CS 1675 Introduction to Machine Learning

Department of Computer Science, SCUPI

Fall 2025

Instructor

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Office Hours: Monday & Friday 09:00-12:00 or by appointment

Teaching Assistants

- Section 1: Penny Zhao 赵佩仪
- Section 2: Alexandra Hu 胡锦仪

Lectures

- Section 1: Tuesday 13:50-16:25 @ S503
- Section 2: Thursday 13:50-16:25 @ S503

Course Description

This undergraduate course will give an overview of many models and algorithms used in modern machine learning and deep learning. The first part of the course will cover the basics of regression and over-fitting, classification, ensemble methods, dimension reduction, clustering, and anomaly detection. The second part will cover the basics of neural networks and describe specific types of deep nets, including convolutional neural networks, recurrent neural networks, transformers, reinforcement learning, self-supervised learning, and generative models. 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.

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 understand the principles of deep learning and its capabilities
- To understand the advantages/disadvantages of machine learning and deep learning algorithms and how they relate to each other
- To acquire practical skills to design, implement, and train practical machine learning and deep learning systems
- To practice implementing and using these techniques for simple problems

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.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- 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.

Textbooks

- *Pattern Recognition and Machine Learning*. Christopher M. Bishop. Springer, 2006. Available at https://www.cs.uoi.gr/~arly/courses/ml/tmp/Bishop_book.pdf.
- *Deep Learning*. Ian Goodfellow, Yoshua Bengio, Aaron Courville. MIT Press, 2016. Available at https://www.deeplearningbook.org/.

Grading

- Attendance 5%
- Assignments 20%
- Projects 20%
- Mid-Term Exam 25%
- Final Exam 30%

Communication

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

Class Policies

Attendance

Class attendance will be checked on a bi-weekly basis and takes a share in your final grade. A student has three chances to be absent from class free of penalty without prior notification. Otherwise, please notify the instructor in advance if you have a valid reason.

Assignment

Assignments are submitted every four weeks. Late submission must be made within one week after the due date, otherwise it will not be accepted. One late submission is accepted penalty-free, after that a late penalty of 5% per day, up to 30% in total, is imposed. Any questions regarding to the grading of homework assignment must be raised to the instructor within a one-week time frame.

Project

Students must report their project progress every four weeks during the presentation sessions. Project work must be submitted at the end of week 8 and week 16. Based on the TA's supervisory advice, students can refine their project work in one week after the submission without penalty, if needed. After that, no late submission is accepted. Questions regarding to the grading of project must be raised to the instructor within a one-week time frame.

Exam

Exams are CLOSED BOOK, CLOSED NOTES, CLOSED COMPUTER, and CLOSED CELLPHONE.

Academic Integrity

The principles of academic integrity require 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.

Classroom Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

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Tentative Course Schedule

Week	Date	Topics
1	Sep 8	Introduction
2	Sep 15	Machine Learning Basics
3	Sep 22	Regression and Over-fitting
4	Sep 29	Project Presentation
5	Oct 6	Classification
6	Oct 13	Ensemble Methods
7	Oct 20	Clustering
8	Oct 27	Project Presentation
9	Nov 3	Deep Learning Basics & Midterm Exam
10	Nov 10	Neural Network Training
11	Nov 17	Convolutional Neural Networks
12	Nov 24	Project Presentation
13	Dec 1	Recurrent Neural Networks
14	Dec 8	Transformers

15	Dec 15	Generative Models
16	Dec 22	Project Presentation
17	Dec 29	Final Exam