Interactions Analysis

The domain of social network analysis is a whole research domain in itself and Wimmics targets what can be done with typed graphs, knowledge representations and social models. We also focus on the specificity of social Web and semantic Web applications and in bridging and combining the different social Web data structures and semantic Web formalisms. Beyond the individual user models, we 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. We propose models of collectives of users and of their collaborative functioning extending the collaboration personas and methods to assess the quality of coordination interactions and the quality of coordination artifacts. We extend and compare community detection algorithms to identify and label communities of interest with the topics they share. We propose 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. Moving to social interaction we develop models and algorithms to mine and integrate different yet linked aspects of social media contributions (opinions, arguments and emotions) relying in particular on natural language processing and argumentation theory. To complement the study of communities we rely on multi-agent systems to simulate and study social behaviors. Finally we also rely on Web 2.0 principles to provide and evaluate social Web applications.

3.3. Vocabularies, Semantic Web and Linked Data Based Knowledge Representation

For all the models we identified in the previous sections, we rely on and evaluate knowledge representation methodologies and theories, in particular ontology-based modeling. We also propose models and formalisms to capture and merge representations of different levels 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. We propose vocabularies and semantic Web formalizations for the whole aspects we model and we consider and study extensions of these formalisms when needed. The results have all in common to pursue the representation and publication of our models as linked data. We also contribute to the transformation and linking of existing resources (informal models, databases, texts, etc.) to be published on the semantic Web and as linked data. Examples of aspects we formalize include: user profiles, social relations, linguistic knowledge, business processes, derivation rules, temporal descriptions, explanations, presentation conditions, access rights, uncertainty, emotional states, licenses, learning resources, etc. At a more conceptual level we also work on modeling the Web architecture with philosophical tools so as to give a realistic account of identity and reference and to better understand the whole context of our research and it conceptual cornerstones.

3.4. Analyzing and Reasoning on Heterogeneous Semantic Graphs

One of the characteristics of Wimmics is to rely on graph formalisms unified in an abstract graph model and operators unified in an abstract graph machine to formalize and process semantic Web data, Web resources, services metadata and social Web data. In particular CORESE, the core software of Wimmics, maintains and implements that abstraction. We propose algorithms to process the mixed representations of the previous section. In particular we are interested in allowing cross-enrichment between them and in exploiting the life cycle and specificity of each one to foster the life-cycles of the others. Our results all have in common to pursue analyzing and reasoning on heterogeneous semantic graphs issued from social and semantic Web applications. 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. Social Semantic Web

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 licenses, 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: SMILK Joint Laboratory, Corese/KGRAM, DBpedia.fr.

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 1.5 billion users) first giving the Web back its status of a social read-write media and then putting it back on track 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.

By reasoning on the Linked Data and the semantics of the schemas used to represent social structures and Web resources, we provide applications supporting communities of practice and interest and fostering their interactions in many different contexts (e-learning, business intelligence, technical watch, etc.).

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. Example of collaboration and applied projects: OCKTOPUS, Vigiglobe, Educlever, Gayatech.

5. Highlights of the Year

5.1. Highlights of the Year

- Elena Cabrio successfully obtained an assistant professor position in Wimmics.
- Serena Villata successfully obtained a researcher position (CR1 CNRS) in Wimmics.
- Olivier Corby and Catherine Faron-Zucker received a medal from University Côte d'Azur on December 10th as a follow-up of their IC 2015 best paper award.
- HDR Defense of Freddy Lécué (Inria-IBM)
- Two successful MOOCs (HTML5, Semantic Web)
- Fabien Gandon was General Chair of ESWC 2015 and will be general co-chair of WWW 2018

5.1.1. Awards

BEST PAPER AWARD:

[39]

O. CORBY, C. FARON-ZUCKER. *Un navigateur pour les données liées du Web*, in "Journées francophones d'Ingénierie des Connaissances", Rennes, France, AFIA, July 2015, vol. IC2015, https://hal.inria.fr/hal-01155644

6. New Software and Platforms

6.1. CORESE

KEYWORDS: Semantic Web - Web of Data - RDF - SPARQL
FUNCTIONAL DESCRIPTION

Corese is a Semantic Web Factory, it implements W3C recommendations such as RDF, RDFS, SPARQL 1.1 Query and Update. It provides an Inference Rule language, a Transformation Language for RDF graphs and a function language on top of SPARQL. Furthermore, Corese integrates original features such as approximate search and extended Property Path. It also provides distributed federated query processing (cooperation with Johan Montagnat, I3S).

- Participants: Olivier Corby, Erwan Demairy, Fuqi Song.
- Partners: I3S, Mnemotix
- Contact: Olivier Corby
- URL: http://wimmics.inria.fr/corese

6.2. DBpedia

KEYWORDS: French chapter of DBpedia
FUNCTIONAL DESCRIPTION

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

- Participants: Raphaël Boyer and Fabien Gandon
- Contact: Fabien Gandon
- URL: http://fr.dbpedia.org

6.3. Discovery Hub

KEYWORD: Search Engine
FUNCTIONAL DESCRIPTION

Discovery Hub is an Exploratory Search Engine on top of DBpedia.

- Participants: Nicolas Marie, Fabien Gandon, Emilie Palagi and Alain Giboin
- Partner: Alcatel-Lucent
- Contact: Fabien Gandon
- URL: http://discoveryhub.co

6.4. QAKiS

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

- Participants: Elena Cabrio, Amine Hallili (SynchroNext), Alessio Palmero Aprosio (FBK Italy), Fabien Gandon and Serena Villata
- Contact: Elena Cabrio
- URL: http://www.qakis.org/

7. New Results

7.1. Users modeling and designing interaction

7.1.1. *Exploratory search*
Participants: Emilie Palagi, Alain Giboin.

Contrary to lookup search engines that help users to retrieve specific items (e.g., names, numbers, short statements, or specific documents), Exploratory Search Systems (ESSs) are search engines that help users to explore a topic of interest. Exploratory search (ES) tasks are open-ended, multi-faceted, and iterative like learning or topic investigation [59]. Currently, the evaluation methods of ESSs are not entirely adapted to the special features of ES tasks, and do not effectively assess that ESSs support users in performing those tasks. Our research goal is to elaborate methods that effectively lead to this assessment. Two research actions were undertaken this year to contribute to achieve this goal.

7.1.1.1. Design of an exploratory-search-oriented protocol for testing an image search algorithm based on user's eye movements
Participants: Emilie Palagi, Alain Giboin.

This work was undertaken in the context of the VISIIR ANR project [2], leaded by the MinD team (I3S, UNS), with Stéphanie Lopez and Frédéric Precioso. One of the objectives of VISIIR is to design an interactive image search system based on user's eye movements. Detected by an eye-tracker, these movements allow the system to infer the image that the user is going to select; VISIIR's aim is to replace user's mouse clicks as a selection mode by implicit *eye-clicks*. Since ES behaviors can be observed in image search tasks, we designed an eye-tracking user test protocol on Discovery Hub [3] in order to: 1) increase our understanding of the ES process (at the cognitive and perceptual-motor levels); 2) verify if identified characteristics of gaze trajectories allow to infer the images that the user is going to select in ES tasks (as opposed to lookup search tasks).

7.1.1.2. Design of a user-centered evaluation method of exploratory search systems based on a model of the exploratory search process
Participants: Emilie Palagi, Alain Giboin, Fabien Gandon.

(with Raphaël Troncy, Eurecom)

This work was undertaken in the context of the PhD of Emilie Palagi. In [41] we introduced our approach for designing a user-centered evaluation method for ESSs. Our method takes into account users's ES behavior and is based on a cognitive model of an ES task. We will specially work on Discovery Hub (Wimmics project – Inria) and 3cixty [4] (EURECOM project) ESSs.

7.1.2. Sentiment Analysis
Participant: Andrea Tettamanzi.

Together with Célia da Costa Pereira (I3S, UNS) and Mauro Dragoni of FBK, Trento, who visited our team for three months from April to June 2014, we have further refined our approach to concept-level sentiment analysis based on fuzzy logic [12].

7.1.3. Recommendation of Pedagogical Resources Adapted to User Profile and Context
Participants: Oscar Rodriguez Rocha, Catherine Faron-Zucker.

In the framework of the Semantic Educloud project, we developed a Web ontology for the description and representation of serious games. Such ontology describes the functional and design elements of the game, the profile and virtual context of the players and furthermore the datasets from the Web of data that the game can query. The ontology has been evaluated through a prototype, which is basically a serious game quiz based on DBpedia. As future work, it is planned to implement state-of-the-art recommendation algorithms of Linked Data resources that take into account the context and players' profile. Furthermore an integration with the EDUCLOUD platform is considered: EDUCLOUD is an emerging initiative in Sophia Antipolis, for the implementation of a platform of digital educational content accessible through the cloud from a 3D portal of resources, and any interface devices (tablets, smartphones, PCs). [44]

7.2. Communities and social interactions analysis

7.2.1. Community Detection and Interest Labeling
Participants: Zide Meng, Fabien Gandon, Catherine Faron-Zucker.

7.2.1.1. Topic Modeling Based Overlapping Community Detection

Based on previous work, we conducted more experiments to evaluate the effectiveness and efficiency of the proposed tag tree based method. We used perplexity score to evaluate the performance of topic extraction. We got consistent performance when applying the model on a Flickr dataset. This work has been published in IEEE/WIC/ACM Web Intelligence 2015 [32] and Social Network Analysis and Mining Journal [13].

