

ESE 188: Understanding Machine Learning

Winter 2019

Catalog Description:

This is a course on the basics of machine learning. Students develop an intuitive understanding of the core concepts of machine learning including supervised and unsupervised learning, classification and prediction. The course provides a number of practical examples from a wide range of disciplines including biomedicine, social sciences, and engineering. The course does not require any prerequisites in engineering or computer science.

Course Designation:

SBC: TECH

Course Credits:

3

Prerequisite:

None

Faculty:

Vibha Mane

Email: vibha.mane@stonybrook.edu

Department of Electrical and Computer Engineering

Teaching Assistant:

TBD

Office Hours:

Wed 4 pm – 7 pm

Instructor Support:

Available by Phone, Email, Skype chat, and Discussion Board.

Course Delivery:

Online, Asynchronous, Blackboard; PowerPoint lectures/videos and Software for Hands-on Investigations.

Course Dates and Duration:

Tues, January 7 – Saturday, January 25.

Grading

Quizzes (Multiple Choice Online through Blackboard) Best 4 out of 5 (25 points each)	100
Extra Credit	25

Course Learning Outcomes: Upon completion of the course, students will

- Learn basic framework of the machine learning lifecycle.
- Develop an intuitive understanding of the core concepts of machine learning algorithms, such as clustering, classification and regression.
- Learn about various types of neural networks.
- Understand how machine learning algorithms are applied to real world problems, through hands-on investigations.

Learning Modules and Topics:

There are 5 Learning Modules, with topics as described below. Each Module also has Hands-on Investigations and an Exam. The Hands-on investigations are based on applications provided by the instructor. Students are not expected to do programming.

Schedule

Module 1 (Jan 7 - 10)	Understanding Data: Structured, semi-structured and unstructured data; data visualization; histogram, density and scatter plot. Hands-on Investigation: Scatter plot and bar plot visualization of data.
Module 2 (Jan 11 - 14)	Understanding Distributions: Probability distributions, univariate & multivariate; some common distributions: Normal and Poisson. Hands-on Investigation: Generate simulated data from binomial and normal distributions; fit distributions to observed data.
Module 3 (Jan 15 - 18)	Understanding Clustering: Supervised vs. unsupervised learning; grouping similar objects. Hands-on Investigation: Cluster Wholesale Customer Data
Module 4 (Jan 19 - 22)	Understanding Regression: Regression Models and their use for prediction. Hand-on Investigation: Predict housing prices
Module 5 (Jan 23 - 25)	Understanding Neural Networks: Concepts and types of Neural Networks. Hands-on Investigation: A simple neural network.
Extra Credit (Jan 17 - 25)	Work on extra credit; topics will be provided.