Knowledge Modelling and Management (0)

UG4/MSc Course Semester 2

Dr. Jessica Chen-Burger

Knowledge Modelling and Management (KMM)

Specialism: Knowledge Representation and Reasoning
Level: 10/11
Semester: 2

Prerequisites: None
Recommended: Fundamentals of AI,
Logic Programming

Study Format: 20 lectures, 2 assessed exercises (25%), 1 exam (75%)

Knowledge Modelling and Management (KMM)

Two Teaching Blocks:

Part A: Ontologies for Knowledge Management
Dr. Stuart Aitken (10 lectures, weeks 1-4 ½, weeks 10 ½)

Part B: Conceptual Modelling Methods for Knowledge Management
Dr. Jessica Chen-Burger (10 lectures , weeks 4 ½-10 ½)

Timetable: **Semester 2 lectures**
Mondays 16:10-17:00
Thursdays 16:10-17:00

Ontologies for KM

Part A outline:

- **Introduction - What is an Ontology?**
  - Methodological ways to develop ontologies
  - Tools, e.g. Protégé
- **Languages: Description logic and OWL and proof methods**

  Uncle ≡ Man *hasSibling* some Parent

  Parent ≡ Person *hasChild* some Person
- **Examples: CYC, Gene Ontology, Enterprise Ontology**
- **Parts and wholes: mereology and topology**
- **Principles for organising and evaluating class hierarchies**

Conceptual Modelling for KM

Part B outline:

- An introduction to knowledge management
- Higher level view of knowledge management and modeling
- How conceptual/enterprise modelling and knowledge engineering techniques relate to KM
- Knowledge acquisition and model building techniques
- Example Conceptual/Enterprise modelling methods:
  - e.g. CommonKADS, IDEF methods, UML and Ontology.
- Business Process Modeling Methods
- Knowledge representation and inferencing for models
- Business Intelligence and Knowledge Management

KMM: Learning Outcomes

- To understand the principles of ontology design;
- To be able to construct an ontology and understand the formal basis of the definitions it contains;
- To be able to apply evaluation criteria to assess ontologies;
- To understand the issues of sharing knowledge in an organisational context and in a scientific community;
- To gain an overview of the different types of knowledge modelling methods and how they may be used together;
- To be able to select the appropriate modelling method(s) given certain circumstances;
- To be able to construct correct models given a domain;
- To be able to carry out reasoning on models based on lightweight logical methods;
- To critically appraise the strengths and weaknesses of knowledge-based models;
- To acquire the ability to critically review relevant literature independently thus extend one's knowledge.
- To solve problems of a more open-ended nature.

Reading List

- **Knowledge Engineering and Management: The CommonKADS Methodology. Guus Schreiber, Robert de Hoog, Hans Akkermans, Anjo Anjewierden, Nigel Shadbolt, Walter Van de Velde.**
- **Business Intelligence - a managerial approach, by Efraim Turban, Ramesh Sharda, Dursun Delen and David King. Published by Pearson Education, Inc. Publishing as Prentice Hall. ISBN 13:978-0-13-247882-3. Copyright (c) 2011.**
- **Data Mining - Concepts and Techniques by Jiawei Han and Micheline Kamber, published by Morgan Kaufmann.**
- **Ontological Engineering: With Examples from the Areas of Knowledge Management, E-Commerce and the Semantic Web Asunción Gómez-Pérez, Mariano Fernandez-Lopez, Oscar Corcho.**

Useful KMM Course Website

- http://www.inf.ed.ac.uk/teaching/courses/kmm/
- http://www.aiai.ed.ac.uk/~jessicac/project/KMM/