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[2] http://www.agence-nationale-recherche.fr/?Projet=ANR-13-CORD-0009
[3] http://discoveryhub.co/
[4] https://www.3cixty.com/

7.2.1.2. Temporal Analysis of User and Topic

By jointly modeling topic, expertise, time and activity, we were able to retrieve many meaningful latent information from the user generated contents. We proposed a method to track the dynamics of topics and users. It can also track the dynamics with a specific granularity of time level such as, yearly, monthly, daily and hourly. Besides, the model can overcome a comparison problem of LDA based model by modeling the reverse distribution.

7.2.1.3. Topic labeling

The output of topic model is normally a bag of words. Each topic consists of closely related words. An interesting question is to assign one or more topic label to this set in order to indicate the general meaning of a bag of words. By integrating the original dataset with linked open data sources, we are now planning to propose a generic method to automatically label the detected topics.

7.2.2. *Semantic Modeling of Social, Spatiotemporal and Dedicated Networks*

Participants: Amel Ben Othmane, Nhan Le Thanh, Michel Buffa, Andrea Tettamanzi, Serena Villata.

We have been working on modeling a multi-agent based recommender system. The aim of such system is to recommend a list of activities (plans) according to user preferences in order to achieve a goal. For this purpose, we propose a multi-context framework based on the well-known agent Belief-Desire-Intention (BDI) architecture [58]. First, we extend the BDI model with additional contexts in order to handle sociality. Second, we use a possibilistic approach based on the work of Da Costa Pereira & Tettamanzi [55], to reason about beliefs, desires, goals and intentions. Further, we use ontologies to represent and reason about plans and intentions. The proposed framework is detailed in a long paper that will be presented in the 8th International Conference on Agents and Artificial Intelligence in 2016 [18].

7.2.3. *Collaborative Software Development Platforms*

Participant: Isabelle Mirbel.

The collaborative nature of software development helped in the emergence of several online collaborative software development platforms (CSDPs). These platforms enable distributed teams of contributors to participate in the development of the various hosted projects. In such a context, the identification of relevant contributors is very important for handling efficiently the abundant requirements. However, this can be really challenging because of the fairly large number of involved contributors, especially in some distinguished projects. Moreover, the contributor profiles on a CSDP are often inadequately informative, which makes them an unqualified resource for learning about the contributors.

In this context, we proposed to identify contributors by their reputation on a CSDP. Our approach calculates reputation scores using a belief calculus, called subjective logic, according to contributors' performed roles. Knowing the reputation of anonymous contributors would enable project members to reduce the uncertainty in their future interactions with them. Moreover, we use concept lattices to classify contributors by their reputation scores, which enable us to have a comparable view on the considered contributors. Consequently, we can produce a roadmap to examine new requirements thus supporting their effective communication and prioritization.

7.2.4. *Logical Foundations of Cognitive Agents*

Participants: Andrea Tettamanzi, Serena Villata.

Together with Célia da Costa Pereira (I3S, UNS), we have continued an investigation about the issue of trust in multi-agent systems, and we proposed a computational model of trust based on the content of messages and on the characteristics of their sources [27].

7.2.5. *Combining Argumentation Theory and Normative Reasoning with Natural Language Processing*

Participants: Serena Villata, Elena Cabrio.

Together with Cristian Cardellino and Laura Alonso Alemany from the University of Cordoba (Argentina), we applied different Active Learning strategies to Information Extraction from licenses in English, with highly repetitive text, few annotated or unannotated examples available, and very fine precision needed. We showed that the most popular approach to active learning, i.e., uncertainty sampling for instance selection, does not provide a good performance in this setting. We showed that we can obtain a similar effect to that of density-based methods using uncertainty sampling, by just reversing the ranking criterion, and choosing the most certain instead of the most uncertain instances. The results of this research have been published at the CICLing [24] and JURIX [23] international conferences.

In another work, together with Alessio Palmero Aprosio (FBK Trento, Italy), we have worked on an extension of QAKiS, the system for open domain Question Answering over linked data, that allows to query DBpedia multilingual chapters. Such chapters can contain different information with respect to the english version, e.g. they provide more specificity on certain topics, or fill information gaps. In particular, we have introduced and evaluated the RADAR 2.0 framework for information reconciliation over language-specific DBpedia chapters. The framework is composed of three main modules: a module computing the confidence score of the sources depending either on the length of the related Wikipedia page or on the geographical characterization of the queried entity, a module retrieving the relations holding among the elements of the results set, and finally a module computing the reliability degree of such elements depending on the confidence assigned to the sources and the relations among them. This third module is based on bipolar argumentation theory to return the acceptability degrees. A demo of the RADAR framework is available online [5]. This contribution has been submitted to the Semantic Web Journal and is under review.

Moreover, we have proposed the BEGincs (BEG-Inconsistencies) framework, which translates a bipolar entailment graph into an argumentation graph. It then provides to the annotators sets of arguments that are supposed to be consistent. If it is not the case, the Textual Entailment system wrongly assigned some relations. Moving from single pairs to an overall graph allows for the detection of inconsistencies otherwise undiscovered. BEGincs does not identify the precise relation causing the inconsistency, but provides annotators with the consistent arguments sets, they are supported in narrowing the causes of inconsistency. The results of this research have been published at the CLIC conference [43].

7.2.6. *Argumentation theory and its applications*

Participants: Elena Cabrio, Serena Villata, Fabien Gandon, Andrea Tettamanzi.

Together with Celia da Costa Pereira (UNS), we have proposed a framework to measure the acceptability of an information in a multiagent system, according to *(i)* the agent's goals and the information source's goals, *(ii)* the credibility, for the agent, of the incoming information and *(iii)* the agent's beliefs (or perceptions) about the context (or situation) in which it operates. The results of this research have been published at the AAMAS international conference [27].

Moreover, together with Sahbi Benlamine, Maher Chaouachi and Claude Frasson (U. of Montreal) we have presented an empirical evaluation of the relationship between the argumentative structures of human debates and the emotions felt by the debate participants. Argumentation is often seen as a mechanism to support different forms of reasoning such that decision-making and persuasion, but all these approaches assume a purely rational behavior of the involved actors. However, humans are proved to behave differently, mixing rational and emotional attitudes to guide their actions, and it has been claimed that there exists a strong connection between the argumentation process and the emotions felt by people involved in such process. We assess this claim by means of an experiment: during several debates people's argumentation in plain English is connected and compared to the emotions automatically detected from the participants. The results of this research have been published at the IJCAI international conference [19], and submitted to the Cognitive Science journal (under review).

7.2.7. *Natural Language Argumentation on Twitter*

Participants: Tom Bosc, Elena Cabrio, Serena Villata.

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

A great amount of textual data is published on social media every day. For example, there are about 500 million new tweets per day on Twitter. These data reflect the opinion and thoughts of a large population and are thus potentially useful to decision-makers and marketers, among others. But processing them is challenging because of their large quantity as well as their noisiness : poor quality of writing, redundancy, presence of advertisement, etc.

The goal of this project is to build a pipeline to automatically analyze messages exchanged on Twitter and build informative and synthetic views. We study tweets under the angle of argumentation theory. First of all, the algorithm filters in argumentative tweets. Then, it describes how tweets relate to one another : tweets may support or attack other tweets, or be neutral. Finally, a visualisation of the interactions between tweets is produced. Individual parts of the pipeline are machine learning models that are trained using datasets that are crafted specially for the project. Importantly, datasets span several domains (politics, society topics, product announcements) to ensure that the approach is generic enough and will generalize to unseen topics.

7.3. Vocabularies, Semantic Web and linked data based knowledge representation

7.3.1. *SPARQL Template Transformation Language*

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

We designed and developed a generic software environment to generate Semantic Web Servers and Linked Data Navigators [6] on top of the STTL SPARQL Template Transformation Language. We designed STTL transformations from RDF to HTML that enable to set up hypertext Linked Data Navigators on local or remote (e.g. DBpedia) triple stores. This work was published at ISWC, WebIST, LNBIP and IC [26], [25], [45], [39].

We extended STTL in order to perform rule based constraint checking. Templates return boolean true (resp. false) when constraint cheking succeeds (resp. fails). We applied this extension on OWL profile conformance checking and we tested with success OWL RL, OWL EL and OWL QL profiles.

7.3.2. *SPARQL Function Language*

Participants: Olivier Corby, Catherine Faron-Zucker.

