CMPT 419 - D100 Special Topics in Artificial Intelligence

Instructor(s): Mo Chen  
SFU Burnaby

Calendar Objective/Description:
Current topics in artificial intelligence depending on faculty and student interest.

Instructor's Objectives:
This course introduces fundamental concepts in robotics and related fields, including analytical methods for decision making, and machine learning in the context of robotics. Topics include modelling and simulation of robotic systems, optimization, optimal control, robotic safety, reinforcement learning, and robotic perception. Applications of the material include unmanned aerial vehicles and self-driving cars.

Prerequisites:
None

Topics:
- Modelling and simulation
- Optimization
- Optimal control
- Robotic safety
- Reinforcement learning
- Robotic perception

Grading:
Assignments – 40%  
Project proposal – 10%  
Project presentation and report – 50%

Recommended Books:
Introduction to Autonomous Mobile Robots, R. Siegwart, I. R. Nourbakhsh, and D. Scaramuzza, MIT Press, 9780262015356
Planning Algorithms, S. M. LaValle, Cambridge University Press, 9780521862059
Convex Optimization, S. Boyd and L. Vandenberghe, Cambridge, 9780521833783
Dynamic Programming and Optimal Control, D. P. Bertsekas, Athena Scientific, 9781886529434
Reinforcement Learning: An Introduction, R. S. Sutton and A. G. Barto, MIT, 9780262039246

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