Using UML Profiles for Enterprise Knowledge Modelling

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1. Introduction

2. Research Framework

3. MDK Proposal
   - Steps
   - UML Profile

4. Conclusions
Enterprise Knowledge

- Definition no universally accepted

- Different perspectives: state of mind, object, process, etc.

Concept of **Knowledge**

“The awareness that allows people to possess the skill or the capacity required in a particular situation”

- To deal with and solve complex issues efficiently and creatively
- To take advantage of opportunities by making the most appropriate decision

Concept of **Enterprise Knowledge**
Review Literature

Two approaches to model Enterprise Knowledge

Knowledge Representation

```xml
<?xml version="1.0"?>
<rdf:RDF
 xmlns="http://www.co-ode.org/ontologies/pizza/2005/05/16/pizza.owl#"
 xmlns:protege="http://protege.stanford.edu/plugins/owl/protege#"
 xmlns:xsd="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
 xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
 xmlns:owl="http://www.w3.org/2002/07/owl#"
 xmlns:daml="http://www.daml.org/2001/03/daml+owl#"
 xmlns:dc="http://purl.org/dc/elements/1.1/"
 xmlns:base="http://www.co-ode.org/ontologies/pizza/2005/05/16/pizza.owl#"

<owl:Ontology rdf:about=""
 <owl:versionInfo rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
 version="1.2"/>
 <owl:annotationProperty rdf:resource="http://www.w3.org/2002/07/owl#rdfscomment"
 xml:lang="en">
 "A "final stage" that contains all constructs required";
 </owl:annotationProperty>

<owl:Ontology rdf:about=""

<owl:Class rdf:ID="TomatoTopping">
 <owl:disjointWith>
  <owl:Class rdf:ID="SpinachTopping"/>
 </owl:disjointWith>
 <owl:disjointWith>
  <owl:Class rdf:ID="RocketTopping"/>
 </owl:disjointWith>
 <owl:disjointWith>
  <owl:Class rdf:ID="KnifeTopping"/>
 </owl:disjointWith>
 <owl:disjointWith>
  <owl:Class rdf:ID="CaperTopping"/>
 </owl:disjointWith>
 <owl:disjointWith>
  <owl:Class rdf:ID="ArtichokeTopping"/>
 </owl:disjointWith>
</owl:Class>
```
Enterprise Knowledge Modelling

**Enterprise Modelling** is the art of “externalising” enterprise knowledge *(Vernadat, 1996)*

- To add value to enterprise
- To be shared with others
- To represent enterprise in terms of organisation, process, decision, product, resource, and so forth

**Knowledge Representation** is a multidisciplinary subject

- **From logic** → formal structure and rules of inference
- **From ontology** → define kinds of things in the domain
- **From computation** → to support applications

**Knowledge Representation** is the application of logic and ontology to the task of constructing computable models for some domain *(Sowa, 2000)*
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Proposed Solution to Model Enterprise Knowledge

Traditional Enterprise Modelling

1. No Knowledge Dimension
Proposed Solution to Model Enterprise Knowledge

1. No Knowledge Dimension

2. Difficult to exchange EM
Proposed Solution to Model Enterprise Knowledge

Enterprise A

Enterprise B

Enterprise n

1. No Knowledge Dimension

2. Difficult to exchange EM

3. Difficult to generate SW from EM

Traditional Enterprise Modelling
Proposed Solution to Model Enterprise Knowledge

Enterprise A
- IEM

Enterprise B
- GRAI

Enterprise n
- EEML

1. No Knowledge Dimension
2. Difficult to exchange EM
3. Difficult to generate SW from EM
4. KR at low level not graphic
Proposed Solution to Model Enterprise Knowledge

Enterprise A
- IEM

Enterprise B
- GRAI

Enterprise n
- EEML

1. No Knowledge Dimension
2. Difficult to exchange EM
3. Difficult to generate SW from EM
4. To use UML as ML

Traditional Enterprise Modelling / KR
Proposed Solution to Model Enterprise Knowledge

Enterprise A

1. No Knowledge Dimension

Enterprise B

2. Difficult to exchange EM

Enterprise n

3. To use a MDA approach

4. To use UML as ML

Traditional Enterprise Modelling / KR

CIM

PIM

IBM Rational SDP/ MagicDraw UML …

UML

PSM

KMS

GRAl

EEML

GraiTools

Metis

MDA

PSM

KMS
Proposed Solution to Model Enterprise Knowledge

Enterprise A

Enterprise B

Enterprise n

1. No Knowledge Dimension

2. Based on UEML/PO* PIM

GraiTools

GRAI

EEML

3. To use a MDA approach

4. To use UML as ML

IBM Rational SDP/MagicDraw UML …

IBM Rational SDP/MagicDraw UML …

Traditional Enterprise Modelling / KR
Proposed Solution to Model Enterprise Knowledge

1. To add dimension: Knowledge
2. Based on UEML/POP*

1. To use UML as ML
4. To use UML as ML
3. To use a MDA approach

To develop a Proposal for Modelling EK at the CIM Level → MDK Proposal

MDA
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**Conceptual blocks of knowledge**

- Organisation
- Process
- Product/Service
- Resource
- Owner
- Supplier/Customer
- Employee
- Administration
- Business District

**Target Knowledge**

- Decisional and Organisational Structure
  - Process Map
  - Best Practices Workflow
- Material Planning Availability
- Vision Mission Strategy
- Objectives Police
- Collaboration Degree of satisfaction Values
- Experience Competencies Values
- Regulations Policies of RSC Rights
- Enterprise Culture District Know-how

**Sources of Knowledge**

- Explicit
  - Owners Employees Trade Unions...
  - Employees Customers Suppliers...
  - Employees Customers Suppliers...
  - Employees Owners Customers...
  - Owners Employees Administrations
  - Suppliers Customers Employees...
  - Employees Customers Owners...
  - Administrations Trade Unions Web
  - Competitors Associations Universities

- Tacit

**PHASE I. Identification**

- Conceptual blocks of knowledge

**PHASE II. Extraction**

- Sources of Knowledge

**PHASE III. Representation**

- MDA Approach

**PHASE IV. Processing**

- PIM
- PSM
- CODE

**PHASE V. Utilisation**

- Knowledge Map at the CIM Level
- Knowledge Portal (Executable Knowledge Map)
- Ontology
- Technological Architecture of the KMS

**KM-IRIS Methodology for the Implementation of a KMS**
Using UML Profiles for Enterprise Knowledge Modelling

PHASE I. Identification


PHASE II. Extraction


- Sources of Knowledge: Owners Employees Trade Unions, Employees Customers Suppliers, Employees Customers Suppliers, Employees Owners Administrations, Owners Employees Suppliers, Employees Customers Administrations, Employees Customers Owners, Administrations Trade Unions Web, Competitors Associations Universities

PHASE III. Representation

- PHASE IV. Processing

- PHASE V. Utilisation

- Technological Architecture of the KMS

- Ontology

- Knowledge Map at the CIM Level

- Knowledge Portal (Executable Knowledge Map)

- CODE

- PIM

- PSM

- Employees

- Education

- Continuous Improvement

- Maintenance

- ..........
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Steps for Developing the EKML

1. To define the Models and Diagrams included in the MDK Proposal

2. To define the Metamodels based on collected requirements

3. To define and implement the concerned UML2 Profiles

4. To describe the elements (including icons) of each Diagram

5. To validate with a case study
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