



INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE

*Project-Team ACACIA*

*Acquisition des Connaissances pour  
l'Assistance à la Conception par  
Interaction entre Agents*

*Sophia Antipolis*

THEME SYM

*Activity*  
*R* *eport*

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# 2. Overall Objectives

## **2.1.1. Context and Objectives**

Our multidisciplinary project aims at offering methodological and software support (i.e. models, methods and tools) for knowledge management (KM), i.e., for building, managing and distributing a corporate memory. This research can be extended to any organization or community.

## **2.1.2. Research Topics**

We study the case where the building of a corporate memory relies on use of knowledge underlying documents, on the management of links between documents and knowledge bases or on the modelling of multiple viewpoints. We study knowledge acquisition, modelling and management from multiple expertise sources (experts and documents). We are especially interested in several scenarios of corporate memory: technical memory, profession memory and project memory, in particular in concurrent design, skills management and scientific and technological watch.

We study the problems raised by the dissemination of knowledge through a knowledge server via the corporate Intranet or via the Web: we consider the semantic Web as a privileged way for supporting

management of knowledge distributed either inside a company or between several companies. We aim at building knowledge servers enabling search for information in a heterogeneous corporate memory, this search being “intelligently” guided by ontologies and ontological annotations.

This work is a contribution to the construction of a semantic Web for a company or a community. We focus on the case of a corporate memory materialized in the form of a XML-based corporate semantic Web.

For representing ontologies or knowledge models, we use Sowa’s conceptual graphs formalism and the languages of the XML galaxy (especially RDF - Resource Description Framework).

Our research topics can be decomposed as follows:

- Support for Corporate Memory Construction:
  - Methodology for building a corporate memory.
  - Multi-agents architecture for corporate memory.
  - Project memory and technical memory for concurrent design.
  - Management of multi-expertise:
    - \* Acquisition, modeling and capitalizing knowledge from several experts.
    - \* Managing multiple expert models, multiple ontologies, multiple points of view.
  - Acquisition, modeling and capitalizing knowledge from texts.
- Support for Corporate Memory Broadcast and Use:
  - Knowledge Servers on a Semantic Web.
  - Tools for Querying and Browsing Ontologies and Documents.
  - Support to “Intelligent” Information-Retrieval, guided by ontologies.
  - Multi-agents System for Information Retrieval in a Distributed Corporate memory and for Proactive Dissemination.

### 2.1.3. International and industrial relations

Our work was applied in the context of the IST project CoMMA. We collaborate or collaborated with industrialists in the following fields: aeronautics (Aerospace, Dassault-Aviation, EADS), car industry (Renault), telecommunications (CSELT, T-NOVA, Telecom Valley), service integration (Atos Origin). We also had collaborations with researchers in accidentology (INRETS) and currently we have collaborations in civil engineering sector (CSTB), in the field of health (Nautilus) or in biology (IPMC). We had international relations with Griffith University and CSIRO (Australia), Parma University (Italia) and T-Systems Nova (Germany). We took part in the OntoWeb thematic network and we take part in the Knowledge Web Network of Excellence.

## 3. Scientific Foundations

### 3.1. Foundations

**Keywords:** *Artificial Intelligence, Assistance to the User, Co-operation, Cognitive Sciences, Conceptual Graph, Corporate Memory, Information Retrieval, Knowledge Acquisition, Knowledge Engineering, Knowledge Management, Knowledge Server, Knowledge-Based System, Multiagent System, Multiexpertise, OWL, Ontology, RDF, Semantic Web, Structured Document, XML.*

Knowledge Management (KM) is one of the key progress factors in organizations. It aims at capturing explicit and tacit knowledge of an organization, in order to facilitate its access, sharing out and reuse [7][6]. The considered organization can be an actual enterprise or a public organization, but it may also just consist of a given department or service; it can also be a group, or a community, or a virtual enterprise (made of members possibly stemming from different companies, but sharing a common interest). An organization is made up of people interacting for common objectives, in an internal environment and with an external environment. These persons may have different functions and tasks in the organization, different competencies, knowledge, opinions, and work methods and they may produce explicit traces of their activities. In the course of their individual or collective tasks, they may need to find people able to give them useful information or to find such helpful information somewhere (in a document, a database, a CDROM, a film, etc.).

The members of the organization have individual knowledge (that may be explicit, implicit or tacit), as well as individual and collective objectives in the framework of their group or of the whole organization. The organization has global objectives and KM must be guided by a strategic vision. This vision enables to determine the main organizational objectives for KM:

- Improve knowledge sharing and cooperative work between people inside the organization.
- Disseminate the best practices in the company.
- Preserve past knowledge of the company so as to reuse it.
- Improve quality of projects and innovation.
- Improve relationships with external world (such as customers, or privileged partners).
- Anticipate evolution of the external environment (clients, competitors, etc.).
- Be ready to react to unexpected events and to manage emergency and crisis situations.

So a KM policy must rely on a deep understanding of what is the organization, what is its corporate culture, what kind of knowledge exists (either individual, or collective in an internal group or collective in the whole organization), how can the organization's intellectual capital be assessed, how can the past explain the present and help to prepare the future, what can be the strategic objectives of KM and how they can be achieved according to the corporate culture and the environment of the end-users.

In an organization, knowledge can be individual or collective, it can be explicit, implicit, or tacit. In Nonaka's model [70], organizational learning relies on transformation between these different types of knowledge. Collective knowledge can also emerge in a community of practice. Tacit knowledge can be transmitted without any language (e.g. through observations), but in order to be transmitted to other persons, explicit knowledge generally needs a medium (i.e. document, database, etc.) so that people can create their own knowledge either by interacting with each other or by retrieving information from explicit traces and productions of other colleagues' knowledge. Knowledge can also be distributed among several knowledge sources in the organization, with possibly heterogeneous viewpoints.

There are three significant aspects to be tackled:

- People (i.e. their knowledge, the way they acquire and communicate this knowledge, their organizational functions, their interest centers, their knowledge networks, their work environment, etc.): any KM solution must be compatible with the end-users' cognitive models and work environment.
- Organization (i.e. its objectives, its business processes, the corporate culture, its corporate strategy, etc.): any KM solution must be compatible with the organizational strategy and culture.
- Information technologies for supporting the intended knowledge management: the chosen technologies will depend on the KM objectives and on the intended end-users' environment.

The strategic vision for KM must enable to select the KM priority needs and to orientate the choice of relevant techniques. One possible approach for KM is the building of a corporate memory or organizational memory (OM). A corporate memory can be defined as an "explicit, disembodied, persistent representation of crucial knowledge and information in an organization, in order to facilitate their access, sharing and reuse by members of the organization, for their individual or collective tasks". So different scopes and grains are possible for an organizational memory. Its building can rely on the following steps (cf. figure 1) [6], with Management throughout all such steps:

1. Detection of needs in corporate memory,
2. Construction of the corporate memory,
3. Diffusion of the corporate memory,
4. Use of the corporate memory,
5. Evaluation of the corporate memory,
6. Maintenance and evolution of the corporate memory.

An organizational memory can be modeled from several perspectives: for whom, why, what, how, when, who and where. It aims at delivering the right knowledge to the right person at the right time in the right format, in order to enable the right action / decision. Although KM is an issue in human resource management and enterprise organization beyond any specific technological issues, there are important aspects that can be supported or even enabled by intelligent information systems. Especially artificial intelligence (AI) and related fields provide solutions for parts of the overall KM problem. Several techniques can be adopted for the building of an OM. The choice of a solution depends on the type of organization, its needs, its culture and must take into account people, organization and technology.

Several research topics can be useful for OM design:



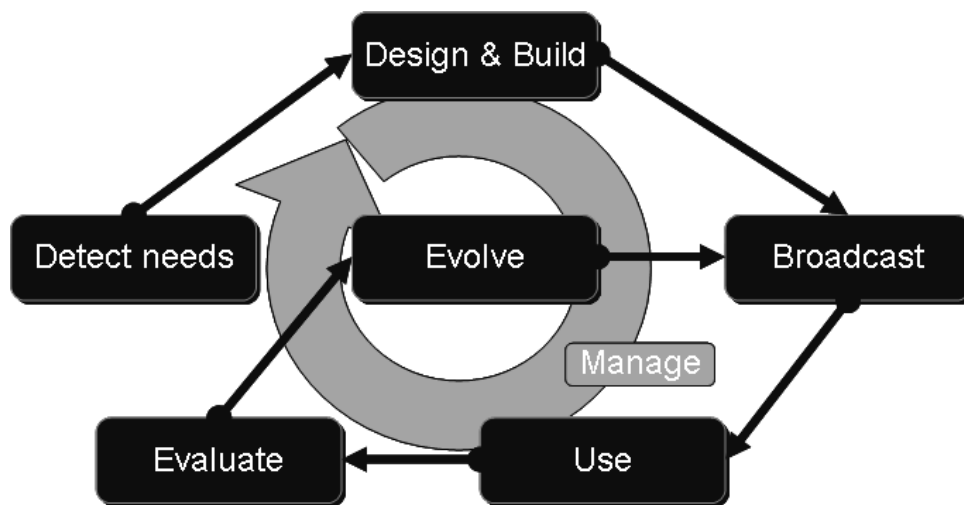


Figure 1. Life cycle of corporate memory

- Knowledge engineering and enterprise modeling techniques [49][73][55][54] can contribute to identification and analysis of a company’s knowledge-intensive work processes (e.g. product design or strategic planning): the analysis of information flow and involved knowledge sources allows to identify shortcomings of business processes, and to specify requirements on potential IT support.
- In order to acquire implicit knowledge, knowledge engineering methods and techniques are useful, in particular concepts handled in knowledge engineering such as ontologies, tasks and problem-solving methods. Knowledge modeling can be needed. The degree of depth of required knowledge modeling can vary: a significant depth can be required if the organizational memory is materialized in a knowledge base, a shallow modeling is sufficient for building a simple competence map of the organization.
- Past experiments (e.g. lessons of past projects, past incidents, past successes or failures, etc.) can be represented in a case-based system [47]; case-based reasoning techniques can then be useful for retrieving them and reusing them for a new situation.
- Ontologies can be a component of a corporate memory so as to be explored by the end-users; they can also be used for improving information retrieval about resources (such as documents or persons) constituting the memory if these resources are annotated w.r.t. the ontology. Such a use of ontology is close to the Semantic Web approach relying on metadata describing the semantic content of the Web resources, using ontologies [56][71]. This approach for a corporate memory is inspired of the Semantic Web and is called “corporate semantic web” by the Acacia team [22][21], [53].
- Natural language processing (NLP) tools can be exploited for the construction or enrichment of such ontologies [48] or for building annotations on the resources constituting the corporate memory.
- KM in an organization requires abilities to manage disparate know-how and heterogeneous view-points, to make them accessible and suitable for the organization members that need them. When the organizational knowledge is distributed on several experts and documents in different locations, an Intranet inside the organization and Web technologies can be a privileged means for acquisition, modeling, management of this distributed knowledge. Agent technologies and Semantic Web technologies are a privileged way to handle such a distributed memory. Moreover, CSCW [50] offers an interesting way to enhance collaborative work between persons through distributed memories.

