Introduction to Intelligent Systems

Course number: 430.457
Time: M/W 2:00-3:15PM
Location: Building 301 Room 104

Instructor: Prof. Songhwai Oh (오성회)
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Course description: This course introduces the foundation of intelligent systems, such as probabilistic modeling and inference, statistical machine learning, computer vision, and robotics, to undergraduate students. Topics include Bayesian networks, hidden Markov models, Kalman filters, Markov decision processes, linear regression, linear classification, nonparametric models, Bayesian learning, neural networks, and reinforcement learning. Students will also learn about how these methods are applied to practical applications such as computer vision and robotics. Lectures will be in English.

Textbooks: Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach (3rd edition), Prentice Hall, 2009.

Grading: Assignments (30%), midterm (20%), and final (exam and/or term project) (50%). Note that the percentages are approximate and the actual weights used to compute the final grades may be different.

Prerequisites: Introduction to random variables and random processes (430.314, 확률변수 및 확률과정의 기초) and linear algebra for electrical systems (430.216, 전기시스템 선형대수).

Academic honesty: Same as the academic integrity policy of the university and the school.

Weekly plan (subject to change):

Week 1	Review of probability and linear algebra
Week 2	Bayesian networks
Week 3	Inference in Bayesian networks
Week 4	Dynamic models, Hidden Markov models (HMM)
Week 5	Kalman filtering, Dynamic Bayesian networks
Week 6	Supervised learning, Decision trees
Week 7	Linear regression, Linear classification
Week 8	Neural networks
Week 9	Nonparametric models, Support vector machines (SVM)
Week 10	Bayesian learning, EM algorithm
Week 11	Introduction to Computer vision: image formation, edge detection, texture, optical flow
Week 12	Object recognition, Reconstructing the 3D world
Week 13	Markov decision processes (MDP), Reinforcement learning
Week 14	Introduction to Robotics, Localization, Mapping
Week 15	Simultaneous localization and mapping (SLAM), Path planning