We started the design of a Function Language on top of SPARQL filter language. We added the `function` statement that enables users to define extension functions directly in the filter language. We added statements to the filter languages such as `let` local variables, `for` loop and `list` datatype and we integrated `select` and `construct` queries in the language. Extension functions are directly available into SPARQL queries. This solves the problem of extension function interoperability. We were able to design custom datatypes such as roman numbers, custom aggregates such as median and standard deviation, extension functions to compute the week day of a given date, approximate search functions, recursive functions with the service clause, etc. [50].

7.3.3. *Graph Pattern Matching*

Participants: Olivier Corby, Fuqi Song.

We proposed a heuristics-based query planning approach which allows reducing SPARQL query executing time. This approach has been developed and integrated to Corese plaform. The relevant work and results have been published at conference KES 2015 [35].

We developed a component that can improve the storage capacity of Corese software, generally speaking this approach stores large RDF literals into the file system instead of in memory. The experiments are performed based on the data set of BSBM [54] and the results suggested that with this component, it can save up to 40% RAM space without slowing down the query execution time.

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[6]http://corese.inria.fr

We implemented and integrated similarity measurement algorithms to Corese software in order to enable approximate semantic search. The main objective is to return approximate results when there are no results in the data source corresponding to the query.

7.3.4. *Dynamic Application Scheme Composition*
Participant: Isabelle Mirbel.

Dynamic service composition has emerged as a promising approach to build complex runtime-adaptable applications. In this context, new approaches for bottom-up opportunistic assembly of services have emerged. However, these approaches may lead to meaningless and useless compositions. Therefore, we advocate an approach in which bottom-up discovery of services is coupled with top-down user's requirements elicitation.

In our approach, application schemes publish available behaviors from basic component assembly. Our user's requirements elicitation framework, based on previous work, offers the capability to capture high-level end-user's requirements in an iterative and incremental way and to turn them into queries to retrieve application scheme's descriptions. We adopt semantic Web languages and models as a unified framework to deal with end-user's requirements and application scheme's descriptions in order to take advantage of their reasoning and traceability capabilities. We extended previous work about requirement's modeling by providing means to represent and reason on AND and OR operators as well as contextual data. Moreover, relying on the STTL language (see Section 7.3.1, we proposed two transformations for runtime composition: the first transformation aims at detecting the possible compositions with regards to the available applications schemes; the second one aims at building a BPMN modeling to achieve user's requirements.

7.3.5. *Semantic Web Languages And Techniques for Digital Humanities*
Participants: Serena Villata, Elena Cabrio, Catherine Faron-Zucker, Franck Michel.

In the framework of the Zoomathia project, we conducted three complementary works. Their results have been published at the SW4SH international workshop [22][37][38]. First, together with Cécile Callou, Chloé Martin and Johan Montagnat (UNS), we started working on the construction of a thesaurus to support multi-disciplinary studies on the transmission of zoological knowledge throughout historical periods, combining the analysis of ancient literature, iconographic and archaeozoological resources. We constructed a SKOS thesaurus based on the TAXREF taxonomical reference designed to support studies in Conservation Biology.

Second, together with Molka Tounsi (UNS), and Arnaud Zucker (UNS), we have introduced a methodology to (i) extract pertinent knowledge from medieval texts using Natural Language Processing methods, (ii) semantically enrich semi-structured zoological data and publishing it as an RDF dataset and its vocabulary, linked to other relevant Linked Data sources, and (iii) reason on this linked RDF data to help epistemologists, historians and philologists in their analysis of these ancient texts.

Third, together with Arnaud Zucker, we have proposed to adopt argumentation theory together with Semantic Web languages and techniques to provide an overall view of conflicting critiques over ancient texts, and to detect what are the different competing viewpoints and what are the strongest arguments emerging from the debate. An ontology for argumentative documents is used to annotate ancient texts, and an example of such annotation is provided about the topic of the Eternity of the species in Aristotle.

Moreover, together with Ahmed Missaoui (UNS) and Sara Tonelli (FBK Trento, Italy), we have presented the process performed to map the metadata from the Verbo-Visual-Virtual Project to the Linked Open Data cloud and the related data enrichment. Although the work was largely inspired by past efforts by other cultural heritage institutions, they face new challenges, partly related to the small size of the collection, with little-known artists and few information available from other online sources, and partly to the integration of Natural Language Processing techniques to enrich the metadata. The results of this research have been published at the AIUCD international conference.

7.3.6. *Autonomous Learning of the Meaning of Objects*
Participants: Valerio Basile, Elena Cabrio, Fabien Gandon.

The goal of ALOOF (CHIST-ERA) project [7] is to enable robots to tap into the ever-growing amount of knowledge available on the Web, by learning from there about the meaning of previously unseen objects, expressed in a form that makes them applicable when acting in situated environments. By searching the Web, robots will be able to learn about new objects, their specific properties, where they might be stored and so forth. To achieve this, robots need a mechanism for translating between the representations used in their real-world experience and those on the Web.

In this direction, we are building a *machine reading* pipeline to extract formally encoded knowledge from unstructured text. By combining linguistic and semantic analysis of natural language with entity linking and formal reasoning techniques, our system is capable of extracting meaningful knowledge about entities with URIs in the Linked Open Data (e.g., from DBpedia) and their relationships, encoded in standard Semantic Web fashion, i.e., RDF triples. We then employ the machine reading software to harvest the Web, targeting informative natural language resources such as educational Websites, to create a large-scale meaning bank of common sense knowledge.

7.3.7. *Social Media Intelligence and Linked Knowledge*
Participants: Farhad Nooralahzadeh, Elena Cabrio, Fabien Gandon.

Automated Natural Language Processing (NLP), Web Open Data (Linked Open Data) and social networks are the three topics of the SMILK ANR LabCom including their coupling studied in three ways: texts and Linked Data, Linked Data and social resources, texts and social resources. It is a Joint laboratory between the Inria research institute and the VISEO company to develop research and technologies on the one hand, retrieve, analyze, and reason about linking data from textual Web resources and other to use open Web data taking into account the social structures and interactions in order to improve the analysis and understanding of textual resources.

In this context, we have developed the entity discovery tools by adopting the semantic spreading activation, then we integrated it with the SMILK framework. The goal of this work was to semantically enrich the data by linking the mentions of named entities in the text to the corresponding known entities in knowledge bases. In our approach multiple aspects are considered: the prior knowledge of an entity in Wikipedia (i.e. the keyphraseness and commonness features that can be precomputed by crawling the Wikipedia dump), a set of features extracted from the input text and from the knowledge base, along with the correlation/relevancy among the resources in Linked Data. More precisely, this work explores the *collective ranking approach* formalized as a weighted graph model, in which the mentions in the input text and the candidate entities from knowledge bases are linked using the local compatibility and the global relatedness. Experiments on the datasets of the Open Knowledge Extraction (OKE) [8] challenge with different configurations of our approach in each phase of the linking pipeline reveal its optimum mode. We investigate the notion of semantic relatedness between two entities represented as sets of neighbors in Linked Open Data that relies on an associative retrieval algorithm, with consideration of common neighborhood. This measure improves the performance of prior link-based models and outperforms the explicit inter-link relevancy measure among entities (mostly Wikipedia-centric). Thus, our approach is resilient to non-existent or sparse links among related entities.

7.3.8. *Ontology-Based Workflow Management Systems*
Participants: Tuan Anh Pham, Nhan Le Thanh.

The main objective of this PhD work is to develop a Shared Workflow Management System (SWMS) using ontology engineering. Everybody can share a semi-complete workflow which is called "Workflow template", and other people can modify and complete it to use it in their system. This customized workflow is called "Personalized workflow". The challenges of a SWMS are to be simple, easy to use, user friendly and not too heavy. But it must have all functions of a WMS. There are three major challenges in this work: How to allow the users to customize the workflow template to correspond to their requirements, with changes compliant with the predefined rules in the workflow template? How to build an execution model to evaluate step by step a personalized workflow [34][33].

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[7]http://www.dis.uniroma1.it/~aloof/
[8]https://github.com/anuzzolese/oke-challenge

7.3.9. Semantic Mappings with a Control Flow-Based Business Workflow

Participants: Thi Hoa Hue Nguyen, Nhan Le Thanh.

The aim of this PhD work is to improve the Coloured Petri Nets (CPNs) and Ontology engineering to support the development of business process and business workflow definitions of various fields. To realize this objective, we first propose an ontological approach for representing business models in a meta-knowledge base. We introduce four basic types of manipulation operations on process models used to develop and modify business workflow patterns. Second, we propose a formal definition of semantic constraints and an O(n3)-time algorithm for detecting redundant and conflicting constraints. By relying on the CPN Ontology and sets of semantic constraints, workflow processes are semantically created. Finally, we show how to check the semantic correctness of workflow processes with the SPARQL query language [34].

7.4. Analyzing and Reasoning on Heterogeneous Semantic Graphs

7.4.1. RDF Mining

Participants: Andrea Tettamanzi, Catherine Faron-Zucker, Fabien Gandon, Tran Duc Minh, Claudia d'Amato.