- A specific kind of corporate memory is a project memory for preserving knowledge acquired during a project, for improving project management, for reusing past project experiences, design technical issues and lessons learned [6]. KM can rely on the business processes. This process-oriented vision of KM can lead to OM integrating workflow systems.
- A corporate memory can rely on a competence map, and techniques enabling expertise location are very useful for knowing who knows what in the company.

The Acacia approach relies on the analogy between the resources of a corporate memory and the resources of the Web. We consider that a corporate memory can be materialized in a corporate semantic web, that consists of [6][22][21]:

- resources (i.e. documents in XML, HTML or non Web-oriented formats, people, services, software, materials),
- ontologies (describing the conceptual vocabulary shared by the different communities of the organization),
- semantic annotations on these resources (i.e. on the document contents, on persons' skills, on the characteristics of the services/software/materials), these annotations using the conceptual vocabulary defined in ontologies.

The underlying research topics are:

- How can we build and make evolve each component (resource, ontology, annotation)?
- How can we build them semi-automatically through knowledge acquisition from textual sources or from structured database?
- How can we take into account multiple viewpoints?
- How can agent technology enable to build, manage and use a distributed memory?
- How can we offer "intelligent", ontology-guided information retrieval or pro-active dissemination?
- How can we rely on scenarios of use for needs detection and for stakeholder-centered evaluation?

## 4. Application Domains

### 4.1. Panorama

**Keywords:** *Accidentology, Aeronautics, Automobile, Biology, Engineering, Health, Oncology, Telecommunications, Transportation.*

There are various application domains of the project: our work on technical memory or project memory has applications in engineering (aircraft industry and car industry). Our work on the knowledge servers also has applications in engineering, in the sector of telecommunications (for corporate memory, skills management and technological watch) and in the biomedical field. Accidentology for road safety was a privileged application domain of all our work. But many other fields are possible.

### 4.2. Transportation: Accidentology

We collaborated with INRETS for the modeling of knowledge of several experts in road accident analysis (psychological specialists in the driver's behavior, vehicle engineers, infrastructure engineers). This application of accidentology illustrates an example of (partial) corporate memory and moreover, served as concrete example for numerous works of the team: analysis of co-operation between experts during a collective problem resolution, analysis of explanatory dialogues, comparison between multiple expertise models via our MULTIKAT software, exploitation of CommonKADS method generic models, association of conceptual graphs to

expertise documents via our CGKAT software, representation of the artificial agents associated to the experts and their COMMONKADS expertise models, exploitation of the C-VISTA model for the representation of multiple points of view of different experts. We developed the RESEDA system (Intranet Network for Detailed Study of Accidents) in XML and JAVA, in order to support INRETS for road accident analysis.

### 4.3. Transportation and Engineering: Automobile

In the context of the improvement of the vehicle design process control, we collaborated with Renault to develop a memory of problems encountered during vehicle projects, whose traces were stored in the corporate information system. The construction of this project memory relied on techniques of knowledge engineering and of linguistic analysis. SAMOVAR system can be considered as a concrete example of corporate semantic Web.

### 4.4. Transportation and Engineering: Aeronautics

In the past, we had collaborated with Aérospatiale and Dassault Aviation on project memory. Recently, we collaborated with EADS Corporate Research Laboratory for building a Corporate Memory for an Industrial Research Laboratory.

### 4.5. Telecommunications

Our work on corporate memory, in particular the use of intelligent agents, ontologies and XML technology, is of particular interest for the companies of the telecommunications sector, as testifies our collaboration with T-NOVA (Deutsche Telekom) and CSELT (Italian Telecom) in the framework of the CoMMA IST project. T-NOVA applied this work for the assistance to insertion of new employees and CSELT for the assistance to technological monitoring. We currently collaborate with Telecom Valley and the GET (ENST and ENST-Bretagne) for our work on skills management in the RNRT KMP project. We also collaborate with ENST-Bretagne for the CNRS Specific Action on "Semantic Web and E-learning".

### 4.6. Civil Engineering Sector

Our work on corporate memory, in particular the use of intelligent agents, ontologies and XML technology, is also interesting for the construction industry: we thus collaborated with the CSTB (French Scientific and Technical Center for Building) within the framework of the CoMMA project for a scenario of technological watch. We continue a collaboration on the topics of technological watch.

### 4.7. Biomedical Domain

Our work on corporate memory, in particular our corporate semantic Web approach (ontologies and XML technology), is applied to several biomedical applications: use of linguistic techniques for building an experiment memory for transcriptome analysis (in the framework of the MEAT project in collaboration with IPMC), use of a medical ontology, viewpoints and CSCW for supporting collaborative work in a health care network (in the context of the ACI *Ligne de Vie* project in collaboration with the SARL Nautilus and SPIM (Service de Santé Publique et d'Informatique médicale de la Faculté de Médecine Broussais-Hôtel Dieu).

## 5. Software

### 5.1. CORESE

**Keywords:** *Conceptual Graph, Information Retrieval, OWL, RDF, RDFS, Semantic Web, XML, ontology.*

**Participants:** Olivier Corby [correspondant], Olivier Savoie.

### 5.1.1. Description.

CORESE (COncceptual REsource Search Engine) is an RDF(S)-dedicated engine based on conceptual graphs. It enables to load RDFS schemas and RDF annotations and to transform them into conceptual graph formalism. It then enables to query the base of annotations thus created, by using the projection operator offered by the conceptual graph formalism. The result obtained is translated into RDF to be returned back in response to the request.

CORESE takes benefits of an INRIA operation of software development (ODL) intended to improve quality of the implementation in order to support its diffusion.

<http://www-sop.inria.fr/acacia/soft/corese>

### 5.1.2. Applications.

CORESE is used as search engine:

- for the KMP project on skills management with Telecom Valley,
- in the *Ligne de Vie* project on health care network,
- in the MEAT project on experiment memory on transcriptome analysis,
- in our co-operation with EADS.

CORESE was the cornerstone of four co-operations of the Acacia team:

- the IST project, CoMMA (Corporate Memory Management through Agents) [57][58],
- the SAMOVAR project with Renault [13], [64][63],
- the co-operative research action ESCRIRE [69],
- the Color action Aprobation with CSTB.

### 5.1.3. Diffusion.

- CORESE was registered at APP.
- CORESE was made available to:
  - Renault,
  - ATOS Origin,
  - T-Systems NOVA (Deutsche Telekom),
  - CSTB,
  - CSELT (Telecom Italia),
  - LIRMM,
  - Mainline team at ESSI,
  - CETU (Centre d'étude des tunnels du Ministère de l'Équipement).
  - University of Santiago Chili,
  - ENST Bretagne,
  - Tech-CICO team at Université Technologique de Troyes (UTT),
  - Facultad de Informatica, LSIIS
  - Zuhlke Engineering AG, CH
  - W3C Group on the Social Meaning of RDF Graphs, Deltek Systems, Inc. USA
  - Galaad team at INRIA Sophia Antipolis.

- In 2004, CORESE was presented in demonstration to:
  - Thales,
  - IPMC, I3S for the MEAT Cooperation
  - ILOG TAB,
  - Software Café on Corese,
- The work on CORESE was published in [3][4][29].
- The project of creation of the start-up eCore in order to market a solution for skills management based on Corese was prize-winner (category emergence) in the 2004 National Competition for support to creation of enterprises of innovative technologies, competition organized by the Ministry of Research with participation of Anvar and of Social European Fund (FSE).
- Olivier Corby and Rose Dieng-Kuntz gave an interview on Corese to Corriere della Serra and to Nice-Matin.

## 6. New Results

### 6.1. Support to Modelling and Building of a Corporate Memory

**Keywords:** *Assistance to the User, Co-operation, Cognitive Psychology, Cognitive Sciences, Communication, Corporate Memory, Knowledge Acquisition, Knowledge Engineering, Knowledge Management, Ontology.*

The objective of this action is to propose methodological and software support for the construction of a corporate memory, thanks to a user-centered approach. We study in particular the construction of a corporate semantic Web and the construction of ontologies and annotations from human and textual sources of expertise or from databases. Moreover, we study how to handle multiple viewpoints or multiple ontologies and how to take into account the life cycle and the evolution of a corporate semantic web. We also started to study a new scenario of knowledge management: e-Learning, and to study how to use “Semantic Web Services” and to tackle the context and privacy of the (possibly mobile) user.

#### 6.1.1. Methodology for Construction of a Corporate Semantic Web

**Keywords:** *Corporate Memory, Knowledge Capitalization, Knowledge Management, Project Memory.*

**Participant:** Rose Dieng-Kuntz.

We synthesized our vision of a corporate semantic web, and we proposed a life cycle based on the following steps [53]:

- Inventory of fixtures,
- Choice of the application scenarios,
- Building of the ontology (from human sources, from textual corpus or from structured databases),
- Validation of the ontologies: consistency checking from system viewpoint, knowledge audit and validation by experts, evaluation by end-users),
- Constitution, organisation and validation of resources: creation of new resources, or adaptation (transformation, reorganization) of legacy resources,
- Annotation of resources: manual annotation, automatic annotation or semi-automatic annotation,
- Validation of the semantic annotations and of the corporate semantic Web,
- Maintenance and Dynamic evolution of the corporate semantic Web.

A synthesis of existing work on corporate semantic Webs (history, approach, methods, tools and examples of applications) is described in [53]. Several examples of construction of such corporate semantic Webs inspired of Acacia applications are described in [22][21].

### 6.1.2. Adapting Models from Human and Social Sciences to the Design of Organizational Memory Systems

**Participant:** Alain Giboin.

If machine-to-machine interoperability through ontologies is a major issue of the Semantic Web research, users' mutual understanding is a critical issue. Our research actions deal with the mutual understanding issue, considered as threefold: (1) mutual understanding between users (in our case, of Semantic Web applications supporting Organizational Memory and Knowledge Management), (2) mutual understanding between users and machines, and (3) mutual understanding between users and designers. The aim of the research actions is to provide designers and users with models, methods, and tools to facilitate such types of mutual understanding.

- The *Correspondences framework*. We further developed our work on the use of the Correspondences Framework [60][61] to analyze and support the coordination between producing and understanding or using the electronic documents which constitute a part of the memory of some organization [24]. This dialogical framework relies on the principle that documents are props of a dialog between writers and readers of these documents, and that the dialog succeeds when correspondences can be established, through documents, between the writers and readers respective representations and processes, be they internal or external. We analyzed some organizational memory techniques in terms of correspondence processes.
- The notion of *Common Frame of Reference*. Correspondence processes allow people to build shared internal representations which [68][67] called « [operative] common frames of reference » (*référentiels (opératifs) communs*), and which are also referred to as « shared context » [65] or « internal context » [66]. We reviewed a set of French-speaking work in ergonomic psychology on common reference frames, as well as non-French-speaking work often used in this French-speaking work [62], and identified convergence points in this work: (a) on the nature of common frames of reference, (b) on the processes used to construct the frames, and (c) on the ergonomic consequences of (a) and (b) for designing collective work systems such as organizational memory systems or knowledge management systems. One of the convergence points we identified is the necessity to consider common frames of reference as two-sided representations, or as joint internal (mental) and external (physical) representations.
- *The notion of corresponding representations*. Viewed as external representations, common frames of reference refer to notions such as "mediating representation", "intermediary representation", "intermediary object", "boundary object", and "communication genre", which are employed in system design communities such as knowledge and ontology engineering, requirements analysis, human-computer interaction, and computer-supported cooperative work, to improve mutual understanding. For example, the knowledge engineering community uses the notion of *mediating representations* to denote « problem modeling languages that help bridge the gap between experts and computer implementations » [52]. Gathering these various notions under the term of "corresponding representations", we began to analyze them using our Correspondences Framework, and relying on our previous work on representations for mutual understanding and mutual agreement [51]. As suggested in [62], we also began to work towards constituting "referential components" libraries to be later on connected to "user-interface components" libraries. Scenarios are such referential components.
- *Scenario-based design and evaluation of ontologies and semantic web applications*. This action is a follow-up to the work reported in [59]. For the KMP project, we elaborated a scenario-based procedure to evaluate ontology-based interfaces. We also initiated a research action aimed at designing an editor of multimedia scenarios for ontology-based applications.



