CS 1675 Introduction to Machine Learning

Department of Computer Science, SCUPI

Fall 2024

Instructor

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Office Hours: Tuesday 13:30-16:30 & Thursday 8:30-11:30

Teaching Assistants

Section 1: Wenhao Zheng 郑文豪 (email: 2023323045055@stu.scu.edu.cn)
Section 2: Yuyao Tang 唐宇瑶 (email: 1017170093@qq.com)

Lectures

Section 1:
Monday 8:15-11:00
Location: 3-104

Section 2:
Tuesday 8:15-11:00
Location: 3-106

Description

This introductory machine learning course will give an overview of many models and algorithms used in modern machine learning, including linear models, multi-layer neural networks, support vector machines, density estimation methods, bayesian belief networks, clustering, ensemble methods, and reinforcement learning. The course will give the student the basic ideas and intuition behind these methods, as well as, a more formal understanding of how and why they work. Through homework assignments students will have an opportunity to experiment with many machine learning techniques and apply them to various real-world datasets.

Prerequisites

- CS 1501 Algorithm Implementation
- STAT 1000 Applied Statistical Methods

Course Objectives

- To learn the basic machine learning techniques, both from a theoretical and practical perspective
- To practice implementing and using these techniques for simple problems
- To understand the advantages/disadvantages of machine learning algorithms and how they relate to each other

Applicable ABET Outcomes

- Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of

computing requirements in the context of the program's discipline.

- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.

Textbook

Christopher M. Bishop. *Pattern Recognition and Machine Learning*. Springer.

Reference

Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. MIT Press.
Trevor Hastie, Robert Tibshirani, and Jerome Friedman. *The Elements of Statistical Learning*. Springer.
David Barber. *Bayesian Reasoning and Machine Learning*. Cambridge University Press.

Grading

Attendance	5%
Quizzes	1%
Assignments	24%
Mid-Term Exam	20%
Project & Presentation	20%
Final Exam	30%

Conversion from Numerical Score to Letter Grade

[90, 100]	A
[85, 90)	A-
[80, 85)	B+
[76, 80)	B
[73, 76)	B-
[70, 73)	C+
[66, 70)	C
[63, 66)	C-
[61, 63)	D+
[60, 61)	D
[0, 60)	F

Communication

All lecture notes, assignments, projects, and announcements will be published on Blackboard (https://pibb.scu.edu.cn/). Announcements and notifications for update on Blackboard will be sent to QQ / email group. It is the student's responsibility to regularly check Blackboard in a timely manner.

In case you need to contact the instructor via email, please have the TA CCed and begin the email subject line with **[CS1675]**. For other course-related questions, students are encouraged

to contact the TA.

Class Policy

Attendance

Class attendance is expected and takes a share in your final grade. If a student has a valid reason to be absent from a class session, please notify the instructor beforehand.

Homework Assignment

Homework assignment is due one week later before the class begins. A late penalty of 5% per day, up to 30% in total, is imposed on overdue homework until the solution published on Blackboard in one more week. Any questions regarding to the grading of homework assignment must be raised to the instructor and the TA within a one-week time frame.

Exam

There will be one mid-term exam and one final exam. The final exam will be cumulative. The exams will be CLOSED BOOK, CLOSED NOTES, and CLOSED COMPUTER.

Academic Integrity

The principles of academic integrity requires that a student to make sure that all work submitted is the student's own and created without the aid of impermissible technologies, materials, or collaborations. Academic integrity policy will be strictly followed.

Tentative Course Schedule

Week	Date	Topics
1	Sep 2	Introduction
2	Sep 9	Linear Models for Regression
3	Sep 16	Regression Revisit
4	Sep 23	Linear Models for Classification
5	Sep 30	Classification Revisit
6	Oct 7	Neural Networks
7	Oct 14	Kernel Methods
8	Oct 21	Sparse Kernel Machines
9	Oct 28	Graphical Models
10	Nov 4	Mid-term Exam
11	Nov 11	Mixture Models and EM
12	Nov 18	Approximate Inference
13	Nov 25	Sampling Methods
14	Dec 2	Continuous Latent Variables
15	Dec 9	Sequential Data
16	Dec 16	Combining Models
17	Dec 23	Project Presentation
18	Dec 30	Project Presentation
19	Jan 6	Final Exam