We carried on our investigation in an approach to RDF mining based on grammatical evolution and possibility theory, whose aim is to mine large RDF graphs by automatically generating and testing OWL 2 axioms based on the known facts. In particular, we addressed the problem of scaling up the scoring heuristics based on falsification and possibility theory we have recently proposed [36].

7.4.2. Data and Knowledge Integration and Extraction

Participant: Andrea Tettamanzi.

Together with Somsack Inthasone of the National University of Laos, Nicolas Pasquier and Célia da Costa Pereira of I3S, we completed a survey on biodiversity and environment data mining [16].

7.4.3. Scalable Uncertainty Management

Participant: Andrea Tettamanzi.

Within the framework of the CNR PEPS GéoIncertitude, we proposed and studied the properties of uncertain logical gates in possibilistic network, using a problem of human geography as a motivating example and testbed [28].

7.4.4. Natural Language Question Answering

Participants: Andrea Tettamanzi, Elena Cabrio, Catherine Faron-Zucker, Amine Hallili.

We extended previous work on answering N-relation natural language questions in the commercial domain by combining an approach to learning regular expressions based on genetic programming [21].

7.4.5. Events Detection in Twitter

Participants: Amosse Edouard, Elena Cabrio, Nhan Le Thanh.

We analyze Twitter data in the objective of identifying events reported by Twitter users. Specially we have worked on two main aspects: an approach for classifying tweets as either related or not related to events and secondly we have studied an approach for disambiguating geographic entities in tweets.

We have worked on an approach for separating event-related content from the rest of Twitter messages. We have combined technics from Natural Language Processing (NLP) and Machine Learning (ML) for building a classifier model that aims at classifying tweets into two mutually exclusive classes. First of all, we apply a Named Entity Recognizer to the tweets in order to identify the occurrences of named entities and special Twitter features such as hashtags, shortened URLs or user mentions. In a second step, the named entities are replaced by their generic class in the DBpedia Ontology; we do so by using SPARQL to query the DBpedia Knowledge Base to extract the class related to each entity. Third, we use the modified content as examples to train a binary classifier. Our evaluation using different classifiers such as Naive Bayes and Long Short Term Memory have shown promising results in term of performance compared to the state of the art.

We have also worked on an approach for identifying geographic entities in Twitter. This task is challenging for two main reasons: first, a geographic term can be related to either geographic or non geographic entities (Paris can be a person or a place) and second, many geographic places might have the same name (Paris can be either the capital of France or a city in Texas). We have proposed an approach based on distant-supervision and ontology matching for identifying and disambiguate ambiguous geographic terms.

8. Partnerships and Cooperations

8.1. Regional Initiatives

8.1.1. Seminar with UNS

We organize a seminar with Lise Arena (UNS, Gredeg) and Bernard Conein (UNS, Gredeg) between Inria and Univ. Nice-Sophia Antipolis on *Digital artifacts and materialities*. We organize a seminar on *Law, Philosophy and Digitality* between UNS faculties of Law and Philosophy and Inria. Alexandre Monnin will address the impact of digital technologies on law itself.

8.1.2. PEPS GéoIncertitude

We participated in the CNRS PEPS GéoIncertitude, with researchers of the UMR 7300 ESPACE of Nice and of the IRIT of Toulouse on the modeling of uncertainty in Geography using fuzzy logic and possibility theory, which was re-financed for a second year.

8.1.3. SPARKS Team (I3S)

Wimmics is member of the I3S SPARKS team (Scalable and Pervasive softwARe and Knowledge Systems). It is structured according to three axes: FORUM, ELK and S3.

8.1.3.1. SPARKS FORUM Axis

Wimmics contributes to the SPARKS FORUM research axis (FORmalizing with Users and Models). Catherine Faron-Zucker and Alain Giboin are co-animators of FORUM.

8.1.3.2. SPARKS ELK Axis

Wimmics contributes to the SPARKS ELK research axis (Knowledge Learning and Extracting). Andrea Tettamanzi is co-animator of ELK. Elena Cabrio, Tom Bosc and Farhad Nooralahzadeh contribute on it.

8.1.3.3. SPARKS S3 Axis

Wimmics contributes to the SPARKS S3 research group (Scalable Software Systems). Olivier Corby, Fuqi Song and Erwan Demairy contribute with federated distributed query processing in Corese with Johan Montagnat and Abdoul Macina. Catherine Faron-Zucker and Franck Michel contribute on it with Johan Montagnat on heterogeneous databases federation.

8.1.4. HCI Group (I3S)

Participant: Alain Giboin.

The HCI Group animated by Anne-Marie Dery brings together I3S researchers conducting or wishing to conduct research related to Human-Computer Interaction. The group specifically addresses the issues of how to conduct user experiments to evaluate the UIs of the software developed in SPARKS. The group establishes collaborations between researchers in the design and implementation of experiments. This year Wimmics collaborated in the design, running and analysis of two experiments aiming at identifying and testing a set of principles for designing tabletop applications. One of the experiment involved Alzheimer people.

Wimmics also contributed to a working paper on the teaching of task modeling in the HCI curriculum of Polytech (with Philippe Renevier, Anne-Marie Dery and Gaëtan Rey). This paper was requested by the AFIHM working group "Enseignement sur l'analyse de tâches : leçons acquises et nouveaux défis".

8.1.5. MSHS: Axis-2 "ICT, Usage and Communities"

Participants: Alain Giboin, Alexandre Monnin, Fabien Gandon, Emilie Palagi.

Axis-2 of the "Maison des Sciences Humaines et Sociales (MSHS) du Sud-Est (Nice)" aims to federate interdisciplinary research on the relationships between ICT, Practices and Communities. Wimmics is mainly involved in one of the Axis-2 groups-projects, "Artifacts and Coordination." This group-project studies the impact of cognitive technologies on the social and cognitive coordination between individuals in organizational and community contexts. Alain Giboin is co-animator of this group-project with Lise Arena (GREDEG). He is also co-animator (with Pierre Thérouanne (Lapcos), Lise Arena and Agnès Festré (GREDEG)) of the project "Acceptabilitity of digital devices: an interdisciplinary perspective." During the first workshop organized this year on this topic, a talk was given by Alain Giboin on "Mesurer l'acceptabilité des collecticiels : de l'observation et/ou de la théorisation des activités collectives à l'élaboration de critères de mesure de l'acceptabilité". Alexandre Monnin is co-animator (with Lise Arena and Bernard Conein (GREDEG)) of a series of seminars on "Digital Artifacts and Materialities." During the first seminar, talks were given by Alexandre Monnin on "Quelques réflexions autour des couples artefacts/objets et numérique/matérialité", and by Alain Giboin on "Les personas comme artefacts substituts des utilisateurs dans un processus de conception".

8.2. National Initiatives

8.2.1. BPI funded project : AZKAR

Participants: Alain Giboin, Thierry Bergeron, Michel Buffa, Catherine Faron-Zucker.

AZKAR is a two years French project funded by BPI (Banque Publique d'Investissement), focused on *Fast Control of Mobile Robots over the Internet*, using Web technologies such as WebRTC and semantic Web technologies. The project started September 15th 2014. The first step of the project will be the evaluation/benchmarking of video and data solutions over internet, based on the WebRTC technology. The second step will consist in helping the robotic partner in the project (the Robosoft company) to implement these solutions on a real mobile robot that will be deployed in museums or in homes for helping seniors in their daily tasks. Semantic Web technologies, will be used in the project for describing the services, the context of the application domain, the content transmitted, etc.

This year, Wimmics main contributions were: a state-of-the-art on the techniques for transferring Web-based data/audio/video ; prototypes based on the technologies selected from the state-of-the-art ; a procedure and quantitative and qualitative criteria for benchmarking the prototypes.

8.2.2. ANR LabCom SMILK

Participants: Farhad Nooralahzadeh, Elena Cabrio, Fabien Gandon.

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

8.2.3. Ministry of Culture: DBpedia.fr

Participants: Raphaël Boyer, Fabien Gandon.

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.

A new complete DBpedia extraction has been performed, together with a technical documentation to reproduce it and a documentation for the users has been done too. In addition we have included the last community user interface and adapted it for French DBpedia. This version is more ergonomic and detailed, but also integrates a new SPARQL editor named Flint for students and beginners. A new DBpedia service from the community has been adapted for the French version: it's called "fragments", a service made for minimizing server processing.

Some scripts have been developed, one for generation of statistics based on log, others for grouping the abstracts of each language, based on redirections and interlanguages linked data. Also to increase our amount of available data, we created a new extractor that can extract historic and make statistics of modifications of each Wikipedia article.

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

8.2.4. *Ministry of Culture: GT 6*
Participant: Fabien Gandon.

We supervised the working group GT6 Ministry of Culture on the creation of a research convention to foster research and development at the crossroad of culture and digital sciences.