### 6.1.3. *Generation of Semantic Annotations for an Experiment Memory: Application to Transcriptome Analysis*

**Keywords:** *Biochip experiments, Corporate memory, Natural Language Processing, Ontologies, Semantic Web, Semantic annotations.*

**Participants:** Khaled Khelif, Rose Dieng-Kuntz.

This work is carried out in the context of Khaled Khelif's thesis.

The study of gene expression has been greatly facilitated by biochip technology. Biochips can assess tens of thousands of genes simultaneously and provide a huge amount of information: for example, information about the roles played by particular genes in drug sensitivity and the effects of drugs on gene expression. In the framework of a collaboration project with biologists working on biochip experiments at IPMC [30], our work consists of assisting them in validating and interpreting the results of their experiments of obtained results. Our aim is to propose methodological and software support for the capitalization and the valorisation of knowledge resulting from experiments (semantic annotations, ontology...) and techniques to preserve and reuse data (structured documents, semantic information retrieval). We rely on the techniques of semantic web and knowledge engineering.

Initially we focused on the validation and interpretation of experiments results. Since this phase of validation is based on information retrieval, our approach rests on the semi-automatic generation of semantic annotations for scientific articles in the biochip domain. These articles can come from internal sources such as specific documentation databases for each biologist or from external sources such as on line documentation databases. Thus, we developed a system which, starting from a text written by a biologist (e.g. a scientific article), allows to generate a structured semantic annotation, based on a domain ontology, and describing the semantic contents of this text. This system called MeatAnnot, extracts information from text, instantiates concepts and relationships of UMLS ontology and generates RDF annotations for the document [39][36][37][38]. Then, we validated these annotations with biologists and we tested their coherence using Corese. Finally, we are studying the scalability of the system and we are working on methods which allow to make reasoning on these annotations using the query language and rules of Corese.

### 6.1.4. *Ontologies and Semantic Relation Acquisition from Biomedical Corpora*

**Keywords:** *NLP, Semantic Web, Syntax-semantics interface, Unification-grammars, causation, lexico-syntactic information extraction, ontology and annotation learning, semantic schema acquisition.*

**Participants:** Laurent Alamarguy, Rose Dieng-Kuntz, Catherine Faron-Zucker.

This work is performed in the framework of Laurent Alamarguy's PhD thesis. Corpus-based knowledge acquisition is an important challenge for community memory constitution by collecting and apprehending language constructions underlying domain knowledge. This constitutes a helpful method for domain experts to supervise their discovery of relevant knowledge interrelations and favors information retrieval. This work deals with the acquisition of semantic relations from biomedical corpora for the construction of ontology and annotations. This aims at elaborating methodological supports and tools to enhance the automation of ontology construction and enrichment from linguistic comprehension of texts in order to develop community memory in biomedical area.

Text comprehension through Natural Language Processing methods provides knowledge structures closer to target domain thanks to fine-grained and more accurate linguistic analysis. While respecting the domain ontological conformity, the automation of knowledge extraction and construction has to be increased by optimizing the linguistic processing, so our study naturally focuses on the syntax-semantics interface development.

After having underlined the importance of the notion of causality interrelating central nervous system pathologies and some involved genes, from our training corpus constituted with Medline abstracts, we collected some semantic markers denoting causal relations, such as verbs like "to cause", "to affect", "to inhibit", etc., or nouns like "inhibition", "triggering", etc., or more idiomatic lexical constructions like "to act upon", "to be responsible for". This step aims at discovering the nature of conceptual knowledge that could

be extracted and to elaborate some conceptual frameworks by apprehending the contextual frame through the causative construction peculiar to each semantic marker with its causing and caused elements and its domain setting.

More generally our conceptual acquisition method aims at proposing some salient semantic relation schemas to domain experts who supervise the ontology and annotation construction. This method follows the linguistics processing philosophy and is declined into several main stages dedicated to the syntax-semantics interface. This interface is elaborated through the formalism of the grammatical parser, PATR-II, based on unification grammars that are performed thanks to lexicons that are constituted with the results of term extraction and shallow processing that reveals different kinds of abstract lexico-syntactic information, and thanks to grammars that we manually determine upon causative construction of salient semantic markers [25][26]. This interface generates some candidate conceptual schemas that are transcribed in semantic web RDF(S) languages to be used with Corese search engine.

More particularly the focus on the syntax-semantics interface concerns text comprehension, and discourse processing is tackled through a cognitive-functional approach. We rely on this approach to elaborate the discourse parsing following the modeling of lexicon and rules taking into account some lexical and morpho-syntactic information, and also to construe the valence between form and meaning bringing new perspective on the ontology construction.

### 6.1.5. Construction of a multi-point of view Semantic Web

**Keywords:** *Ontology, Ontology Matching, Semantic Web, Viewpoints.*

**Participants:** Thanh-Le Bach, Rose Dieng-Kuntz.

This work is carried out within the context of Thanh-Le Bach's PhD.

The objective of this thesis is to allow to construct and use a semantic web in a heterogeneous organization, comprising various sources of knowledge and various categories of users and requiring the management of multiple ontologies or of a single ontology organized in multiple viewpoints.

During this year, we continued to study the state of the art on current alignment techniques. We contributed to the workpackage 2.2 "Heterogeneity" of the European Network of Excellence, Knowledge Web (<http://knowledgeweb.semanticweb.org/>). A new algorithm for matching/aligning two ontologies is being studied, as extension of the previous one dedicated to RDF(S) [27]. We try to build it based on the ontology structural information and all the other available information possible in ontologies. The new algorithm will focus on the matching/aligning for two ontologies represented in OWL, the web ontology language recommended by W3C. In the first stage, the algorithm will deal with ontologies represented in OWL Lite. So the available information in an OWL (Lite) ontology will be extracted from 40 OWL (Lite) primitives (constructs or elements) such as owl:class, owl:cardinality... and from individuals described in the ontology.

We also proposed a representation of C-VISTA model in OWL. C-VISTA model is a model proposed by Myriam Ribière for representing multiple viewpoints, so it allows to represent multi-viewpoints ontologies [15]. The result is an OWL ontology representing C-Vista model. It will be used to construct a new OWL multi-viewpoints ontology. This OWL ontology will be validated in the future (in the real-world uses) and will be modified if necessary.

As further work, the new algorithm for matching/aligning OWL ontologies will be improved, implemented in Java and tested with ontologies in the framework of *Ontology Alignment Contest* <http://co4.inrialpes.fr/align/Contest/> and other test ontology pairs at I3CON (the Information Interpretation and Integration Conference) <http://www.atl.external.lmco.com/projects/ontology/i3con.html>. The new algorithm will be also adapted for matching/aligning multi-viewpoints ontologies.

### 6.1.6. Management of Corporate Semantic Web Evolution

**Keywords:** *Annotations, Corporate semantic web, Evolution, Life cycle, Ontologies, Versioning.*

**Participants:** Phuc-Hiep Luong, Rose Dieng-Kuntz.

This work is being carried out within the framework of Luong Phuc Hiep's PhD research.



Nowadays, business dynamics and changes in the operating environment often give rise to continuous changes in application requirements, especially in the web-based applications. The web changes at an incredible pace, much faster than a user or even an intelligent web agent can keep up with. Due to the ever increasing complexity, heterogeneity and physical distribution of the information resources, the Semantic Web applications therefore need efficient mechanisms to cope with changes in the environment.

One of our current research approaches is to study the life cycle of a Corporate Semantic Web and the problems related to its evolution: evolution of each component (resources, ontologies and annotations) and evolution of relations among these components.

We aim at studying thoroughly the problems of redundancy and consistency regarding ontology modification, influence on the set of dependent components of an ontology (semantic annotations on these resources, annotated resources with ontology and other dependent ontologies), the problem of version management of some ontologies and annotations and the problem related to cooperative and distributed evolution of ontologies and annotations through the multiple human agents and software. For the first step, we focused on analyzing some related work on ontology evolution. In particular, we have studied the change management for distributed ontologies and some existing methods and tools for ontology evolution as well as the cooperative relations between ontologies and semantic annotations. This work is also a part of the workpackage WP2.3 "Dynamics" of the Knowledge Web Network of Excellence.

As further work, we will continue to study ontology evolution and its influence on the resources and annotations depending on the evolving ontology. We also started to work on the metadata evolution and the problem of management of these changed versions of ontologies and annotations.

### 6.1.7. Semantic Web and E-Learning

**Keywords:** *Annotations, E-learning, Ontologies, Pedagogical Resource Composition, Pedagogical Resource Retrieval.*

**Participants:** Sylvain Dehors, Fabien Gandon, Catherine Faron-Zucker, Alain Giboin.

This work takes place in the framework of Sylvain Dehors's PhD.

Several domains of both topics (Semantic Web and E-Learning) were investigated through an extensive bibliographic research. Below is presented a brief overview of the outcome of this task: it appears that many research fields now deal with e-learning issues, some of them were originally interested in achieving learning through computer use like Intelligent Tutoring Systems and AH. But as new paradigms of learning grow popular, communities dealing with KM are tackling the problem as well, dragged along with others by the universal and irresistible current of the spread of the Web.

This "webization" comes with new ideas such as the Semantic Web, which aims at standardizing and facilitating knowledge sharing. The scientific evidence we've been gathering during this year clearly shows a convergence move towards standardization. Work on standards such as LOM or SCORM appear to be the first step in that direction. One of the questions still raised is whether and how the Semantic Web can play a key role in this process.

As a start to take advantage of semantic web techniques for e-learning, we considered e-learning as a new scenario for knowledge management. By using the semantic search engine Corese, we explored several common e-learning scenarios where learning material was looked upon as a set of learning resources.

In any domain, the first issue raised by using semantic web techniques is to get sufficient processable information to work with (metadata, annotations, resource descriptions, etc.). So our first experiment consisted in building an annotation tool to allow the expression of this information in a machine understandable way, namely RDF, a W3C standard the Semantic Web relies upon.

The expression of that kind of information is tightly related to an ontology, in this case we restricted to model to the pedagogical domain. We used existing models and schemes to build a specific ontology based on LOM and Dublin Core standards. Once combined with the annotation tool, the ontology offers perspectives for model-guided human annotation processes.

And finally we are currently setting up an experiment to evaluate how semantic techniques can improve the common e-learning situation where undergraduate students access course material through the web. This experiment involves a cooperation between two members of ACACIA (Sylvain Dehors and Alain Giboin) and two members of I3S (Catherine Faron-Zucker and Jean-Paul Stromboni) who both teach at ESSI, where the experiment is to take place at the beginning of February 2005.

