EEC289A: An Introduction of Reinforcement Learning

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Course description: This course focuses on the introduction of one important subject of machine learning: reinforcement learning, which is considered the core for artificial intelligence. Topics include fundamentals of reinforcement learning, bandit problems, Markov decision processes, dynamic programming, Monte Carlo methods, temporal-difference learning, on-policy vs. off-policy learning, learning vs. planning, approximation methods, eligibility trace, policy gradient methods, and critic-actor methods.

Number of Units: 3  
Hours per week: 3  
Class number: EEC 289A

Topics:
- Fundamentals of reinforcement learning  
- Bandit problems  
- Markov decision process  
- Dynamic programming  
- Monte Carlo methods  
- Temporal-difference learning: TD(0)  
- N-step TD  
- Learning vs. planning  
- Approximation methods  
- Eligibility trace  
- Policy gradient methods

Recommended Textbook:

Reinforcement Learning: An Introduction, Second edition

By Richard S. Sutton and Andrew G. Barto
ISBN-10: 0262039249  
Supplementary Textbook:

Reinforcement Learning and Optimal Control

By Dimitri Bertsekas
ISBN-10: 1886529396

Grading Structure:

1. Homework sets. 50%.
   
   Homework sets will mainly be computer programming to implement learning algorithms discussed in the class.

2. Final project. 50%

   The final project will focus on exploring the applications of learning algorithms discussed in the class.