8.2.5. *ANR OCKTOPUS*
Participants: Fabien Gandon, Catherine Faron-Zucker, Zide Meng.

OCKTOPUS is an ANR project (2012-2016). The objective of OCKTOPUS is to increase the potential social and economic benefit of the large and quickly growing amounts of user-generated content, by transforming it into useful knowledge. We believe that it is possible to considerably improve upon existing generic Information Retrieval techniques by exploiting the specific structure of this content and of the online communities which produce it. Specifically, we will focus on a multi-disciplinary approach in order to address the problem of finding relevant answers to questions within forums and question-answer sites. To create metrics and predictors of content quality and use them to improve the search experience of a user, we will take advantage of:

- the experience of the CRG (the management research institute of Ecole Polytechnique and CNRS) to understand better the incentives of, and interactions between individuals who produce online content within large communities;
- the experience of the Wimmics research team to analyze the structural and temporal aspects of the complex typed social graphs found within these communities;
- the ability of Alcméon (a start-up developing a search application dedicated to user-generated content) to integrate and test the results of OCKTOPUS within a common demonstration framework, in order to assess their practical usefulness when applied to concrete large-scale datasets.

Partners: Alcméon, CRG, Inria Wimmics.

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

8.2.6. *GDRI Zoomathia*
Participants: Olivier Corby, Catherine Faron-Zucker, Alexandre Monnin, Andrea Tettamanzi.

Wimmics is partner of International Research Group (GDRI) Zoomathia funded by two CNRS institutes: INEE and INSHS. It aims at studying transmission of zoological knowledge from Antiquity to Middle-Age through material resources (bio residues, artefacts), iconography and texts.

One of the goals of the project is to design a thesaurus and semantically annotate resources, capturing different types of knowledge: zoonyme, historical period, zoological speciality (ethology, anatomy, physiology, psychology, zootechnique, etc.), litterary genre or iconography.

We started to work on 1) the translation of manual annotations of middle-age structured texts from XML to RDF, 2) the automatic extraction of RDF annotations from text using NLP techniques and 3) the exploitation of these semantic metadata to help historians in their studies of knowledge transmission through these texts.

Web site: http://www.cepam.cnrs.fr/zoomathia/

8.2.7. *Semantic EDUCLOUD Carnot Project*

Participants: Oscar Rodriguez Rocha, Catherine Faron-Zucker.

Partner : GAYAtech. This project was just accepted this year on the topic of *semantic Web for e-learning*. This is a joint project with Gayatech on the recommendation of pedagogical resources adapted to user profile and context in the EDUCLOUD 06 Serious Game. To get help in his quests and various quiz testing his knowledge, the gamer can use external digital resources (books, video, TV, Web) and an in-game social network to work with his teacher and comrades. In this context, and to meet the needs of GAYATECH developing edutainment solutions, the Semantic EDUCLOUD project aims to improve the recommendation of educational resources to learners in EDUCLOUD 06, by using semantic Web and social Web models and techniques.

8.2.8. *Carnot Project Vigiglobe*

Participants: Elena Cabrio, Serena Villata.

Partner : Vigiglobe.

This project was just accepted this year on the topic of *Natural Language Argumentation on Twitter: Retrieval of Argumentative Structures and Reasoning*. this is a joint project with Vigiglobe on the natural language processing of argumentation on Twitter to retrieve argumentative structures and reason on them. The goal of the project is to : (1) Automate the selection and annotation of tweets, i.e., retrieval of those tweets that can be considered as arguments (2) Automate the assignment of labels to the type of relation holding between arguments - positive relation or negative relation. (3) Create an argumentation graph illustrating the relations between the arguments about a certain subject, and the further application of argumentation semantics to compute the set of "winning" arguments This graph-based visualization provides a summary of the ongoing discussion on Twitter.

8.2.9. *FUI PadDOC*

Participants: Patrice Pena, Alain Giboin.

PadDOC goal is to contribute to accelerating the digital transition of citizen, local and regional authorities, administrations and enterprises, by : (1) developing an open standard and innovative software and hardware resources to facilitate nearby or distant administrative formalities and procedures; (2) improving the security of the holder's personal data by putting these data under the exclusive control of the holder; (3) exploiting unmarked communicating supports (such as smartphones or tablets) for all chain actors. PadDOC partners are: Docapost BPO, Anyces, ABC SmartCard and the teams Rainbow, Media-Coding and Wimmics.Wimmics will contribute to: (1) the analysis, design and evaluation of the PadDOC security-oriented user interfaces; (2) the impact assessment of the chain of actors participating in the experiment to validate the viability of the PadDOC social system. The PadDOC project officially began in November 2014.

This year, Wimmics main contributions were: a state-of-the-art on user-centered privacy and security (leading to the identification of the security and privacy aspects to be taken into account, from a user's point of view, in the design of a mobile device used to communicate personal data and documents); a field study of users performing administrative procedures from the point of view of security and privacy; and the functional mock-ups of the GUIs of the PadDOC mobile application to be used by the client of a commercial or administrative service.

8.3. European Initiatives

8.3.1. FP7 & H2020 Projects

8.3.1.1. ALOOF CHIST-ERA

Participants: Valerio Basile, Elena Cabrio, Fabien Gandon.

ALOOF (Autonomous Learning of the Meaning of Objects) is a European project (CHIST-ERA 2015-2018) to enable robots to use the ever-growing amount of knowledge available on the Web, by learning from there about the meaning of previously unseen objects, expressed in a form that makes them applicable when acting in situated environments. Partners include: University of Rome La Sapienza (Italy), University of Birmingham (United Kingdom), Technische Universität Wien (Austria), Inria Sophia Antipolis Méditerranée (France).

Web site: http://www.dis.uniroma1.it/~aloof

8.4. International Initiatives

8.4.1. Inria International Labs

We participate to the LIRIMA Africa (Laboratoire international de recherche en informatique et mathématiques appliquées) where we have a long term collaboration with University Gaston Berger in Saint-Louis, Senegal, with Pr. Moussa Lo. We host two PhD students in co-supervision with UBG: Papa Fary Diallo and Oumy Seye [60].

8.4.2. Inria Associate Teams not involved in an Inria International Labs

8.4.2.1. SEEMPAD

Participants: Elena Cabrio, Serena Villata, Valerio Basile, Fabien Gandon, Claude Frasson.

> **SEEMPAD**
>
> Title: Social Exchanges and Emotions in Mediated Polemics - Analysis and Data
>
> International Partner (Institution - Laboratory - Researcher):
>
> > University of Montréal (Canada) - Higher Educational Research ON tutoring systems (Heron) - Claude Frasson
>
> Start year: 2014
>
> Team site: https://project.inria.fr/seempad/
>
> Generating, annotating and analyzing a dataset that documents a debate. We aim at synchronizing several dimensions: social links (intensity, alliances, etc.); interactions happening (who talks to whom); textual content of the exchanged messages; social-based semantic relations among the arguments; emotions, polarity, opinions detected from the text; emotions, physical state detected from sensors.

8.5. International Research Visitors

8.5.1. Visits of International Scientists

8.5.1.1. Internships

> Lautaro Petaccio
>
> > Title: Design and development of a fact-checking framework based on argumentation theory and Natural Language Processing techniques.
> >
> > Date: August 2015-December 2015
> >
> > Institution: Universidad de Buenos Aires (Argentina)
> >
> > Supervisor: Elena Cabrio, Serena Villata
>
> Clémence Chauvet

Title: GUI for a requirement system
Date: from June 2015 until August 2015
Univ. Nice
Supervisor: Isabelle Mirbel et Serena Villata
Molka Dhouib
Title: Integration and enrichment of cultural heritage metadata on the Web of Data.
Date: until September 2015
Univ. Nice, Master 2
Supervisor: Catherine Faron-Zucker, Elena Cabrio
Raphael Gazzotti
Title: Checking OWL profile conformance with SPARQL Template Transformation Language
Date: from May 2015 until September 2015
Univ. Nice, Master 2
Supervisor: Olivier Corby
Racha Gouareb
Title: Semantic Annotation of Lyrics
Date: from May 2015 until October 2015
Univ. Nice
Supervisor: Michel Buffa, Catherine Faron-Zucker
Ahmed Missaoui
Title: Integration and enrichment of cultural heritage metadata on the Web of Data
Date: October 2014 - February 2015
Univ. Nice
Supervisor: Elena Cabrio, Catherine Faron-Zucker and Serena Villata
Baffoue Kangah
Title: Robot Navigation Web Control
Date: from May 2015 until October 2015
Univ. Nice
Supervisor: Michel Buffa, Catherine Faron-Zucker
Garance Vallat
Title: Semantic Web based platform for bibliography query and visualisation
Date: from June 2015 until August 2015
Univ. Nice, Master 1
Supervisor: Olivier Corby, Mireille Blay-Fornarino (I3S)
Reda Zarhbouch
Title: From user requirement to BPMN service composition modeling
Date: from May 2015 until October 2015
Univ. Nice, Master MIAGE
Supervisor: Isabelle Mirbel
Konstantina Poulida
Title: Extraction of Zoological Knowledge from Ancient and Middle-Age Scientific Texts
Date: from November 2015 to January 2016
Inria, University of Patras, Greece
Supervisor: Catherine Faron-Zucker, Andrea Tettamanzi

8.5.2. *Visits to International Teams*

8.5.2.1. *Research stays abroad*

Catherine Faron-Zucker spent the month of July at the Hasso Platner Institute (HPI) in Potsdam, Germany. She presented her research work in a seminar of the Semantic Web group.

