

NEW COURSE

EECS 498-14: Machine Learning Basics for Optics & Photonics

**Prof. Mohammed N. Islam (mni@umich.edu)
2 credits, Tuesdays 5:30-7:30pm in Room 3427**

This course is intended for students who have not taken any course on artificial intelligence or machine learning (no background is assumed, and you actually do not even have to be in Optics & Photonics or EECS 434). In this supplement to EECS 434, we will cover an introduction to machine learning and neural networks. Why? Because for most applications using optical sensors, machine learning will be used to analyze the data and provide the results. Continuous monitoring optical systems provide such a vast amount of information that machine learning is vital for processing. In the future, many “software defined optical systems” will be a combination of the optical hardware and machine learning or neural networks. So, the foundation for such hardware and machine learning systems is established in this introductory course.

LECTURES ON MACHINE LEARNING:

- Lecture 1 Machine Learning Fundamentals
- Lecture 2 Linear Regression with One Variable
- Lecture 3 Linear Regression with Multiple Variables
- Lecture 4 Logistic Regression Classification
- Lecture 5 Overfitting & Regularization
- Lecture 6 Non-linear Hypothesis & Neural Networks
- Lecture 7 Neural Networks: Loss Function, Forward & Backward Propagation
- Lecture 8 Applying Machine Learning (time permitting)

GRADING:

For the students, the grades will be based on attendance, and review of sections of the book by Andrew Ng, “Machine Learning Yearning”. The book will be provided, and different students will cover different sections of the book and present to the class with slides.

- Attendance will be required, with at most two lectures that can be missed without instructor approval.
- Students will give presentation from “Machine Learning Yearning.” To the extent possible, the presentations should involve the class, so we can all learn as a group.
- NOTE: no programming in class (but you may want to do it on your own)