### 6.1.8. *Semantic Web Services*

**Keywords:** *Semantic Web, Web Services.*

**Participants:** Fabien Gandon, Liana Razmerita.

The ACACIA team focuses on knowledge management solutions based on semantic Web technologies and the last five years resulted in the development of a semantic Web search engine (Corese) enabling us to analyze, query and infer from descriptions in languages of the semantic Web, RDF(S)/OWL, taking into account the ontologies on which they are based. These annotations generally describe documentary resources but, when relying on schemata as the ones advocated in OWL-S, these annotations can describe web services available online (intranet, extranet, open Web) allowing us to automate identification, composition and invocation of these services to provide high-level functionality through dynamic integration.

Thus, we initiated a new activity to specify and implement a generic engine that could discover and compose services allowing applications to plan and execute chains of web services realizing high-level tasks required by a user. The goal is to rely on the semantic search engine Corese to solve queries on descriptions of services, taking into account the ontologies used to characterize them, for instance during the matchmaking of inputs and outputs while forming chains of services.

The problem of planning the composition can be studied from three possible perspectives: assisting manual composition, semi-automatic composition and fully-automatic composition. The problem of running a planned composition will include taking into account potential failures when invoking a service and the discovery/management of possible alternatives.

This work will take place in the framework of the post-doc of Liana Razmerita and, next year, in the framework of the visit of a researcher from Gaston Berger University of Saint-Louis, Senegal, with an AUF grant.

### 6.1.9. *Mobility, Context-Awareness and Privacy*

**Keywords:** *Awareness, Context, Mobility, Privacy.*

**Participant:** Fabien Gandon.

Increasingly, application developers are looking for ways to provide users with higher levels of personalization that capture different elements of a user's operating context, such as her location, the task that she is currently engaged in, who her colleagues are, etc. While there are many sources of contextual information, they tend to vary from one user to another and also over time. Different users may rely on different location tracking functionality provided by different cell phone operators; they may use different calendar systems, etc.

We worked on a Semantic e-Wallet aimed at supporting automated identification and access of personal resources, each represented as a Semantic Web Service. A key objective was to provide a Semantic Web environment for open access to a user's contextual resources, thereby reducing the costs associated with the development and maintenance of context-aware applications. A second objective was, through Semantic Web technologies, to empower users to selectively control who has access to their contextual information and under which conditions. This work was initially carried out in the context of myCampus, a context-aware environment aimed at enhancing everyday campus life and empirical results were obtained on Carnegie Mellon's campus [23][34][35].

New scenarios have been envisaged this year through an application to museum tour guides developed for III Taiwan and an application to the assistance of visual deficient submitted in a proposal for a CNRT project.

### 6.1.10. *Support to Cooperative Work: Application to a Health Care Network*

**Participants:** Marek Ruzicka, Rose Dieng-Kuntz, David Minier.

This work was performed in the framework of the Ligne de Vie project (see section 7.2). The ACI *Ligne de Vie* project objective is to develop a knowledge management system for a health care network, so as to ensure care continuity and support to collaborative work of the actors of the network.

This year, our contribution consisted of developing knowledge management tool for a health care network, called *Virtual Staff*, a tool for processing of patient cases and visualization of collective reasoning using conceptual graphs.

In the hospital, the unity of location and of time allows the doctors to meet as a staff in order to discuss about the decisions to take. In a health care network, the Virtual Staff aims to be a collaborative work supporting tool, allowing the real time update and history of therapeutic decisions. As an electronic board where each one can note information readable by the other members of the team, it constitutes a discussion support that may be synchronous (if the participants take part to the discussion at the same time or in the same place) or asynchronous (if each one accesses it at the moment appropriate to him/her). Starting from the patient's health problems, the members of the team will formulate diagnostic hypotheses and proposals for a treatment. Via this Virtual Staff, the care team will connect the various elements of the patient record useful for the discussion, and thus will converge in an asynchronous way towards the identification of new health problems and of new therapeutic actions.

We suppose that several patient cases will be created asynchronously by multiple users. This requires to visualize and store all information about the patient case, including multi-user and temporal aspects. Another objective of Virtual Staff is to collect solved cases in a special repository and to reuse them for retrieving past patient cases similar to a new patient case to solve. This kind of reasoning - that is based on Corese semantic search engine - is similar to case-based reasoning.

The Virtual Staff relies on a medical ontology Nautilus represented in RDFS and generated in 2003 from the Nautilus medical database by Acacia research team [31][32][33]. The Virtual Staff enables to visualize cooperative reasoning through cooperative building of graphs based on the SOAP (Subjective, Objective, Assessment, Plan) model used in medical community and on the QOC (Questions, Option, Criteria) model used by CSCW (Computer-Supported Collaborative Work) community for support to design rationale and decision-making support [31][32][43].

To reach platform-independence, Virtual Staff is completely implemented in Java. The prototype was validated by our industrial partner Nautilus SARL.

### 6.1.11. *Ontology for Manufacturing*

**Participants:** Jiehan Zhou, Rose Dieng-Kuntz.

This work took place in the framework of the post-doctoral visit of Jiehan Zhou on a semantic manufacturing knowledge management system

We proposed an ontology-driven solution for shared manufacturing knowledge understanding [42]. We analyzed knowledge management requirements from knowledge-intensive manufacturing, designed a semantic manufacturing knowledge management system, developed common manufacturing knowledge ontology and implemented a semantic knowledge query system with the semantic search engine Corese [41], [74].

## 6.2. Information Retrieval in a Corporate Semantic Web

**Keywords:** *Conceptual Graph, Corporate Memory, Information Retrieval, Knowledge Acquisition, Knowledge Engineering, Knowledge Management, Knowledge Server, OWL, Ontology, RDF, Semantic Web, XML.*

We study the problems involved in the dissemination of knowledge through a knowledge server via Intranet or Internet: we consider the Web, and in particular the semantic Web, as a privileged means for the assistance to management of knowledge distributed within a firm or between firms. A knowledge server allows the search for information in a heterogeneous corporate memory, this research being intelligently guided by knowledge models or ontologies. It also allows the proactive dissemination of information by intelligent agents. We look

further into the case of a memory materialized in the form of a corporate semantic Web, i.e. in the form of resources (such as documents) semantically annotated by RDF statements relating to an ontology.

### 6.2.1. Corese Semantic Search Engine

**Keywords:** *Conceptual Graph, Corporate Memory, Information Retrieval, Knowledge Acquisition, Knowledge Engineering, Knowledge Management, Knowledge Server, Ontology, RDF, Semantic Web, XML.*

**Participants:** Olivier Corby [responsible], Olivier Savoie.

- *Corese software development operation*  
The Corese ODL software development operation finished in June 2004. We designed and developed a semantic web server architecture to embed Corese. The server is based on Tomcat, servlets and JSP. We have designed several functions that enable a smooth integration of Corese RDF processing into standard web technology such as XSLT, JSP and Java TagLib.
- *Graphic User Interface*  
We designed an XML GUI meta language that enable to describe ontology based graphic user interface. Graphic widgets are built by queries to the semantic server. The query retrieves ontology *and/or* metadata elements and builds graphic widgets such as a selector. The meta description of the GUI is translated, by XSLT, into HTML/JSP in order to be rendered by a navigator.
- *RDF Query Language*  
We designed and developed a new query language based on RDF triples. The language has a *select where* format and it happens to be compatible with the W3C SPARQL proposition. Our language includes boolean expressions with *and/or* connectors, the test of non existence of arcs and optional arcs. Variables can match property as well as resources. The query language also processes a subset of XML Schema datatypes. The query language is translated into query graphs and processed by conceptual graph projection.
- *RDF Rule Language*  
Corese RDF Rule Language takes into account the new query language syntax. Rules are now written as RDF query triples. Furthermore, the rule language has been extended in order to enable the creation of blank nodes in the RDF graph.
- *OWL Lite*  
We continued the extension of Corese to OWL Lite restrictions on properties (*owl:someValuesFrom* and *owl:allValuesFrom*). The restrictions are translated into Corese RDF Rules.
- We participated in the installation of Corese and helped the Galaad team at INRIA Sophia Antipolis.

### 6.2.2. Semantic distances and clustering

**Keywords:** *approximate search, ontologies, semantic distance.*

**Participant:** Fabien Gandon.

Most of the conceptual structures used in knowledge-based systems essentially rely on a logical formalization of the knowledge. However focusing on the logical implications lead knowledge-based systems to ignore some characteristics of the conceptual structures of people. One of the things that graph-based formalisms underline is an isomorphism between graph-distances or geometric distances in the representation and natural conceptual distances between the notions they represent and articulate. In other words, two notions geometrically close in the graphical representation are supposed to be intuitively close in the mind of the modelers. This closeness is a characteristic that can be exploited, for instance, to improve information retrieval in the form of constraints relaxation to closest notions. To do so we are studying algorithms to simulate conceptual distances using the ontological tree and we are applying it in particular to approximated search and result clustering.

### 6.2.3. Visualization surrogates for conceptual structures

**Participant:** Fabien Gandon.

Here we address a problem faced in many projects: the generation of semiotic representations for conceptual structures such as the annotations, and query results on the semantic Web. Drawing on the parallel between the patterns of such surrogates and the notion of identity conditions, we proposed and explained a mechanism exploiting the semantic Web frameworks to automate the generation of templates for these surrogates. We showed how these templates improve representation, for instance when viewing the results of a query. The approach focused on generating templates providing the properties to include in a surrogate, regardless of the way it is rendered (text, graphics, speech, etc.).

Our goal was to detect a maximum of these properties that were potentially interesting, then fine tuning can take place. Our approach and implementation relied on rules because the Corese platform of the ACACIA team is based on conceptual graphs and graph rules. In other platforms offering other formalization means or insights in the ontology engineering process, other sources than rules could be exploited to derive surrogate properties from identity conditions. Our point here is that the semantic web will have to be dynamic and will use: the users' profile, the context and history of interactions, semiotic modeling primitives added to our meta-model, signs linked to the primitives of our ontologies, logics of semiotics and surrogate generation, in addition to the conceptual structures to be communicated to the users.

### 6.2.4. Software Agents for Web Mining: Application to Technological and Scientific Watch

**Keywords:** *Corporate memory, Multi agent system, ontology, semantic annotations, semantic web, technological monitoring, technological watch, web mining.*

**Participants:** Tuan-Dung Cao, Rose Dieng-Kuntz.

This work was performed in the context of the thesis of Tuan-Dung Cao.

Technological Watch or Technology Monitoring is now recognized as a crucial activity for achieving and maintaining competitive positions in a rapidly evolving business environment. It serves the purpose of identification and assessment of technological advances critical to the company's competitive position, and of detecting changes and discontinuities in existing technologies. The rise of Internet supported the appearance of much information available on line, potentially useful for the technological and scientific survey of an enterprise. Within the framework of knowledge management of an organization or a community, the Web mining can be particularly useful when it is applied by a multi agent system to discover in the Web of relevant information, at ends of the technological or strategic watch.