Alexandre Monnin spent the month of November at the Digital Cultures Research Center (Leuphana University, Lüneburg, Germany), as a Research Fellow, to participate in the discussions on the semester's topic ("Non-knowledge and Digital Cultures"). Among other things he did a response to a talk delivered by Jeannie Moser's on "Mistrust", did two interviews on digital cultures, and participate in the non-knowledge seminar organized in Braunschweig, Germany.

9. Dissemination

9.1. Promoting Scientific Activities

9.1.1. Scientific events organisation

9.1.1.1. General chair, scientific chair

Elena Cabrio: Area chair (Semantics). CLIC-it 2015 (Italian Conf. on Computational Linguistics). Challenge co-chair, Extended Semantic Web Conference (ESWC 2015)

Catherine Faron-Zucker: Workshops co-chair at ESWC 2015, co-chair of SW4SH 2015 workshop.

Fabien Gandon: General chair of ESWC 2015, European Semantic Web Conference, Portoroz, Slovenia

Alexandre Monnin: co-chair of SW4SH 2015 workshop.

9.1.1.2. Member of the organizing committees

Alain Giboin: co-organizer of JMIC 2015 Talence et JMIC 2015 Nantes.

9.1.2. Scientific events selection

9.1.2.1. Chair of conference program committees

Alain Giboin: Associate Chair of CSCW 2015.

9.1.2.2. Member of the conference program committees

Fabien Gandon: IJCAI, ISWC, WWW, WI, ESWC, Hypertext, WebSci, ICWSM, SEMANTiCS, SAC, RFIA, EGC, IC.

Michel Buffa: Web Audio Conference.

Elena Cabrio: Association for Computational Linguistics conference (ACL 2015), Extended Semantic Web Conference (ESWC 2015), Language Resources and Evaluation Conference (LREC).

Olivier Corby: IC, GKR Workshop @ IJCAI, MOREBI

Catherine Faron-Zucker: i-KNOW, PRIMA, KEOD, LinkED, SW4SH, GKR, IC, EIAH

Alain Giboin: member of the steering committee of the COOP conference series (International Conferences on the Design of Cooperative Systems). Member of the program committee of: SEMANTICS 2015 - Research & Innovation Track; SEMANTICS 2015 - Posters and Demos; IC 2015; EPIQUE 2015.

Isabelle Mirbel:

26th International Conference on Advanced Information Systems Engineering (CAISE 2015),
First International Workshop on Semantic Web for Cultural Heritage to be held in conjunction with the 19th East-European Conference on Advances in Databases and Information Systems (ADBIS 2015).

Alexandre Monnin: IC, ESWC, WWW, PhiloWeb, SW4SH.

Andrea Tettamanzi: FLAIR 2015 and 2016, EvoApps 2015, IC 2015, WIRN 2015, PRIMA 2015, PPSN 2016, GECCO 2016, and LREC 2016 conferences, as well as for the SW4SH workshop of ESWC and the MOD workshop.

Serena Villata: IJCAI, AAAI, JURIX.

9.1.2.3. Reviewer

Michel Buffa: ESWC, WWW Demo Track, SWCS, Web Audio Conference 2016.

Olivier Corby: ESWC, GraphQ, SIIM, TTCS.

Alain Giboin: CHI 2015, OZCHI 2015, ESWC 2015, IHM 2015, WWW 2016.

Alexandre Monnin: IC, ESWC, WWW Webscience track, TICE.

9.1.3. Journal

9.1.3.1. Member of the editorial boards

Nhan Le Thanh: Journal of Science and Technology, Danang University- Issue on Information and Communications Technology [9].

9.1.3.2. Reviewer - Reviewing activities

Elena Cabrio: Journal of Web Semantics, and for the Computational Linguistics journal

Olivier Corby: Journal of Computer and System Sciences, Semantic Web Journal

Catherine Faron-Zucker: Int. Journal of Artificial Intelligence in Education (IJAIED), Int. Journal of Human Computer Studies (IJHCS)

Fabien Gandon: Intellectica

Isabelle Mirbel: Artificial Intelligence Review Journal (Springer), Neurocomputing (Elsevier), International Journal of Information System Modeling and Design (IGI Global).

Andrea Tettamanzi: Genetic Programming and Evolvable Machines

Nhan Le Thanh: Journal of Science and Technology, Danang University.

Serena Villata: Journal of Logic and Computation, Argument & Computation, ACM Transactions on Intelligent Systems and Technology.

9.1.4. Invited talks

Michel Buffa: Web Audio track at WWW2015, presentation of MT5, a HTML5 multitrack player for musicians, May, Florence, Italy.

Fabien Gandon[10]:

- Invited research Talk, Dassault Systèmes, "Relier trois des toiles du Web : ou comment tisser des liens entre le Web de données, le Web sémantique et le Web social", 28/01/2015
- LIG Keynote Speech, "Bridging formal semantics and social semantics on the Web" 8/01/2015

Olivier Corby:

- *SPARQL Template Transformation Language* at ESIROI, University of La Réunion, April 16th.
- FunSPARQL: a Function Language on top of SPARQL, December 15th, Web/reactive programming seminar at Inria Sophia Antipolis organized by Indes team.

Alexandre Monnin:

- Participate in a closed seminar hosted by Peter Norvig at Google's headquarter in Mountain View on the Philosophy of the Web (other invitees included such renown figures as David Bates, Warren Sack, Andy Clark, Henry S. Thompson, Brian Cantwell Smith, Alison Gopnik, Daniel Russell, Hubert L. Dreyfus, Geoffrey Hinton, Ramanathan Guha, Sam Goto, Erin Siegal, Alva Noe, Tania Lombrozo, Terry Winograd, David Kirsh, Fernando Flores, John Searle).
- In April, was invited to participate in a seminar at Paris 10 Nanterre organized by Louise Merzeau, on DBpedia, and controversy analysis.

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[9] http://jst.udn.vn/ict
[10] see http://www-sop.inria.fr/members/Fabien.Gandon/talks.html

- The same day, did a presentation at La Sorbonne, at the Obvil Labex seminar, on the ontology of the Web.

- In April, presentation along with philosopher Pierre Livet (Aix-Marseilles University) at MSHS: "Séminaire invité, axe 2 "TICs, Usages et Communautés"", on "Architecture du Web et ontologie des opérations".

- In May, invited by the Digital Cultures Research Center (DCRL) of Leuphana University in Lüneburg (Germany) to participate in an international symposium: "Technological Conditions of Interventions. History, Epistemology, Dramaturgy". A book will be edited out of it (chapter "Making and caring: Philosophical engineering and the philosophy of the Web").

- In June, presentation during a two-day seminar at Mines ParisTech. A book will be published from the texts gathered there.

- In July, one-week long international conference at Cerisy-la-Salle on Scientific Philosophy, to celebrate the famous 1935 conferences on logical positivism that took place in Paris. He delivered a talk on the philosophical roots of the Semantic Web, in particular by insisting on the importance of two philosophers, Rudolf Carnap and Otto Neurath (logic and data visualization). The proceedings of this week will be published in 2016 by the Editions Matériologiques.

- In October, participate in the Heritage and Anthropocene conference in Dijon (Centre Georges Chevrier, CNRS, UMR 7366) where he presented a paper with Diego Landivar (Origen MediaLab). A publication venue for the papers presented there is now actively sought.

- La Sorbonne, in Paris, at the annual "Numérique et Société" seminar organized by the CRI (Centre de Recherche en Informatique, Paris 1 Panthéon-Sorbonne University) to deliver a presentation the 19th of November on "What the Web is not and what it is" with Aurélien Bénel (UTT). A publication of all the presentations delivered at this seminar since its inception will be published next year by the Publications de la Sorbonne (including our paper with A. Bénel).

- The 20th of November, presentation of an ongoing project with Lise Arena (UNS, Gredeg) and Bernard Conein (UNS, Gredeg) between Inria and UNS on "Digital artifacts and materialities". This was part of an event organized by Sylvie Mellet, vice president of the university for research, where the various interdisciplinary axes of UNS where introduced to an audience of peers.

- Presentation at the Institut für Transportation Design (ITD) of the Hochschule für Bildende Künste Braunschweig, on the 23rd of November (on digital design and sustain-ability: "Caring for all objects, caring for some of them: instauration (destauration)/disclosing (forclosing)/futuring (defuturing)").

