INGI2261 Artificial intelligence: representation and reasoning

[30h+30h exercises] 5 credits

This course is taught in the 1st semester

Teacher(s): Yves Deville (coord.), Pierre Dupont, Axel Van Lamsweerde
Language: French
Level: Second cycle

Aims

- To understand and explain the basic knowldge representation, problem solving and reasonning methods in artificial intelligence
- To assess the applicability, strength, and weaknesses of the basic knowledge representation, problem solving and reasonning in solving particular engineering problems
- To develop intelligent systems by assembling solutions to concrete computational problems
- To understand the role of knowledge representation, problem solving and reasonning in intelligent-system engineering

Main themes

- Problem solving by searching : formulating problems, uninformed and informed search search strategies, local search, evaluation of behavior and estimated cost, applications
- Constraint satisfaction : formulating problems as CSP, backtracking and constraint propagation, applications
- Games and adversarial search : minimax algorithm and Alpha-Beta pruning, applications
- Propositional logic : representing knowledge in PL, inference and reasoning, applications
- First-order logic : representing knowledge in FOL, inference and reasining, forward and backward chaining, rule-based systems, applications
- Planning : languages of planning problems, search methods, planing graphs, hierarchical planning, extensions, applications
- AI, philosophy and ethics : can machines act intelligently, can machines really think, ethics and risks of AI, future of AI

Content and teaching methods

see "Main themes"

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

- Prerequisites:
This course presupposes the knowledge of material covered in the two following courses
(1) INGI2101 : Mathématiques discrètes : bases logiques de l'informatique
(2) LINF2121 : Algorithmique et structures de données
- References
(1) Stuart Russell and Peter Norvig "Artificial Intelligence: A Modern Approach", Second Edition, Prenticel Hall, 2003
(2) N. Nilsson "Artificial Intelligence: A New Synthesis" Morgan Kaufmann, 1998
(3) E. Rich and K. Knight "Artificial Intelligence", 2nd edition, McGraw Hill Book Company, 1991
(4) P.H. Winston "Artificial Intelligence", 3rd Edition, Adison-Wesley, 1998.
(5) M.R. Genesereth and N. Nilsson "Logical Foundations of Artificial Intelligence" Morgan Kaufmann, 1987

Other credits in programs

FSA3DA	Diplôme d'études approfondies en sciences appliquées	(5 credits)	
FSA3DS/IN	Diplôme d'études spécialisées en sciences appliquées (informatique)	(5 credits)	
INFO22	Deuxième année du programme conduisant au grade d'ingénieur civil informaticien	(5 credits)	Mandatory
INFO23	Troisième année du programme conduisant au grade d'ingénieur civil informaticien	(5 credits)	
LINF22/GN	Deuxième licence en informatique (informatique générale)	(5 credits)	Mandatory