The objective of the thesis is to exploit technology agents to develop a multiagent system, these agents being guided by ontologies, to collect, capture, filter, classify and structure the contents of the Web coming from several sources of information, in a scenario of support to technology watch at the CSTB (French Scientific and Technical Center for Building).

First of all, we analysed the task of monitoring for the field considered (construction and building) which is carried out at CSTB to choose a relevant scenario of monitoring and to build an ontology which will guide the search and the extraction of information. On the one hand, this ontology inherits the vocabulary in the ontology O'CoMMA which was developed for the CoMMA European IST project (2000-2001). On the other hand we added concepts and relations concerning not only the field of Construction but also the actors, tasks, and information sources in the technological monitoring process too.

After identifying the important roles of ontology in each phase in technological monitoring process, we proposed an ontology based approach for building an information system supporting technology monitoring implemented by agents. One of the most important work in this system is to find out useful resources on the Web, and then annotate them using the ontology so that user can retrieve them easily through the semantic search engine Corese.

To do so, we proposed an algorithm using ontology to search the Web with Google and then generate automatically the RDF annotations from these results of Google [28]. The algorithm has been implemented and is currently in the phase of test. As further work, we will continue to test our algorithm and extend it to improve



the results. In parallel, we will design and implement a subsociety of *annotator agents* encapsulating this algorithm, working in cooperation with other agents dedicated to other tasks in the technological monitoring system.

## 7. Contracts and Grants with Industry

### 7.1. Knowledge Management Platform

**Participants:** Alain Giboin (resp.), Olivier Corby, Fabien Gandon, Nicolas Gronnier, Cécile Guigard.

The RNRT project KMP (Knowledge Management Platform) is a pluridisciplinary project, which involves teams specialized in computer science, economic sciences, management sciences, ergonomics and psychology, namely: Laboratoire Rodige (UNSA-CNRS), Laboratoire Latapses (UNSA-CNRS), Acacia Team (INRIA Sophia Antipolis), GET (Telecom Paris and ENST Bretagne), Telecom Valley Association (Sophia Antipolis). The application goal of KMP is to construct a web server facilitating the sharing of competences within the Telecom Valley community (Sophia Antipolis) which gathers firms, local institutions, and academic organizations working in the telecommunications domain. The aim of KMP is to promote partnership seeking and setting within the community [72].

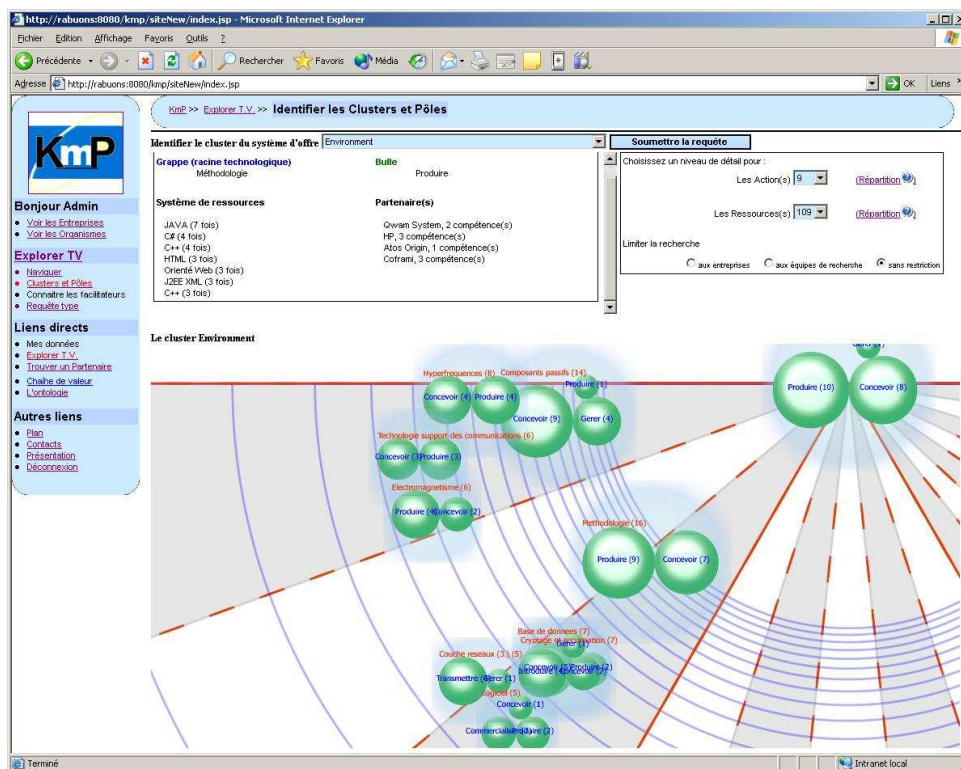


Figure 2. KMP interface: Identifying clusters of (complementary) competencies

The Acacia Team coordinates sub-projects 1 and 3 of the KMP project (1| building an ontology to represent competencies; 3| implementing a web server prototype for competence management), in collaboration with Rodige and ENST Bretagne, together with pilot users of KMP. Hence KMP is a use(r)-oriented co-design



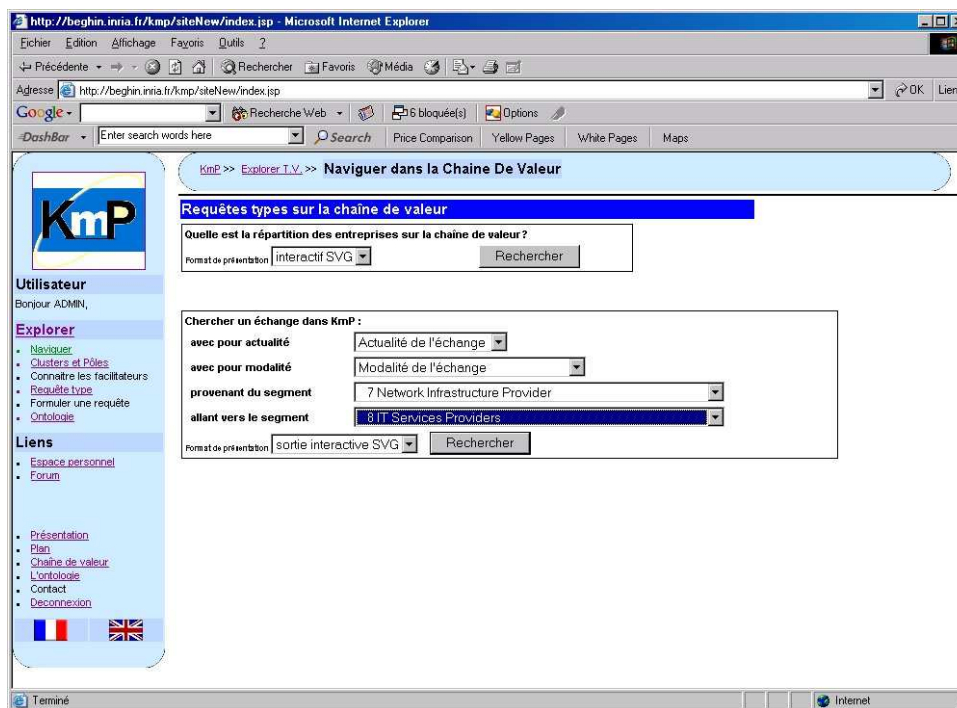


Figure 4. Conceptual search in the Value Chain (corresponding to the answer shown in Figure 3)



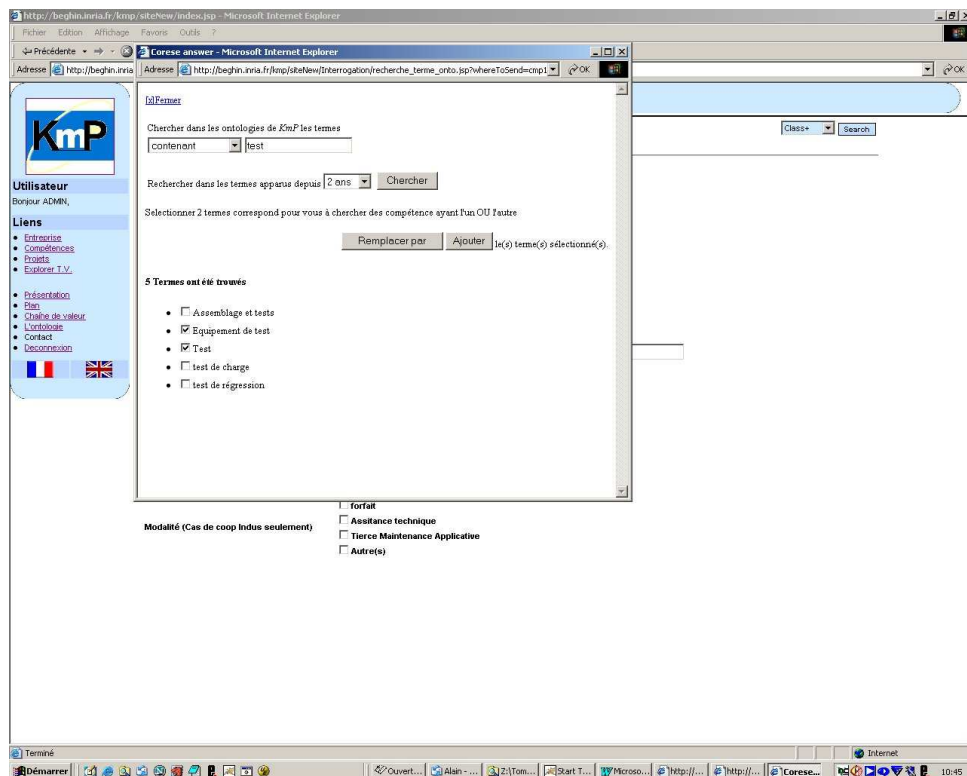


Figure 5. KMP interface: Lexical search interfaces

project. Several actions were undertaken this year, leading to the final version of the KMP prototype based on Corese:

- Enriching and partially reconstructing the KMP ontologies, in strong cooperation with the KMP pilot users and their representatives (i.e., our Rodige partners). Currently, the total number of concepts of the ontologies is 1048.
- Elaborating scripts for monitoring annotations (esp., a script verifying that annotations do not instantiate concepts which have been removed from the ontology).
- Elaborating a clustering algorithm which computes ontological distances to determine similarities and complementarities between competencies, in order to make competencies' clusters and poles dynamically emerge from a user's request.
- Designing the SVG algorithm to display the poles and clusters (see Figure 2).
- Designing the SVG algorithm allowing to display « routes » between actors (firms) of the Value Chain map (see Figure 3). Routes refer to cash flow and work flow.
- Designing conceptual and lexical search interfaces, using forms, hypertext links, etc. (see Figure 4 and 5).
- Implementing a second (final) version of the KMP prototype using Java, to be compliant with Corese (the first version used php).
- Developing the KMP prototype by fully integrating Corese.
- Iteratively testing the usability of the prototype and its underlying ontologies.

These various actions benefited in turn to the Corese generic engine, through a process of making generic the application-specific components of the KMP prototype. In particular, a major generic transformation concerned the interaction between Corese and a database: generating RDF annotations from the information available in the database; integrating the information within stylesheets (Java + XSL). Another contribution to genericity was the rationalisation of the interaction between XSLT and Java.

