COMP/EECE 7720/8720

Artificial Intelligence

Fall 2025

Class Location: Room 233, Engineering Technology Building
Class Time: Mon/Wed, 12:40pm-2:05pm
Instructor: Haomiao Ni, Ph.D.
- Email: hni@memphis.edu
- Office: Room 131, Dunn Hall

TA: Xin Xu (xxu5@memphis.edu)
Office Hour: Scheduled by appointment

Objective: This course will explore fundamental AI technologies, focusing on deriving intelligence from data through probabilistic reasoning and machine learning and exploring various advanced AI topics. By the end of this course, students will have the skills to apply AI techniques effectively to practical problems and critically evaluate the performance of these techniques.

Prerequisites: Python (required in assignments), Linear Algebra, Probability, Algorithm Design and Data Structure.

Topics:
Part 0: Introduction to AI
Part 1: Probabilistic Reasoning
- Probability
- Bayes Nets
- Hidden Markov Model

Part 2: Machine Learning
- Classification & Naive Bayes
- Perceptron
- Optimization & Neural Networks
- Clustering & K-Means

Part 3: Advanced AI Topics
- CNN
- RNN
- Transformer
- Diffusion Models
- Reinforcement Learning

Course Reference:

- Russell, Stuart J., and Peter Norvig. Artificial intelligence: a modern approach. Pearson, 2016. (Website: https://aima.cs.berkeley.edu/, 3rd version PDF from GitHub)
- Goodfellow et al. Deep Learning, MIT Press, 2015 (PDF from GitHub)
- Pattern Recognition and Machine Learning, Chris Bishop, Springer-Verlag, 2006 (PDF from GitHub)

Evaluation and Final Grades:

- Attendance: 10% (Random roll call + Exit quiz)
- Assignments: 40%
- Midterm: 25%
- Final: 25%
- For 8720 students: extra questions/coding tasks in each assignment

Course Policies:

- All homework must be individual work.
    - Allowed: discussing ideas and strategies with others.
    - Not allowed: copying others' code or written solutions.
    - *Conditionally* allowed: Using generative AI tools (e.g., ChatGPT, Copilot), under the following conditions:
        - You must clearly disclose which tools were used and how they were used.
        - You must fully understand and be able to explain all submitted content.
        - You could not submit AI-generated content verbatim without review or modification.
- Do not share course materials (including slides, assignments, or solutions) in any public forum (e.g., GitHub or other public repositories). This restriction applies during and after the semester.
- Academic integrity is strictly enforced. Any suspected violations will be reported to the Center for Student Conduct and may result in point deductions, a zero on the assignment, or a failing grade for the course.
- Grading concerns: Any grading errors on assignments or exams must be reported to the TA within one week of receiving the grade.
- Late submissions: A 5% deduction per day will be applied to late assignments. Submissions more than 7 days late will not be accepted.