Knowledge Representation

CS 2740 (ISSP 3712) – Spring 2007

Lecture meeting time: Tuesday, Thursday 10:15-11:30am (to be rescheduled)
Classroom: 5313 Sennott Square (SENSQ)

Instructor:	**Milos Hauskrecht**	TA:	**Jiang Zheng**
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Course Web page:	http://www.cs.pitt.edu/~milos/courses/cs2740/	**Web Page:**	http://www.cs.pitt.edu/~jzheng/

Course Description:

Knowledge representation (KR) is the study of how knowledge about the world can be represented in a computer system and what kinds of reasoning can be done with that knowledge. Challenges of KR and reasoning are representation of commonsense knowledge, the ability of a knowledge-based system to tradeoff computational complexity for accuracy of its inferences, and its ability to represent and manipulate uncertain knowledge and information.

This introductory knowledge representation course will provide an overview of existing representational frameworks developed within AI, their key concepts and inference methods. The course will cover propositional and first-order logics, their object-oriented extensions (frames), default logic and reasoning, inheritance relations, as well as topics related to Semantic web, design of KB ontologies and probabilistic extensions of logic.

Prerequisites: Foundations of AI (CS 2710), or the permission of the instructor.

Textbook:

Brachman and Levesque. *Knowledge Representation and Reasoning.* Morgan Kauffman, 2004.

Homework assignments

Homework assignments will include a mix of programming and written problems. Programming assignments will be implemented in the language of your choice but the usage of one of the AI languages such as Lisp or Python is highly encouraged. The assignments (both written and programming parts) are due at the beginning of the class on the day specified on the assignment. In general, no extensions will be granted.

Collaborations: You may discuss material with your fellow students, but the report and programs should be always written individually.

Term projects

The term project is due at the end of the semester and accounts for a significant portion of your grade. In very general terms, a project should address a knowledge representation and/or reasoning problem. It may consist of a development of a simple knowledge base (expert system) application, the development of a reasoning, explanation, or consistency checking modules for KBs, or application of KR and reasoning to support advanced web queries.

Policy on Cheating

Cheating and any other anti-intellectual behavior, including giving your work to someone else, will be dealt with severely. If you feel you may have violated the rules speak to us as soon as possible. Please make sure you read, understand and abide by the Academic Integrity Code for the Faculty and College of Arts and Sciences (http://www.fcas.pitt.edu/academicintegrity.html).

Students with Disabilities

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 216 William Pitt Union, (412) 648-7890/(412) 383-7355 (TTY), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Tentative syllabus:

- Propositional logic and inference
- First order logic and inference
- Frame-based representations
- Inheritance and Defaults
- Ontologies and commonsense knowledge
- Semantic Web
- Modeling Uncertainty
- Probabilistic Logic