Course Overview

COMP.4220 Machine Learning

Prof. Reza Azadeh

University of Massachusetts Lowell

Course description

This course introduces machine learning topics used in computer science and pattern recognition applications. We will explore both the theoretical foundations and practical implementations of several important algorithms. We discuss foundations of machine learning for supervised and unsupervised learning including

- Regression
- Classification
- Clustering
- ...

Textbook

Material covered in lectures are from:

[1]. Pattern Recognition and Machine Learning – Christopher Bishop, Springer, 2006.

Note: The PDF format of the textbook has been made available by the author (link in Blackboard).
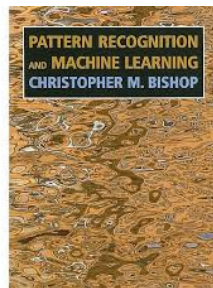
Prerequisites

- COMP.1020 Computing II,
- MATH.3220 Discrete Structures II, and
- MATH.3860 Probability & Statistics I.

Non-official Prerequisites

- Multivariate Calculus and basic Linear Algebra: You should be comfortable taking integrals and derivatives and understanding matrix vector operations and notation.

- Basic Statistics and Probabilities: Gaussian distributions, mean, standard deviation, etc.

- Proficiency in Python: All class assignments and projects will be in Python.

Blackboard

- Make sure you sign-up for Blackboard

- All submissions will be done through Blackboard

- All updates and news will be announced through Blackboard

Slack

Make sure you sign-up as soon as you can (link in Blackboard). We use slack for

- Q&A
- Discussions
- Updates and news (first on Slack then Blackboard)
- Evaluating your participation
- ...

Do not email

- No guarantee you receive a reply
- Use Slack instead (no guarantee either, just a higher probability)

Grading

- Participation (6%)

- Assignments (64%)

- Mid-term (10%)

- Final (20%)

Attendance & Participation

Students are expected to attend class regularly. However, students may occasionally need to miss class due to illness, emergency, or caring for a sick family member. I try to be very accommodating to students who are experiencing attendance challenges, but you must communicate your situation with me regularly and with as much advance notice as possible.

- Attendance is measured through pop-up quizzes.
- The lectures will NOT be recorded. Please see the university privacy policy in syllabus for more information.

Assignments

- There will be 9 assignments throughout the semester.
- The one assignment with lowest grade will be dropped, and the remaining 8 assignments are each worth 8% of your final course grade.
- Late policy: Because the lowest assignment is being dropped, we will not be rescheduling deadlines for submissions missed due to travel, job interviews, and minor illnesses. Special considerations will be made for serious or extended circumstances. Please contact Prof. Reza Azadeh ahead of the deadline to ask about special arrangements.

Mid-term Exam

- There will be a midterm exam worth 10% of the final grade. The format of this exam will be like the other assignments.

- Late policy: The midterm exam is due at the time and date indicated in class schedule. No extension is allowed. Special considerations will be made for serious or extended circumstances. Labs will be completed individually. Please contact Prof. Reza Azadeh ahead of the deadline to ask about special arrangements.

Final Exam

- There will be a final exam worth 20% of the final grade. The format of this exam will be like the other assignments and the midterm.

- Late policy: The midterm exam is due at the time and date indicated in class schedule. No extension is allowed. Special considerations will be made for serious or extended circumstances. Labs will be completed individually. Please contact Prof. Reza Azadeh ahead of the deadline to ask about special arrangements.

Extra Credit

You may earn extra credit throughout the semester through the following:

- Solve problems marked as extra credit

- Make a particularly helpful or insightful Blackboard/Slack post, which is endorsed by at least one course staff. [0.2% of total grade]

- Complete the survey at the end of class. Extra credit of 0.3% of total grade if at least 85% of the class completes the survey.

Policies for the use of AI Generative Tools

- All submitted work must be your own
- Do not copy content created by others without acknowledgment
- "Others" include AI generative tools
- Assignment that violate university policies will be dealt with in accordance with UML's academic integrity policy.

Rule of Thumb

Any work you present as your own should represent your own understanding of the material. When external sources were used as significant points of information (sample code, etc.), the source must be referenced in your submission. Note that

all assignments and projects are expected to be done individually unless specified otherwise.

Course staff

- TA: Alimire Nabijiang
- Office hours: Monday 2:00-5:00
- Location: DAN 412 - and on Slack