Initially planned on November 7, 2004, the end of the project has been extended until April 7, 2005 by the French Ministère de la Recherche. Furthermore, the KMP project may be pursued in 2005, and may benefit to a larger community than the Telecom Valley (Sophia Antipolis), i.e., the Provence-Alpes-Côte d'Azur area. This follow-up project, called KMP-2, should involve the following partners: ACACIA, Rodige, DRIRE and the eCore start-up intended to be created for technological transfer of a skills management solution based on Corese.

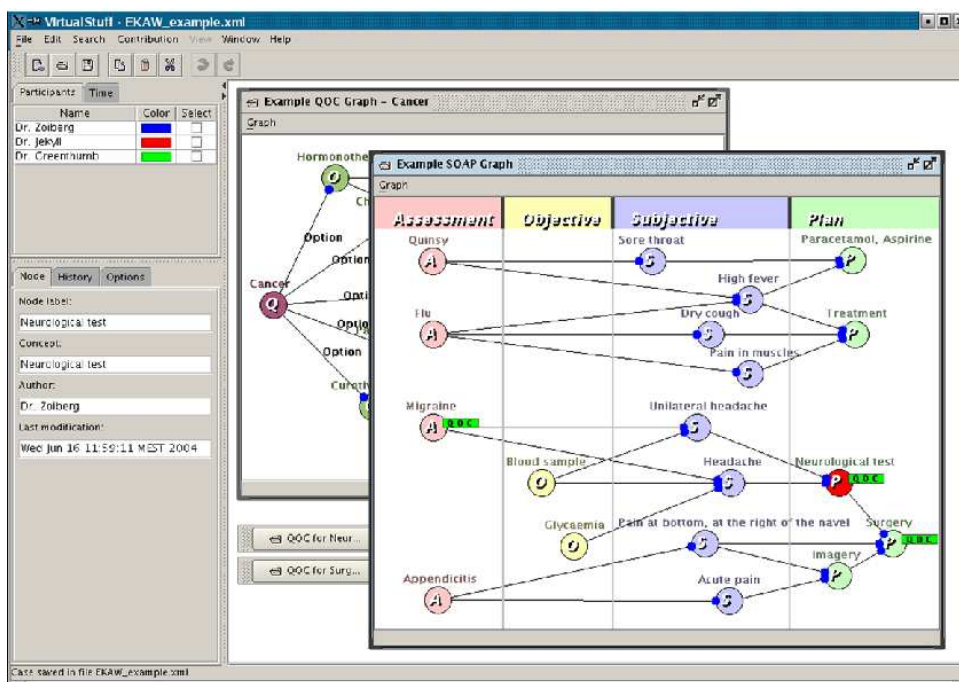


Figure 6. Interface of the Virtual Staff

## 7.2. Ligne de Vie

**Keywords:** *Health Care Network, Knowledge Management, Ontology, RDF, Semantic Web, XML.*

**Participants:** Rose Dieng-Kuntz (resp.), Marek Ruzicka, David Minier, Olivier Corby.

The ACI *Ligne de Vie* project in collaboration with the SARL Nautilus and SPIM (Service de Santé Publique et d'Informatique médicale de la Faculté de Médecine Broussais-Hôtel Dieu) aims at building a knowledge management tool for a health care network, so as to ensure continuity of healthcares and co-operative work in such a health care network.

The contribution of the Acacia team consisted of:

- *Translation of a medical database (Nautilus) into a structured ontology, represented in RDF(S) and enabling to browse this ontology through Corese and thus check its consistency [31][32][33].* This approach is interesting for a company having a database available and wishing to extract from this database the elements enabling to build a structured ontology, represented in a semantic Web standard language such as RDFS.
- *Method for enriching this medical ontology, by relying on the candidate terms extracted by a linguistic tool applied on a corpus of texts on healthcare networks [31][32][33].*
- *Method for creating (possibly multi-viewpoints) annotations*
- *Specifications and implementation of a collaborative tool (virtual staff)*

Our main contribution this year was the implementation in Java of a collaborative tool, called "Virtual Staff", enabling to visualize the collective reasoning of the actors of a health care network for complex diagnostic and therapeutic decisions (see section 6.1.10). Figure 6 shows the graphical interface of the prototype.

## 7.3. EADS

**Keywords:** *Aerospace domain, Knowledge Management, Ontology, RDF, Semantic Web, XML.*

**Participants:** Olivier Corby (resp.), Fabien Gandon, Olivier Savoie.

We have continued the cooperation on a Corporate Memory for an Industrial Research Laboratory with EADS Corporate Research Laboratory. We developed a prototype of a metadata based memory management with the Corese web server. We translated an XML metadata model into RDF/S and built a semantic web server with customized graphical user interface, using XSLT.

# 8. Other Grants and Activities

## 8.1. Regional Actions

### 8.1.1. eCore

**Participants:** Olivier Corby (resp.), Rose Dieng-Kuntz, Fabien Gandon, Alain Giboin, Olivier Savoie.

For more than two years now, ACACIA has been engaged with Hervé Karp (ATOS Origin) and Philippe Pérez in a process of creation of a start-up, eCore, in order to market a solution for skills management based on Corese. We designed and used a questionnaire to evaluate the opportunity of using semantic web tools for human resources management. We defined an architectural design for an industrialized version of Corese and the associated semantic web server. The reengineering of the semantic web server is undergoing.

The project of creation of this start-up eCore was prize-winner (category emergence) in the 2004 National Competition for support to creation of enterprises of innovative technologies, competition organized by the Ministry of Research with participation of Anvar and of Social European Fund (FSE).

Catherine Thomas (Rodige, UNSA-CNRS), the coordinator of the KMP project, joined us this year for the preparation of the eCore start-up.

### 8.1.2. MEAT Project

**Participants:** Khaled Khelif, Rose Dieng-Kuntz (resp.), Olivier Corby.

We collaborate with Pascal Barbry (IPMC), Rémi Bars (Bayer Crop Science) and Martine Collard (I3) to build a memory of experiments on DNA chips (see section 6.1.4).

### 8.1.3. Laboratoire des usages de Sophia Antipolis

**Participants:** Alain Giboin (resp.), Olivier Corby, Fabien Gandon, Nicolas Gronnier, Cécile Guigard.

Through the KMP project, we take part in the use laboratory that aims at observing the current collective usages of technologies, and to anticipate future usages « by a pluridisciplinary research gathering technologists, economists, sociologists, ergonomists, marketing specialists with rigorous methodologies around effective technological platforms and relevant and various users. »

### 8.1.4. CSTB (French Scientific and Technical Center for Building)

**Participants:** Tuan-Dung Cao, Rose Dieng-Kuntz (resp.).

We collaborate with Bruno Fiès and Marc Bourdeau (CSTB) for Tuan-Dung Cao's PhD on *Software Agents for the Web Mining, Application to Technological and Scientific Watch*.

### 8.1.5. CINDY, Pôle Cindyniques of ENSMP

**Participants:** Thanh-Le Bach, Rose Dieng-Kuntz (resp.).

We collaborate with Franck Guarnieri (CINDY - Pole of Research and Formation on Danger and Risk Management of the École Nationale Supérieure des Mines de Paris, in Sophia Antipolis) for Thanh-Le Bach's PhD on *Construction of a multi-viewpoint Semantic Web*. We also have contacts for follow-up of the PhD of Denis Overal, PhD student at CINDY.

### 8.1.6. E-companion

**Participants:** Fabien Gandon, Alain Giboin.

We elaborated the project « e-companion », which aims at designing a mobile device for assisting visually impaired people; in cooperation with the following partners: Rainbow team (I3S), CNRT Telius, Fédération nationale des Déficiants visuels (FNDV), Web2Tel. This project was submitted to CNRT.

### 8.1.7. WebLearn Colors

**Participants:** Olivier Corby, Sylvain Dehors, Rose Dieng-Kuntz (resp.), Catherine Faron-Zucker, Fabien Gandon, Alain Giboin.

We collaborate with the Mainline Team at ESSI, the LIRMM, and the CREGO for the WebLearn Colors on *Semantic Web for E-Learning*. Our objective is to explore the techniques of the Semantic Web for e-learning applications and to measure the impact of e-learning specificities for the design of dedicated semantic portals.

Sylvain Dehors and Alain Giboin set up an experiment about an e-learning tool based on Corese, and implementing the notion of a *Training Semantic Web*, in cooperation with I3S (Jean-Paul Stromboni and Catherine Faron-Zucker).

## 8.2. National Actions

### 8.2.1. WebLearn CNRS Specific Action

**Participants:** Olivier Corby, Sylvain Dehors, Rose Dieng-Kuntz (resp.), Catherine Faron-Zucker, Fabien Gandon, Alain Giboin.

Rose Dieng-Kuntz, Monique GrandBastien (LORIA - Université Nancy I) and Danièle Hérim (LIRMM) co-ordinate the national CNRS Specific Action (SA) on *Semantic Web for E-Learning* (to which the local WebLearn Colors (see above) belongs). In addition to the local teams involved in the WebLearn Colors, the WebLearn SA involve HEUDIASYC (Université Technologique de Compiègne), IMAG-CLIPS (Université Joseph Fourier & CNRS & INPG), LORIA, LIUPPA (Université de Pau et des Pays de

l'Adour) Pau University, the LIASC (ENST Bretagne), and LPS - Université Pierre Mendès France (see <http://www.lirmm.fr/~toutilou/as-weblearn/>).

We take part in the workpackages "Ontologies for e-Learning", "Composition", "Tools for Semantic Web and for e-Learning".

This year, two WebLearn workshops took place in Montpellier (on March ) and in Grenoble on September 15-16. Sylvain Dehors, Rose Dieng-Kuntz attended both workshops. Fabien Gandon attended the Montpellier's one and Alain Giboin attended the Grenoble's one.

- Sylvain Dehors presented a synthesis on ontologies for e-Learning, on annotation tools and on e-Learning tools, as well as the experiment for e-Learning set up with I3S.
- Rose Dieng-Kuntz presented a synthesis on Semantic Web tools.
- Fabien Gandon presented a state of the art and a proposal for integrating existing ontology engineering approaches.

We take part in the writing of the synthesis and prospective report, that will be one of the main results of the WebLearn AS & Colors, in addition to the final workshop of the WebLearn AS & Colors that will hold on May 31, 2005, in the framework of the AFIA Platform.

### 8.2.2. MDA

Fabien Gandon was asked by the CNRS Specific Action on Model-Driven Architecture to participate in the writing of a comparison between meta-modeling frameworks as proposed by the OMG and the semantic web frameworks as proposed by the W3C.

### 8.2.3. Working Groups

Members of the Acacia team take part in several working groups:

- Rose Dieng-Kuntz is member of:
  - the board of the GRACQ (*Groupe de Recherche en Acquisition des Connaissances*) (<http://www.irit.fr/GRACQ>).
  - the TIA Group (*Terminology and AI*) <http://tia.loria.fr/>.
  - the COOP Group (*Acquisition et modélisation des connaissances pour un système d'assistance coopératif*).
- Alain Giboin is member of:
  - the COOP Group,
  - the Group « Psychologie ergonomique » of the Département Recherche de la Société française de Psychologie. Founder member and member of the board of this group, he is also the Webmaster of the group website: <http://www-sop.inria.fr/acacia/gtpe/>

## 8.3. European Actions

### 8.3.1. *OntoWeb Network*

The Acacia project took part in the OntoWeb thematic network (*Ontology-based Information Exchange for Knowledge Management and Electronic Commerce*). Our main participation was on the synthesis on ontological methods and tools and on the best practices.

