



Project Results

The CoMMA project has already provided major results to different research communities. Some of these results are presented hereafter.



O'CoMMA

O'CoMMA (the CoMMA Ontology) contains more than 420 concepts, organized in a taxonomy with a maximal depth of 12 levels hops (using multi-inheritance), more than 50 relations and more than 630 terms to label these primitives. As O'CoMMA includes reusable parts, it is now publicly accessible from the CoMMA Web site.

Methodology for knowledge models/ontologies building

The methodology relies on 5 stages allowing to capture explicit and implicit knowledge and to result in RDFS (Resource Description Framework Schema) models. It is based on a hybrid approach (top-down, bottom-up and middle out). It integrates a terminological phase.

DRDFS

We propose an extension of RDF(S) with class, property and axiom definitions. We call it DRDFS for *Defined Resource Description Framework*. DRDFS is a refinement of the core RDFS which remains totally compliant with the RDF triple model. More precisely, DRDFS is an RDF Schema extending RDFS with new primitives. This extension of RDFS is based on Conceptual Graphs features. DRDFS is built upon the mapping that has been established between RDF(S) and the Simple Conceptual Graph model. DRDFS more generally enables to express contextual knowledge on the Web.

Extensions of Corese search engine

The processing of reflective, symmetric and transitive relations has been integrated in CORESE, thanks to an extension of RDFS with properties of relations such as transitivity, symmetry and reflexivity. CORESE is provided with new inference capabilities enabling to make explicit the implicit knowledge embedded in the semantic annotations of the documents of a corporate memory. It thus enables intelligent information retrieval based on both explicit knowledge originally embedded in the semantic annotations of the documents and the implicit knowledge made explicit.

Solution provider

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One objective

To provide a corporate memory framework:

Corporate memory:

An explicit, disembodied and persistent representation of knowledge and information in an organization, in order to facilitate their access and reuse by members of the organization, for their tasks.

Management Framework:

A supporting structure around which a system can be built, ensuring coherent integration and exploitation of the dispersed knowledge.

Two scenarios

The solution focuses on two major issues of knowledge management:

- Improvement of the new employee insertion
- Technology monitoring support.

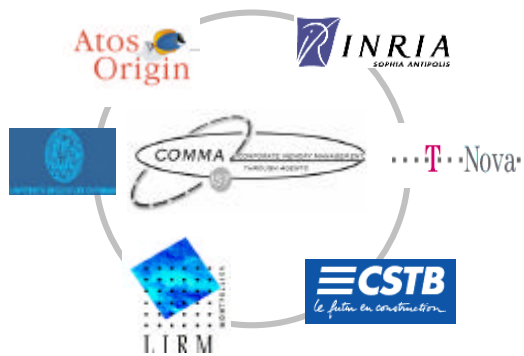
CoMMA

Corporate

Memory

Management through

Agent



Applications

An integrated solution

CoMMA offers an integrated solution to implement a corporate memory based on agent technology.

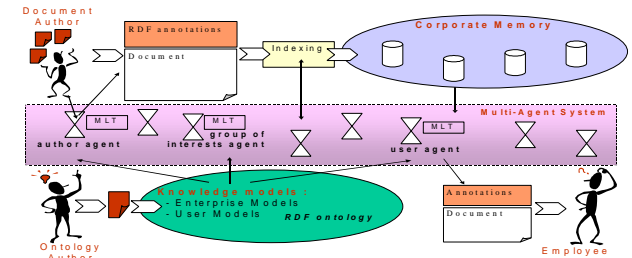
CoMMA promotes a wide vision of the document retrieval issue that could be applied to several cases.

To illustrate this approach, two scenarios have been implemented through the project:

- Insertion of a new employee,
- Technology monitoring

CoMMA is a flexible solution, relying on a distributed architecture. It can be applied to several different contexts, related to the knowledge management issue.

CoMMA Achitecture



Ontology

A keystone

Ontologies are the keystone of the CoMMA system since they provide the building blocks for models, annotations and agent messages, with their associated semantics.

CoMMA proposes:

- A methodology for ontology/knowledge model building
- O'CoMMA: the CoMMA ontology
- A set of tools for managing RDFS-based ontologies and knowledge models



Architecture

Multi-Agent System

A multi-agent system (MAS) is a suitable means to realize complex applications. In fact, agents are flexible autonomous, active and reactive entities that allow an easy integration of heterogeneous components providing them the possibility of interacting with the other parts of the system through the exchange of ACL messages.

In the CoMMA MAS, agents are used to wrap information repositories (i.e., the corporate memory), for the information retrieval, to enhance scaling, flexibility and extensibility of the corporate memory and to adapt the system interface to the users. CoMMA MAS has been realized by using JADE. JADE is an open source agent development framework for the realization of FIPA compliant multi-agent platforms, which offers smart possibilities for the integration of complex distributed processes all over the enterprise. It provides agent management features and supports complex exchanges between agents by using protocols. Resulting from CoMMA, JADE now supports RDF ACL messages, allowing direct access to agents at the semantic level.

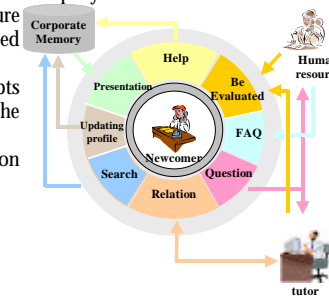
Insertion of a new employee

CoMMA provides a package of functions dedicated to the specific case of the new employee insertion, to allow to search information, taking into account his/her particular status.

Further functions could be envisaged to support the specific relationships between the new comer and his tutor and/or the personnel department of the company.

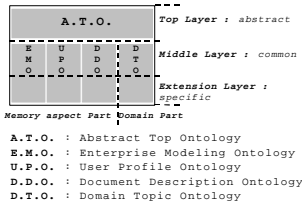
A Solution

1. The memory is composed of heterogeneous evolving documents, we structure them using *semantic annotations* expressed with concepts and relations provided by a shared ontology.
2. The description of the different *user groups, profiles and roles* uses the concepts and relations of the ontology to make explicit, share and exploit a model of the organizational environment and user population.
3. *Ontology* is not only a tool for document annotation and communication support, it is a full document of the memory highly relevant in itself.



Technology monitoring scenario

O'CoMMA



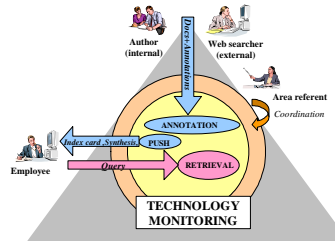
O'CoMMA is broken up in 3 horizontal layers:

- A general top layer, representing the abstract level
- A general middle layer, the most interesting part in terms of reusability
- An extension layer, representing the specific level

CoMMA provides a complete environment to support:

- Annotation of documents,
- Retrieval of documents,
- Definition of user profile,
- Push delivery of information

This environment has been success-fully applied to the technology monitoring scenario.



Semantic search engine

Annotated information worlds are a quick way to make information agents smarter. With the corporate memory becoming an annotated world, agents use the semantics of the annotations and through inferences, help the users to exploit the corporate memory. RDF (Resource Description Framework) and its XML syntax allow the resources of the memory to be semantically annotated.

Traditional search engines are limited to keyword-based, full-text information retrieval. The use of ontologies enables to exploit knowledge about the concepts and their relations, in order to improve information retrieval. CORESE, our semantic search engine, offers ontology-guided document retrieval. It uses the ontology formalized in RDFS and augmented by inference rules enabling to enrich the base of RDF annotations. CORESE is integrated in the CoMMA agents.