- Lille, in December 2015, at the Espace Culture of the University, discussion on the "mappability of the Web". A short paper (3 pages long) was published by the Lettre d'Archimède journal of the University as a teaser for my presentation.

- 1st of December, Time and Temporality on the Web (TToW) international conference, celebrating the Web's 25th anniversary at ISCC (CNRS, Paris) with Fabien Gandon (Inria, Wimmics). Our presentation is dedicated to the history of the architecture of the Web.

9.1.5. Scientific expertise

Alexandre Monnin worked for *Foundation des Galeries Lafayette for Contemporary Art* on their digital platform, of which he is the architect. He worked on the project with Mnemotix, the startup that grew out of Wimmics, and with Telecom ParisTech (official partnership) through Jérôme Denis, who is a sociologist there. This project is very much a research project which aims to capture the practices involved in producing and judging contemporary artworks. Publications are expected to follow from it.

9.1.6. Research administration

Catherine Faron-Zucker coordinates the Web option of the 5th year of Polytech Nice Sophia engineering school and is in charge of continuous training for the computer science department of Polytech Nice Sophia Antipolis.

Fabien Gandon is the W3C Advisory committee representative for Inria.

Alain Giboin serves as scientific correspondent for Inria Sophia of COERLE (Inria Comité Opérationnel d'Evaluation des Risques Légaux et Ethiques), in tandem with the legal correspondent Sabine Landivier.

Isabelle Mirbel is Vice-dean of Science Department at University Nice-Sophia Antipolis.

Andrea Tettamanzi has coordinated the 3nd year of the *Licence* in Business Informatics (MIAGE) at the UFR Science of the Université Nice Sophia Antipolis (UNS)

Nhan Le Thanh is animator of a multidisciplinary cooperation working group (eHealth) and coordinator of the bilateral scientific cooperation program (NiceCampus) between Nice-Sophia Antipolis University and Danang University. He is Director of the computer science department, IUT, Nice-Sophia Antipolis University.

9.2. Teaching - Supervision - Juries

9.2.1. Teaching

Licence : Amel Ben Othmane, Oracle, 64h, L1, IUT UNS.

Licence : Elena Cabrio, Algorithms, Object-oriented programming (labs), 18h, Licence 2, UNS.

Licence : Elena Cabrio, Introduction to the Web (labs), 12h, Licence 1, UNS.

Licence : Elena Cabrio, Web Server Programming (labs), 18h, Licence 1 UNS.

Licence : Olivier Corby, Semantic Web, 2h, L3, UTT.

Licence : Isabelle Mirbel, Databases, 58h, L3 MIAGE, UNS.

Licence : Isabelle Mirbel, Web programming (Persistence), 54h L3 MIAGE, UNS.

Licence : Alexandre Monnin, Analyse des controverses, 7h30, L1, Telecom ParisTech.

Licence : Alexandre Monnin, Philosophie du Web et controverses, 12h, L3, Université Paris 10.

Licence : Andrea Tettamanzi, Algorithmique – Programmation Objet – Python, 50 h, Licence 2, UNS.

Licence : Andrea Tettamanzi, Programmation Web Avancée (côté client), 39 h, Licence 2, UNS.

Licence : Andrea Tettamanzi, Web, 18h, L3 MIAGE, UNS.

Licence : Nhan Le Thanh, Databases, 150h, DUT S2, IUT UNS.

Licence : Nhan Le Thanh, Advanced Databases, 105h, DUT S3, IUT, UNS.

Licence: Nhan Le Thanh, Logical Data Models and Languages, 24h, L3, UNS.

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

Licence : Serena Villata, Conception orientée objets, 6h, Licence Miage, UNS.

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

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

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

Master : Michel Buffa, Web 2.0, Web Services, HTML5, 40h, M2 MIAGE, UNS.

Master : Elena Cabrio, Knowledge Engineering, 7h, Master 2 KIS, UNS.

Master : Elena Cabrio, Web Science, 3h, Master 2 IFI, UNS.

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

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

Master: Amosse Edouard, Development on the Android platform, 24h, M2, UNS, France

Master: Amosse Edouard, Web Services, 22h, M2, UNS, France

Master: Amosse Edouard, Web Architecture & Web Services, 25h, M2, University State of Haiti, Haiti

Master: Amosse Edouard, Mobile Development, 30h, M2, University State of Haiti, Haiti

Master: Amosse Edouard, Introduction to Near Field Communication, 15h, M2, EMSI, Maroc

Master: Amosse Edouard, Administration of Oracle Database, 16h, M1, UNS, France

Master: Alain Giboin, Human-Computer-Interaction Design and Evaluation, 54h, M2, UNS.

Master: Alain Giboin, Interaction Techniques and Mutlimodality, 8h, M2, UNS.

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

Master: Alain Giboin, HCI Design and Evaluation, 10h, M2 Sociology and Ergonomics of Digital Technologies, UNS

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

Master : Isabelle Mirbel, Advanced databases, 48h, MASTER MIAGE 1, UNS.

Master : Isabelle Mirbel, Requirement Engineering, 42h, MASTER MIAGE 1, UNS.

Master : Isabelle Mirbel, Project Management, 20h, MASTER MIAGE 2, UNS.

Master : Alexandre Monnin, Style d'architecture REST et prise en main de Wikipédia/DBpedia, 5h, M2, Université de Technologie de Troyes (UTT).

Master : Alexandre Monnin, Ingénierie des connaissances : Wikipedia, DBpedia et Wikidata, 3h, M2 Miage, UNS.

Master : Andrea Tettamanzi, Systèmes Distribués, 18h, Master MIAGE 1, UNS.

Master : Andrea Tettamanzi, Concurrency and Parallelism, 18h, Master International 1, UNS.

"Fuzzy Description Logics" and "Ontology Learning", within the module *Ingénierie des connaissances*, Master 2 Web, Polytech'Nice, 10 h ETD.

Master : Serena Villata, Knowledge Engineering & Argumentation Theory, 3h, M2 KIS, UNS.

Master : Serena Villata, Web Science, 5h, Master Miage, UNS.

E-learning

Mooc: Fabien Gandon, Olivier Corby & Catherine Faron-Zucker, Semantic Web, 7 weeks, http://www.france-universite-numerique.fr/, Inria, France Université Numérique, Education for Adults, 4000 registered.

Mooc: Michel Buffa, HTML 5 Part 1: HTML5 Coding Essentials and Best Practices, 6 weeks, https://www.edx.org/course/html5-part-1-html5-coding-essentials-w3cx-html5-1x, EDx, W3C, for all international public, 88K + 67K registered (2 sessions).

Mooc: Michel Buffa, HTML 5 Part 2: Advanced Techniques for Designing HTML5 Apps, 4 weeks, https://www.edx.org/course/html5-part-2-advanced-techniques-w3cx-html5-2x, EDx, W3C, for all international public, 20K registered.

9.2.2. Supervision

PhD : **Thi Hoa Hue Nguyen**, *La vérification de patrons de workflow métier basés sur les flux de contrôle : Une approche utilisant les systèmes à base de connaissances*, U. Nice-Sophia Antipolis & U. Danang, June 16th, Nhan Le Thanh

PhD in progress : **Amel Ben Othmane**, *Temporal and Semantic Analysis of Information Retrieved from Short and Spatio-Temporal Messages in Social Networks*, UNS, Nhan Le Than.

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

PhD in progress : **Amosse Edouard**, *Studies of Spatial Semantic Aspect, Real Time Filtering Mechanisms and Semantic Enrichment of Short Messages on Dynamic Spatio-Temporal Social Networks*, UNS, Nhan Le Thanh.

PhD in progress : **Zide Meng**, *Temporal and Semantic Analysis of Richly Typed Social Networks from User-Generated-Content Sites on the Web*, UNS, Fabien Gandon, Catherine Faron-Zucker.

PhD in progress : **Franck Michel**, *Heterogeneous databases federation in distributed environment*, UNS, Johan Montagnat, Catherine Faron-Zucker.

PhD in progress : **Tran Duc Minh**, *Learning Ontologies from Linked Open Data*, Andrea Tettamanzi, UNS and Nguyen Thanh Binh, University of Danang.

PhD in progress : **Emilie Palagi**, *Design of a Model-based Method for Evaluating Exploratory Search Systems*, UNS, Labex UCN@Sophia, Alain Giboin, Fabien Gandon with Raphael Troncy (Eurecom).

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

9.2.3. Juries

Olivier Corby was reviewer, together with Fabien Gandon, of the PhD thesis of Nicola Guido *On the Static Analysis for SPARQL Queries using Modal Logic* at Univ. Grenoble on December 3rd 2015.

Catherine Faron-Zucker was member of the jury of:

Pierre-Yves Buard, *Modélisation de sources anciennes et édition numérique*, Université de Caen, May 2015; Xuan Truong Vu, *User-centered and group-based approach for social data filtering and sharing*, Université de Technologie de Compiègne, April 2015; Farouz Soualah-Alila, *CAMLearn : une architecture de système de recommandation sémantique sensible au contexte: application au domaine du m-learning*, Université de Dijon-Auxerre, March 2015.