### 8.3.2. *Knowledge Web*

**Participants:** Thanh-Le Bach, Olivier Corby, Sylvain Dehors, Rose Dieng-Kuntz (resp.), Fabien Gandon, Alain Giboin, Phuc-Hiep Luong.

We take part in the Knowledge Web Network of Excellence. This year, we took part in the workpackages WP2.2 Heterogeneity where we worked on ontology alignment [44] and WP2.3 Dynamics where we studied thoroughly acquisition and modelling of consensus process from multiple experts. We will also take part in WP1.2 Evaluation. In the WP3 Education, we participated in the definition of the e-learning scenarios for VISWE and their use of ontology-based learning system [45]. We populated the Educanext platform with learning material provided by the ACACIA Team. We took part in the deliverables D2.2.3 [44] and D2.3.2 [46].

Rose Dieng-Kuntz and Fabien Gandon took part in the kick-off meeting in Madrid, Rose Dieng-Kuntz in the research meetings in Amsterdam and Manchester, Olivier Corby and Fabien Gandon in the research meeting in Crete.

## 8.4. International Actions

### 8.4.1. *W3C*

- Olivier Corby took part in the W3C meeting on technical plenary session in Madelieu.
- Rose Dieng-Kuntz took part in the W3C workshop on Semantic Web for Life Sciences, Cambridge, MA, October 27-28, 2004.
- Fabien Gandon is a member of the W3C "Semantic Web Best Practices and Deployment Working Group". He participated in the kick-off meeting at the W3C technical plenary session and from then regularly participated to bi-weekly teleconferences.

### 8.4.2. *Carnegie Mellon University*

Fabien Gandon carried-out a one-month full-time consultant contract for the Mobile Commerce Laboratory of the Carnegie Mellon University. He designed a standalone version of the e-Wallet and extended it to include knowledge edition capabilities and other extensions easing its integration in other applications. He worked in collaboration with the III institute of Taiwan and the Computing Media and Communication Laboratory of Carnegie Mellon in an application to mobile tour guide in museums.

## 9. Dissemination

### 9.1. Animation of the Scientific Community

#### 9.1.1. *Programme committees*

Olivier Corby was member of the following programme committees:

- *15èmes Journées Francophones d'Ingénierie des Connaissances (IC'2004)*, Lyon, May, 2004, <http://liris.cnrs.fr/~ic04/>.
- *ISWC'2004 Workshop on Knowledge Markup and Semantic Annotation*, Hiroshima, Japan, November, 2004 <http://km.aifb.uni-karlsruhe.de/ws/semannot2004/>.



- *EKAW'2004 Workshop on Knowledge Management and the Semantic Web*, Whittlebury Hall, UK, October 8, 2004. <http://www-sop.inria.fr/acacia/WORKSHOPS/EKAW2004-KMSW/call.html>.
- *14th International Conference on Knowledge Engineering and Management (EKAW'2004)*, UK, October 5th - 8th, 2004. <http://kmi.open.ac.uk/events/ekaw/>.

Rose Dieng-Kuntz was member of the following programme committees:

- *2ème Colloque C2EI sur Intégration des Connaissances et Compétences en vue de l'amélioration de la performance industrielle*, Nancy, December 1-2, 2004, <http://www.c2ei.numcop2.com/>
- *2ème journée DeViNT'2004 Déficients Visuels et Nouvelles Technologies : Accessibilité à l'Education*, June 4, 2004, ESSI, Sophia Antipolis, <http://www.essi.fr/devint/accueil.html>.
- *14ème Congrès Francophone de Reconnaissance des Formes et Intelligence Artificielle (RFIA'2004)*, Toulouse, January 28th - 30th, 2004 <http://www.laas.fr/rfia2004/>.
- *AAAI-04 Workshop on Agent Organizations: Theory and Practice*, San José, CA, USA, 25 July 2004 <http://www.cs.uu.nl/~virginia/aotp/>.
- *ECAI'2004 Workshop on Agent-Mediated Knowledge Management (AMKM'2004)*, Valencia, Spain, 2004 <http://www.dfki.uni-kl.de/~elst/AMKM/>.
- *The 2004 Pacific Rim Knowledge Acquisition Workshop (PKAW'2004)*, Australia, 9th - 13th August 2004. <http://www.comp.utas.edu.au/pkaw04/>.
- *First IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI'2004)*, in conjunction with IFIP World Computer Congress, Toulouse, France, August, 22-27, 2004. <http://www-staff.it.uts.edu.au/~debenham/aiai/>.
- *14th International Conference on Knowledge Engineering and Management (EKAW'2004)*, UK, October 5th - 8th, 2004. <http://kmi.open.ac.uk/events/ekaw/>. She also takes part in the steering committee of the conference.
- *Journées nationales EGC'2005 - Extraction et Gestion de Connaissances*, Paris, January 19-21, 2004. <http://www.math-info.univ-paris5.fr/egc2005/>.
- *The IASTED International Conference on Artificial Intelligence and Applications (AIA 2005)* as part of the Twenty-Third IASTED International Multi-Conference on Applied Informatics, February 14-16, 2005, Innsbruck, Austria <http://www.iasted.org/conferences/2005/innsbruck/aia.htm>.
- *Third International Conference on Knowledge Capture (K-CAP'2005)*, October 2-5, 2005, Banff, Canada, <http://www.kcap05.org/>.

Fabien Gandon was member of the program committees of or reviewer for:

- *37th Hawaiian International Conference on System Sciences (HICSS'2004)*, 5-8 January 2004, <http://www.hicss.hawaii.edu/HICSS37/apahome37.html>
- *Web Intelligence 2004*, Beijing, China, September 20-24, 2004, <http://www.maebashi-it.org/WI04/>
- *International Conference on Electronic Commerce 2004 (ICEC'2004)* <http://www.icec04.net/> (chair of the "Semantics, Ontologies & Enterprise Integration track"),
- *AAAI-04 Workshop on Agent Organizations: Theory and Practice*, San José, CA, USA, 25 July 2004 <http://www.cs.uu.nl/~virginia/aotp/>
- *ECAI'04 Workshop on Agent Mediated Knowledge Management*, Valencia, Spain, 2004 <http://www.dfki.uni-kl.de/~elst/AMKM/>



- ECAI'2004 Workshop on Knowledge Management & Organizational Memories, Valencia, Spain, 2004, <http://www.inria.fr/acacia/WORKSHOPS/ECAI2004-OM/call.html>
- EKAW'2004 workshop on Knowledge Management & Semantic Web, Whittlebury Hall, October 2004, <http://www-sop.inria.fr/acacia/WORKSHOPS/EKAW2004-KMSW/call.html>
- ISWC'2004 workshop on Semantic Web Technology for Mobile and Ubiquitous Applications, Hiroshima, Japan, November 7, 2004, <http://www.csc.liv.ac.uk/ISWC04-SWMU/>
- ISWC'2004 workshop on Knowledge Markup and Semantic Annotation, Hiroshima, Japan, 2004 <http://km.aifb.uni-karlsruhe.de/ws/semannot2004/>

Alain Giboin was or will be member of the following programme committees:

- "2ème Journée DeViNT'2004 Déficients Visuels et Nouvelles Technologies : Accessibilité à l'Education"), June 4, 2004, ESSI, Sophia Antipolis, <http://www.essi.fr/devint/accueil.html>.
- CONTEXT'05, the *Fifth International and Interdisciplinary Conference on Modeling and Using Context*, July 5-8, 2005, Paris, France: <http://www.context-05.org>
- UbiMob'05, *Deuxièmes Journées Francophones: Mobilité et Ubiquité 2005*, 1-3 June 2005, Grenoble, France: <http://ubimob05.imag.fr/>
- ÉPIQUE'2005, *Troisièmes journées d'étude en Psychologie ergonomique*, 26-28 September 2005, Toulouse, France: <http://www-sop.inria.fr/acacia/gtpe/epique-2005/>

### 9.1.2. Journals and Publishers

Rose Dieng-Kuntz:

- is co-editor of the series "Frontiers in Artificial Intelligence Applications" at IOS Press,
- is member of the editorial board of the journal *ETAI (Electronic Transactions on Artificial Intelligence)* on the topics *Semantic Web*.
- did several reviews for the Encyclopedia of Knowledge Management (Idea Group Publishing) and for Hermès books.

Fabien Gandon did several reviews for international journals:

- One review for the Applied Artificial Intelligence Journal.
- One review for IEEE Intelligent Systems.
- Two reviews for IEEE Transactions on Knowledge and Data Engineering.
- One review for the International Journal of Human-Computer Studies - IJHCS.
- One review for the World Wide Web Journal.

Alain Giboin was reviewer for the journal *Le Travail Humain*

## 9.2. Organization of conferences and courses

- Rose Dieng-Kuntz was:
    - Conference Chair of COOP'2004, the Sixth International Conference on the Design of Cooperative Systems [17], May 11th - 14th, 2004, presqu'île de Giens, France: <http://tech-web-n2.utt.fr/coop/>
    - Co-chair of the *ECAI'2004 Workshop on Knowledge Management and Organizational Memories* [19] <http://www.inria.fr/acacia/WORKSHOPS/ECAI2004-OM/call.html>, Valencia, Spain, 2004.
    - Chair of the *EKAW'2004 Workshop on Knowledge Management and the Semantic Web* [18], Whittlebury Hall, UK, October 8th, 2004. <http://www.inria.fr/acacia/WORKSHOPS/EKAW2004-KMSW/call.html>.
    - Co-organizer of the *ISWC'2004 Workshop on Knowledge Markup and Semantic Annotation* [20], Hiroshima, Japan, November 2004 <http://km.aifb.uni-karlsruhe.de/ws/semannot2003/>.
  - Fabien Gandon:
    - was a track and reviewer chair for the Sixth International Conference on Electronic Commerce: Semantics, Ontologies & Enterprise Integration track
    - was member of the organization committee of the EKAW'2004 Workshop on Knowledge Management and the Semantic Web, Whittlebury Hall, UK, October 8th, 2004. <http://www.inria.fr/acacia/WORKSHOPS/EKAW2004-KMSW/call.html>.
    - is currently preparing the French biyearly platform on Artificial Intelligence (AFIA 2005) that should gather more than 250 persons in 2 national conferences and 8 national workshops in Nice on May 30- June 3, 2005, <http://www-sop.inria.fr/acacia/afia2005/welcome.html>
  - Alain Giboin was:
    - Co-chair (with Anne-Marie Pinna, I3S) of UbiMob'04, Premières Journées Francophones: Mobilité et Ubiquité 2004, [16], 1-3 June 2004, Sophia Antipolis, France: <http://www.essi.fr/UbiMob>
    - Workshop Chair of COOP'2004, the Sixth International Conference on the Design of Cooperative Systems, 11-14 May 2004, Giens, France: <http://tech-web-n2.utt.fr/coop/>
    - Member of the organizing committee of DeVINT'2004, Deuxième journée "Déficients visuels et NTIC", Sophia Antipolis, France, 4 June 2004. <http://www.essi.fr/devint/accueil.html>
- He will be:
- Member of the local organization committee of the AFIA Platform.

