



CS 559 Machine Learning

Introduction and Overview

In Suk Jang
Department of Computer Science
Stevens Institute of Technology



Instructor Information

- Instructor: In Suk Jang
 - Office Hours: Wednesday 2 PM – 3 PM
 - Email: ijang@stevens.edu



Course Information

- Prerequisite Course
 - MA 222 Probability Theory
- Meeting: Online
- Canvas: Announcements, Assignments, Discussions



Reading Information

- Bishop, Christopher M., 2006
Pattern Recognition and Machine Learning
Springer-Verlag New York, Inc.
- Ian Goodfellow and Yoshua Bengio and Aaron Courville, 2016
Deep Learning
MIT Press
- Hastie, Trevor and Tibshirani, Robert and Friedman, Jerome, 2016
The Elements of Statistical Learning
Springer New York, Inc.
- *Not Required but recommended*



Course Prerequisites and Goals

Before this course, you should know...

- Programming - Python
- Linear Algebra – Vector, Matrix, Projection, Eigenvalues,
- Probability and Optimization – distributions, expectation/variance, etc...

At the end of this course, you should.....

- Be more proficient at math and programming
- Be able to recognize when and how a new problem can be solved with an existing technique
- Be able to implement general ML techniques for a variety of problem types



Grade Information

Class Participation	10%
Homework	40%
Final Project	25%
Midterm	10%
Final Exam	15%



Class Participation Information

- Three to five students will be assigned to make a short 10-minutes long presentation introducing a recent research paper that contains the topics covered in the previous week.
 - Each student will summarize the paper and present how the topic has been applied in the research.
 - Rest students must post questions/comments/thoughts on each presentation. The presenters are required to reply to the posts.
- The posing presentations must be due by Monday of the following week of the topic and other students have comments by Friday of that week 11:59 PM. The replies must be done before the next week from the presentation upload day 11:59 PM.
- **Example:** If Student A upload the video on Tuesday 1/21/2020, classmates post their comments by 1/24/2019 Friday and Student A should reply before 1/28/2020 Tuesday.



Homework Information

There will be bi-weekly homework assignments with both written and programming parts. Each assignment is centered around an application and will also deepen your understanding of the theoretical concepts. Every homework will be due on Monday 11:59 PM.

Submission: jupyter notebook, doxc file on Canvas



Late Submission Information

- Late days: maximum of two (2) late days in total. If you use up your late days, late submission will not be graded.
- Canvas: ask questions on Canvas. Don't email directly.
- Any personal issues and matters – Email me directly



Final Project Information

- The final project provides an opportunity for you to use the tools from class to build something interesting of your choice.
- Individual Work
- A full-report required.



Exam Information

- One Midterm and Final Exam
- Online Test



The Honor Code Information

- May collaborate and discuss together but must write codes and reports independently
- Do not look at classmates' writeup or code
- Do not share writeup/code
- Quote any use of references
- Any violations - will report to the University



Course Information

Week	Date	Topics	Reference	Assignment Due
1	Jan 20	Introduction;		
2	Jan 27	Probability and Linear Algebra Review		
3	Feb 3	Supervised Learning Regression & KNN		Class presentations
4	Feb 10	Clustering & the general optimization		HW 1 Due Class presentations
5	Feb 17	Clustering & the general optimization		Class presentations
6	Feb 24	Logistic Regression		HW 2 Due Class presentations
7	Mar 2	Midterm Exam		
	Mar 9	Spring Break		
8	Mar 16	Probabilistic ML and Feature Engineering		HW 3 Due Class presentations
9	Mar 23	Decision Trees		Class presentations
10	Mar 30	Ensemble Random Forests and Boosting		HW 4 Due Class presentations
11	Apr 6	Supportive Vector Machine		Class presentations
12	Apr 13	Deep Learning		HW 4 Due Class presentations
13	Apr 20	Project Week		Class presentations
14	Apr 27	Project Presentations		
15	May 4	Final Exam		