Fabien Gandon was president of the jury of Freddy Lecue Habilitation *Semantics for Scalable Machine Reasoning in the Web of Data*, University Nice-Sophia Antipolis, November 6th 2015.

Alain Giboin was jury member of the PhD thesis of Aurore Defays: "Influence des communications multimodales sur le processus de grounding. Proposition d'une méthodologie d'analyse, appliquée dans le domaine de la conception architecturale", Université de Liège, Belgique, July 2015.

Isabelle Mirbel was jury member: Myriam FAKHRI, PAX : une vision des processus métier basée sur la co-ingénierie de compositions de services, Aix Marseille Université, December 2015.

Andrea Tettamanzi was jury member:

Seif-Eddine Kramdi, *A Modal Approach to Model Computational Trust*, Université Paul Sabatier, Toulouse, October 5, 2015; María Martínez Rojas, *Tratamiento inteligente de datos en proyectos de edificación*, University of Granada, Spain, November 25, 2015.

9.3. Popularization

Fabien Gandon's general talks [11]**:**
- Invited general Talk, Agora des Savoir, Montpellier, "Les (r)évolutions de la planète Web" 29/4/2015
- Invited general Talk, DataLift Day, "Quand le Web fait sens" 9/04/2015

Catherine Faron-Zucker's general talks:
- Invited talk at the MOOC Lab Inria workshop in january 2015 on the Linked Data in e-Education

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[11]see **http://www-sop.inria.fr/members/Fabien.Gandon/talks.html**

10. Bibliography

Major publications by the team in recent years

[1] E. CABRIO, S. VILLATA. *Natural Language Arguments: A Combined Approach*, in "20th European Conference on Artificial Intelligence (ECAI 2012)", Montpellier, France, August 2012, https://hal.inria.fr/hal-00724780

[2] E. CABRIO, S. VILLATA, F. GANDON. *A Support Framework for Argumentative Discussions Management in the Web*, in "ESWC - 10th International Conference on The Semantic Web: Semantics and Big Data - 2013", Montpellier, France, Lecture Notes in Computer Science, Springer, May 2013, vol. 7882, pp. 412-426, Best Paper Award, https://hal.inria.fr/hal-00907877

[3] 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, pp. 468-482

[4] O. CORBY, A. GAIGNARD, 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

[5] L. COSTABELLO, S. VILLATA, F. GANDON. *Context-Aware Access Control for RDF Graph Stores*, in "ECAI - 20th European Conference on Artificial Intelligence - 2012", Montpellier, France, August 2012, https://hal.inria.fr/hal-00724041

[6] C. DA COSTA PEREIRA, A. G. B. TETTAMANZI. *A Syntactic Possibilistic Belief Change Operator: Theory and empirical study*, in "Web Intelligence and Agent Systems: An International Journal", 2014, vol. 12, n° 2, pp. 155-169 [*DOI : 10.3233/WIA-140290*], https://hal.archives-ouvertes.fr/hal-00983200

[7] 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

[8] G. GOVERNATORI, A. ROTOLO, S. VILLATA, F. GANDON. *One License to Compose Them All - A Deontic Logic Approach to Data Licensing on the Web of Data*, in "ISWC - 12th International Semantic Web Conference - 2013", Sydney, Australia, Lecture Notes in Computer Science, Springer, October 2013, vol. 8218, pp. 151-166, https://hal.inria.fr/hal-00907883

[9] F. PAGLIERI, C. CASTELFRANCHI, C. DA COSTA PEREIRA, R. FALCONE, A. G. B. TETTAMANZI, S. VILLATA. *Trusting the messenger because of the message: feedback dynamics from information quality to source evaluation*, in "Computational and Mathematical Organization Theory", 2014, vol. 20, n° 2, pp. 176-194, Published Online: 28 August 2013 [*DOI : 10.1007/S10588-013-9166-X*], https://hal.archives-ouvertes.fr/hal-00906518

[10] S. VILLATA, L. COSTABELLO, N. DELAFORGE, F. GANDON. *A Social Semantic Web Access Control Model*, in "Journal on Data Semantics", March 2013, vol. 2, n° 1, pp. 21-36, https://hal.inria.fr/hal-00907866

Publications of the year

Doctoral Dissertations and Habilitation Theses

[11] T. H. H. NGUYEN. *Control flow-based business workflow templates checking : an approach using the knowledge-based systems*, Université Nice Sophia Antipolis, June 2015, https://tel.archives-ouvertes.fr/tel-01175929

Articles in International Peer-Reviewed Journals

[12] M. DRAGONI, A. G. B. TETTAMANZI, C. DA COSTA PEREIRA. *Propagating and Aggregating Fuzzy Polarities for Concept-Level Sentiment Analysis*, in "Cognitive Computation", April 2015, vol. 7, n° 2, pp. 186-197 [*DOI :* 10.1007/S12559-014-9308-6], https://hal.archives-ouvertes.fr/hal-01150556

[13] Z. MENG, F. GANDON, C. FARON-ZUCKER, G. SONG. *Detecting topics and overlapping communities in question and answer sites*, in "Social Network Analysis and Mining Journal (SNAM)", July 2015, vol. 5, n° 1, pp. 27:1–27:17 [*DOI :* 10.1007/S13278-015-0268-Y], https://hal.archives-ouvertes.fr/hal-01187445

[14] A. MONNIN. *L'ingénierie philosophique de Rudolf Carnap*, in "Cahiers philosophiques", 2015, n° 141, 27 p. , https://hal.inria.fr/hal-01151072

Articles in National Peer-Reviewed Journals

[15] A. HENNION, A. MONNIN. *Sous la dictée de l'ange. . .* , in "Annales de l'institut de philosophie de l'université de Bruxelles", September 2015, https://hal.inria.fr/hal-01151117

[16] S. INTHASONE, N. PASQUIER, A. G. B. TETTAMANZI, C. DA COSTA PEREIRA. *Biodiversity and Environment Data Mining*, in "Scientific Journal of National University of Laos", May 2015, vol. 9, pp. 116-128, https://hal.archives-ouvertes.fr/hal-01160069

International Conferences with Proceedings

[17] Z. AZMEH, I. MIRBEL. *Identifying Reputable Contributors During Requirements Gathering in Collaborative Software Development Platforms*, in "RCIS 2015", Athenes, Greece, May 2015, https://hal.archives-ouvertes.fr/hal-01159806

[18] A. BEN OTHMANE, A. G. B. TETTAMANZI, S. VILLATA, M. BUFFA, N. LE THANH. *A Multi-context Framework for Modeling an Agent-Based Recommender System*, in "8th International Conference on Agents and Artificial Intelligence (ICAART2016)", Rome, Italy, February 2015, https://hal.inria.fr/hal-01239884

[19] S. BENLAMINE, M. CHAOUACHI, S. VILLATA, E. CABRIO, C. FRASSON, F. GANDON. *Emotions in Argumentation: an Empirical Evaluation*, in "International Joint Conference on Artificial Intelligence, IJCAI 2015", Buenos Aires, Argentina, July 2015, pp. 156-163, https://hal.inria.fr/hal-01152966

[20] M. BUFFA, A. HALLILI, P. RENEVIER. *MT5: a HTML5 multitrack player for musicians*, in "WAC 1st Web Audio Conference January 26-28, 2015 - IRCAM & Mozilla Paris, France", Paris, France, IRCAM & Mozilla Paris, May 2015, https://hal.inria.fr/hal-01150455

[21] E. CABRIO, C. FARON-ZUCKER, F. GANDON, A. HALLILI, A. G. B. TETTAMANZI. *Answering N-Relation Natural Language Questions in the Commercial Domain*, in "The IEEE/WIC/ACM International Conference on Web Intelligence", Singapore, Singapore, December 2015, https://hal.archives-ouvertes.fr/hal-01187413

[22] C. CALLOU, F. MICHEL, C. FARON-ZUCKER, C. MARTIN, J. MONTAGNAT. *Towards a Shared Reference Thesaurus for Studies on History of Zoology, Archaeozoology and Conservation Biology*, in "Extended Seman-

tic Web Confenrece 2015, workshop Semantic Web For Scientific Heritage (SW4SH)", Portoroz, Slovenia, May 2015, vol. Proceedings of the ESWC'15 workshops, https://hal.archives-ouvertes.fr/hal-01146638

[23] C. CARDELLINO, L. ALONSO ALEMANY, S. VILLATA, E. CABRIO. *Improvements in Information Extraction in Legal Text by Active Learning*, in "Proceedings of the 28th Annual Conference on Legal Knowledge and Information Systems", Braga, Portugal, Legal Knowledge and Information Systems - JURIX 2015: The Twenty-Eighth Annual Conference, December 2015, vol. Frontiers in Artificial Intelligence and Applications 279, pp. 21-30, https://hal.inria.fr/hal-01236697

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