## 9.3. Others

### 9.3.1. Scientific Councils and Evaluation tasks

Rose Dieng-Kuntz is member of:

- Scientific Council of the Laboratoire Perception, Systèmes, Information of the university of Rouen and of INSA-Rouen,
- Specialist Commission CS27 of UNSA.
- Specialist Commission CS27 of the Montpellier-II university,
- the CNRS prospective reflection group on *Information, communication and Knowledge*. She especially worked on the prospective on Knowledge Acquisition and Collective Memories.

Rose Dieng-Kuntz was expert evaluator for:

- the European Commission for the 6th PCRD (on "Research and Training Networks"), Brussels, March 1-2 2004,
- the Natural Sciences and Engineering Research Council of Canada,
- the Austrian Science Fund (Technologie Impulse Gesellschaft): evaluation of a competence center on February 26-27, 2004, in Graz, Austria,
- the Schweizerischer Nationalfonds zur Forderung (National Swiss Foundation for Scientific Research).

### 9.3.2. Collective tasks

- Olivier Corby is member of:
  - CUMI (Commission of Users of Informatics) till November 2004
  - CPA (Commission for selection of engineers)
  - CDL (Commission for software development).
 at INRIA UR Sophia Antipolis.
- Rose Dieng-Kuntz is:
  - member of the board of the Project Committee,
  - member of the Centre Committee till November 2004,
  - chair of the Colors Commission.
 at INRIA UR Sophia Antipolis.
- Fabien Gandon:
  - is a member of the CSD (Comité de Suivi Doctoral) of INRIA Sophia Antipolis.
  - participated in the panel on Ph.D. careers at the Doctorial Colloquium UPMC-X DGA (27th May)
  - reports to the DIRDRI on his standardization activities in the W3C.
- Alain Giboin is, since November 2004, member of the Cumir (Commission des Utilisateurs des Moyens Informatiques pour la Recherche), one of the two new commissions created from the former CUMI.

### 9.3.3. Visits

The ACACIA project welcomed:

- Paule Alias, French Ministry of Education (Olivier Corby presented Corese, Alain Giboin, Nicolas Gronnier and Cécile Guigard gave a demonstration of KMP and Marek Ruzicka a demonstration of the Virtual Staff developed in the Ligne de Vie project).
- Philippe Ameline (Nautilus),
- Alain Boucher (Institut de la Francophonie pour l'Informatique, Hanoi, Vietnam),
- Patrick Mallea, CHU Nice (Rose Dieng-Kuntz presented the Acacia team research, Olivier Corby the Corese semantic search engine, Fabien Gandon and Alain Giboin the KMP project).
- the INRIA ComDir (Rose Dieng-Kuntz presented the Acacia team research, Olivier Corby the Corese semantic search engine, and Alain Giboin, Nicolas Gronnier, Cécile Guigard the KMP project).

Rose Dieng-Kuntz will visit the "Institut Francophone pour l'Informatique" (IFI), Hanoi, Vietnam, on December 10, 2004.

## 9.4. Teaching

### 9.4.1. University

- The Acacia project is a welcoming team of the "École doctorale STIC of the Nice - Sophia Antipolis University (UNSA)".
- The members of the project gave the following courses:
  - Thanh-Le Bach gave a practical course: "UEF 1 Informatique et programmation" (18 hours TP) at UNSA, Département d'Informatique.
  - Olivier Corby gave the following courses:
    - \* ESSI, UNSA: Responsible of the Course on Knowledge Engineering for the Semantic Web (total of 45 hours among which he gave 15 hours, Fabien Gandon 25 hours and Alain Giboin 5hours).
    - \* ESSI: Course on XML 2 hours and 7 hours TP
    - \* ENTPE: Course on Knowledge engineering and XML: 12 hours
    - \* UTT Troyes: Course on RDF and Corese semantic search engine: 5 hours
  - Sylvain Dehors did eight practical sessions at ESSI teaching XML and XSLT.
  - Rose Dieng-Kuntz is:
    - \* the main professor of a 30h module on artificial intelligence at ENTPE, Lyon where Rose Dieng-Kuntz (12h on *Knowledge Acquisition and Management* and on *Multiagent Systems*), Olivier Corby (12h on *Knowledge Representation and Reasoning* and on *XML and Semantic Web*) and Bertrand Neveu, Coprin project gave courses.
    - \* responsible for the course on "*Knowledge Capitalization and Economic Intelligence* (20h) in the framework of the Masters "Audit Informationnel et Stratégique" at the Institut d'Administration d'Entreprises, UNSA.

- 
- Fabien Gandon gives lectures as part of the course at ESSI on "Knowledge Engineering and Semantic Web" and supervises a number of students' projects:
    - \* Multi-Agent System Simulation of a toy Economy: supervision of two ESSI2 projects where 6 students explored the Multi-Agent Paradigm to simulate a population producing, selling, buying and consuming goods and sleeping.
    - \* Sokoban 3D and Path finding: supervision of an ESSI3 project where 2 students are combining a Java3D interface and the JESS rule engine to build a 3D version of Sokoban where the users are immersed in the labyrinth and can asked advices to the rule engine to find their way.
    - \* Platform for Empirical Evaluation of Conceptual Distances: supervision of an ESSI3 project where 3 students are designing a Web Application to create, manage and analyze online experiences to evaluate the natural conceptual distances and ordering people use.
  - Alain Giboin gave the following courses:
    - \* ESSI 3rd year, Module « Interfaces graphiques homme-machine » (GUI), Université de Nice Sophia Antipolis: contribution to the organization of the module, lectures, participation to tutorials, and assessment of students' GUI projects (21 h).
    - \* ESSI, Knowledge engineering and semantic web course: lectures (5 h)
    - \* DESS/Master « Ergonomie des Nouvelles Technologies de l'Information et de la Communication (ErgoNTIC)», Université de Nice Sophia Antipolis: in charge of the Module « Méthodes et Techniques de Conception et d'Évaluation des IHM », lectures (6 h), tutoring and training supervision.
    - \* Coordination between the ESSI GUI Module and the DESS/Master ErgoNTIC. This coordination aims at making work together software engineers and ergonomists as early as the learning phase, and to allow software engineering and ergonomics teachers to set up joint actions promoting cooperation between software engineers and ergonomists.
  - Khaled Khelif gave:
    - \* Practical courses on Java Programming at ESSI (24 hours)
    - \* Practical courses on C Programming at UNSA (26 hours)

### 9.4.2. Theses

- Current theses:
  - i. Laurent Alamarguy: *Ontologies and Semantic Relations Acquisition from Biomedical Corpora*, universit  de Nice - Sophia Antipolis.
  - ii. Thanh-Le Bach: *Construction of a Multi-Viewpoints Semantic Web*, Ecole Nationale Sup rieure des Mines de Paris.
  - iii. Tuan-Dung Cao: *Software Agents for the Web Mining, Application to Technological and Scientific Watch*, Universit  de Nice - Sophia Antipolis, in collaboration with CSTB.
  - iv. Sylvain Dehors: *Semantic Web and Knowledge Management for E-learning*, universit  de Nice - Sophia Antipolis
  - v. Khaled Khelif: *Semantic Web and Experiment Memory for the Transcriptome Analysis*, universit  de Nice - Sophia Antipolis (in collaboration with IPMC and Bayer Crop Science).
  - vi. Phuc-Hiep Luong: *Management of a Corporate Semantic Web*, Ecole Nationale Sup rieure des Mines de Paris.
- Thesis jurys: Rose Dieng-Kuntz was member of the following thesis jurys:
  - chair for S bastien Dubois (University Louis Pasteur, Strasbourg I),
  - reviewer for the “Habilitation   Diriger les Recherches” of Brigitte Bi bow (LIPN, Universit  Paris-Nord) and for PhD of Fr d ric Furst (Ecole Polytechnique de Nantes)
  - member for the “Habilitation   Diriger les Recherches” of Nada Matta (universit  de Technologie de Troyes) and for PhD of Chan Le Duc (universit  de Nice Sophia Antipolis).

## 9.5. Participation to conferences, seminars, invitations

Members of the team took part in conferences and *workshops* (see the bibliography). In addition to these conferences,

- Thanh-Le Bach attended COOP’2004 (6th International Conference on the Design of Cooperative system) conference in Hy res, France, May 11-14, 2004.
- Olivier Corby, Fabien Gandon and Alain Giboin took part in the KMP Steering Committees the 22nd-23rd June and 9th-10th November.
- Sylvain Dehors attended:
  - the COOP’2004 conference and workshop in Hy res in May,
  - the UbiMob conference in Sophia Antipolis in June,
- Olivier Corby attended:
  - the European Semantic Web Symposium (ESWS), Crete, May 9-17, 2004, as well as the associated Ontoweb and Knowledge Web meetings,
  - attended the W3C Technical Plenary session on 1st-5th March
 and gave the following talks:
  - Presentation of Corese to Thales on March 16,

- 
- Presentation of Corese for the MEAT Cooperation, with IPMC and I3S,
  - Presentation of the ACACIA project during the ILOG-INRIA Seminar on Semantic Web, at ILOG TAB, July 12,
  - Presentation of Corese during the Software Café on Corese at INRIA September 14,
  - Presentation of the ACACIA project to Procter & Gamble, September 21.
- Rose Dieng-Kuntz:
    - attended COOP'2004 and DeViNT'2004,
    - presented the ACACIA project to SAP
    - gave an invited talk on "Semantic Web Technologies for Analysis of Transcriptome" at ETANG (3rd Indo-French Meeting on Environmental and Therapeutical Applications of Nanotechnologies and Genomics)
  - Fabien Gandon:
    - attended the European Semantic Web Symposium (ESWS), Crete, May 9-17, 2004, as well as the associated Ontoweb and Knowledge Web meetings,
    - attended the W3C Technical Plenary session on 1st-5th March,
    - presented the ACACIA research activities to the University of Naples when they came to visit INRIA (28th of June).
  - Alain Giboin took part in:
    - Coop'2004, UbiMob'04, DeViNT'04.
    - the Scientific Council of the "Laboratoire des usages" of Sophia Antipolis, with Catherine Thomas (Rodige, CNRS-UNSA), coordinator of the KMP Project. The goal of the Conseil scientifique was to evaluate the progress of the KMP project and ten other usage-oriented projects supported by the Laboratoire des usages (January 2004). In its report (March 2004), the Scientific Council « *agreed upon considering the KMP project as the most innovating, the most complete, and the most succeeded project* » of the Laboratoire des usages.
    - a seminar of the Pôle Cindyniques of the Ecole des Mines de Paris at Sophia Antipolis, on « The Analysis of Communication in Work Situations. »
    - presented the research activities of Acacia to three representatives of Ricoh (Corporate Technology Planning Division), to help them assess the feasibility of creating a Ricoh R&D Center in Sophia Antipolis (February 2004).
  - Khaled Khelif gave the following talks:
    - ACACIA-ORION Crossed Seminar on Application of ontologies, Sophia Antipolis, February 16, 2004
    - MATIS'04 Seminar, Grenoble, April 21-22, 2004,
    - Seminar of External Collaborators of Bayer Crop Science, Sophia Antipolis, June 21, 2004: Annotations sémantiques dans le domaine des biopuces.

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