

COGS 514 – Cognition and Machine Learning – Fall 2014-2015

Instructor: Asst. Prof. Dr. Cengiz Acartürk
Schedule: Monday, 08:40-11:30, Classroom S03
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Course Objectives. The major goal of this course is to introduce machine learning and its applications as a research methodology at the intersection between natural and artificial cognitive systems. The course curriculum covers the fundamental topics in machine learning, including supervised learning, Bayesian decision theory, decision trees, multilayer perceptrons, and their applications in subdomains of cognitive science, including natural language processing, vision and models of human learning.

Outline

- Introduction to Machine learning applications and techniques
- Designing a ML program
- Concept learning algorithms, inductive learning, Decision Trees
- Functional methods: Linear regression, gradient descent, nonlinear regression, logistic regression
- Issues in ML design: Overfitting, regularization, debugging learning algorithms
- Artificial neural networks
- Bayesian learning
- Unsupervised learning techniques, clustering
- Recommender systems

Text Book. There is no specific textbook for the course. Below are some reference sources.

References

- Alpaydin, E. (2010). Introduction to machine learning, Second Edition. Cambridge: MIT Press.
- Mitchell, T. (1997). Machine learning. McGraw Hill.
- Russell, S. & Norvig, P. (2010). Artificial Intelligence: A Modern Approach. 3rd Ed. Prentice Hall, NJ.
- Witten, I. H., Frank, E., & Hall, M. A. (2011). Data mining: Practical machine learning tools and techniques (3rd ed.). Morgan Kaufman.

Grading. (to be decided upon discussion in the class)

Notes

- Please contact me if you need disability accommodations.
- Please do not expect an immediate reply to your e-mail. It may take up to three days before a reply.

The course schedule, the course content and the grading schedule in this syllabus may be modified at any time by the course instructor. Such changes will be announced in class hours.