Computing Science Course Outlines

CMPT 310 - D100 Artificial Intelligence Survey

Instructor(s): Maxwell Libbrecht

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Calendar Objective/Description:
Provides a unified discussion of the fundamental approaches to the problems in artificial intelligence. The topics considered are: representational typology and search methods; game playing, heuristic programming; pattern recognition and classification; theorem-proving; question-answering systems; natural language understanding; computer vision.

Instructor’s Objectives:
Artificial Intelligence (AI) is the part of computer science concerned with systems that learn, reason and make/support decisions. The goal of this course is to provide students with a survey of different aspects of artificial intelligence. A variety of approaches with general applicability will be developed. We will start with the theory of optimal decision-making, both for single agents (expected utility) and multiple agents (game theory). The next topic is searching for solutions to complex decision and planning problems (search strategies and heuristics). Symbolic logic will be presented as a formalism for representing knowledge in AI systems. Probability as a mechanism for handling uncertainty in AI will be presented, with a focus on Bayesian networks. We will introduce basic concepts of machine learning, such as decision trees and neural nets.

Prerequisites:
CMPT 225 and (MACM 101 or ENSC 251 and ENSC 252)). Students with credit for CMPT 410 may not take this course for further credit.

Topics:
- Search
- Logic
- Game playing
- Planning
- Reasoning under uncertainty (probability)
- Bayesian networks
- Utility theory, Decision networks
- Learning

Grading:
To be discussed the first week of classes
Students must attain an overall passing grade on the weighted average of exams in the course in order to obtain a clear pass (C- or better).

Required Books:

Reference Books:
Academic Honesty Statement:

Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).