

EECS 349: MACHINE LEARNING

Fall 2018

Instructor: Doug Downey	Email: ddowney@eecs.northwestern.edu
Time: MWF 3:00-3:50	Place: Tech Aud

Course Pages:

1. http://www.cs.northwestern.edu/~ddowney/courses/349_Fall2018/

Course Description: Machine Learning is the study of algorithms that improve automatically through experience. This course is a survey of approaches in machine learning, aimed at teaching students the strengths and limitations of machine learning algorithms and how to apply the approaches to tasks in practice.

Course Materials: No textbook. The course material will be comprised of research papers in the field.

Course Goals: To expose students to concepts and methods in machine learning. To give students a basic set of machine learning tools applicable to a variety of problems. To teach students critical analysis of machine learning approaches so that the student can determine when a particular technique is applicable to a given problem.

Prerequisites: (EECS 214 or 325 or graduate standing and equivalent programming experience) and basic knowledge of statistics and probability.

Grading Policy: Four homeworks involving programming and mathematical exercises (40%), two mid-term exams in weeks 4 and 9 (20%), and a substantial student-led project (40%).

Course Objectives: When a student completes this course, s/he should be able to: 1) analyze a problem and determine which machine learning approach may be best suited to solving the problem and 2) implement the chosen approach.

Topics: The course will cover the following topics and potentially others as time allows:

- Decision Tree Learning
- Artificial Neural Networks and Deep Learning
- Evaluating Hypotheses
- Bayesian Learning
- Computational Learning Theory
- Instance-Based Learning
- Reinforcement Learning
- Clustering

Academic Integrity: Students are expected to do their own work. You can discuss homework with your peers, but do not take any written record from the discussions. Do not share your solutions in any way, do not look for solutions to the homework online, do not post test questions online. Several assignments in this course will be group work, and students *in the same group* can collaborate however they like – sharing code, looking over each other’s shoulder while coding, etc. – but students in different groups must not collaborate in this way. Any suspected violations of academic integrity will be referred to the administration.