Corporate Memory Management through Agents

Presentation by the CoMMA consortium - Fabien GANDON
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Objective: Provide a corporate memory management 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 one can build a system insuring coherent integration and exploitation of the dispersed knowledge

Specificity:

Scenarios: New Employee & Technology Monitoring
Integration of several emerging technologies
Plan of the presentation

- Technical choices and their motivations
  - Multi-Agents Systems
  - Knowledge Engineering & XML Galaxy
  - Symbolic Learning
  - Summary and Technical Overview

- Methodological approach
  - Scenarios
  - Data Collection
  - Designing the Architecture
  - Prototypes & Standards
  - Summary and Methodology Overview

- Conclusion

Introduction
Plan
Multi-Agent Systems
Knowledge Engineering
XML Galaxy
Symbolic Learning
Summary
Scenarios
Data Collection
Designing Architecture
Prototypes Standards
Summary
Conclusion
Agent assets

- Flexible distribution through loosely-coupled software components
- Semantic-level message passing, natural in a KM environment

Architecture / Configuration

- Architecture: Agent kinds and their relationships
  Fixed at design time
- Configuration: Exact topography of a given MAS
  Fixed at deployment time
- One functional architecture → Several possible configurations: adapt to corporate environment

Deployment choices driven by: organizational layout, intranet topography, interest area
Knowledge Engineering

- Knowledge acquisition techniques
- Ontology and Model: describe enterprises & users
- Inference and heuristic techniques

*If OM is an annotated world ⇒ Agents use semantic of annotations ⇒ Inferences to help exploit the OM.*

XML: Extensible Markup Language

- Structured data and documents in text format
- Create & access via internet-based networks
- Standard: human & machine understandable
- DTD: one can formally define document structure
- Style sheets: document manipulation beyond styling

RDF: Resource Description Framework

- Annotation internal/external to documents
- RDFS: RDF Schema (to formalize ontology)

Technical choices and their motivations: KE & XML Galaxy
Technical choices and their motivations: Symbolic Learning

- **Adaptability to users**
  - User profiles (explicit, implicit, derived, additional)
  - Group profiles (explicit, implicit, derived, additional)

- **Adaptability to context**
  - From a temporal point of view
  - From an interface point of view
  - From an organizational point of view

- **Techniques**
  - On the fly learning
  - Remote learning
  - Lazy learning

- **Collaborative filtering (Communities of interest)**
  - Public explicit COINs
  - Emergent implicit COINs
Corporate memories are heterogeneous and distributed information landscapes

Stakeholders are a heterogeneous and distributed population

Exploitation of CM involves heterogeneous and distributed tasks

<table>
<thead>
<tr>
<th>CM Materialization</th>
<th>CM Exploitation</th>
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<tr>
<td><strong>XML:</strong> Standard, Structure,</td>
<td><strong>Multi-Agent System:</strong> Modularity,</td>
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<td>Extend, Validation, Transform</td>
<td>Distributed, Collaboration</td>
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<td><strong>RDF:</strong> Annotation, Schemata</td>
<td><strong>Machine Learning:</strong> Adaptability,</td>
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<td>Emergence</td>
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Corporate Memory Management through Agents

Technical choices and their motivations: To Summarize
Technical choices and their motivations: Architecture Overview
- Which ones?
  - Scenario 1: Improve new employee integration
  - Scenario 2: Support technology monitoring process

- What for?
  - Entrance point in the project
  - Dialog catalyst & Very rich story-telling document
  - To focus on specific aspects of KM
  - Context of CoMMA as a component of a KM solution
  - Concrete set of interaction sequences with CM
  - Capture end-users’ needs
  - Something to check up on

- How?
  - Data collection guidelines
  - Scenarios reports

Methodological Approach: Scenarios
- Semi-structured individual & group Interviews
  - Open Discussion (Unstructured)
  - Flashback & Clarification (More structured)
  - Interviewees’ Self-synthesis (Generalization)
- Documents (e.g. NE Route Card)
- Observations:
  - Annotating
  - Indexing
  - Filing
  - Codes
  - Practices
- Ontology Building: Top-Down & Bottom-Up

Methodological Approach: Data collection
Software Agent Role analysis

- Societies
- Roles
- Relationships

Use Cases

- Linked to Scenarios
- Internal Insight
- UML (adapted)

Methodological Approach: Designing the Architecture
Agent Technology
- JADE framework for developing MAS
- Compliant with FIPA specifications
- New versions to include new specifications

Annotation-based Search
- CORESE: COceptual REsource Search Engine
- VRP parser + NOTIO Conceptual Graphs platform
- First tests for the integration in agents

RDF Editor
- Annotation in RDF
- Ontology in RDFS

Machine Learning
- WEKA package under consideration

Methodological Approach: Prototypes and Standards
- Methodological Approach: Summary and Methodology Overview

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<th>Analysis</th>
<th>Design Aspects</th>
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- So far after the first project quarter
  - Some elements were not used
  - Some elements remain to be used

Methodological Approach: Summary and Methodology Overview
Current & Further work

Current work

- Finishing first version of RDF editor
- Formalizing first version of ontology
- Developing a first enterprise model
- ‘Agentizing’ search engine
- Investigating interesting learning functionality
- Designing first user interfaces

Further work

- Integration of the first versions of agents
- Preparation of the first trial with end-users
¡Gracias!

CoMMA consortium - Fabien.Gandon@sophia.inria.fr
http://www-sop.inria.fr/acacia/personnel/Fabien.Gandon/