COMPSCI361 Machine Learning

Course Information

Semester 1, 2019

Prerequisites

Prerequisites:

COMPSCI 220, 225

Course Description

Machine learning is a branch of artificial intelligence concerned with making accurate, interpretable, computationally efficient, and robust inferences from data to solve a given problem. Students should understand the foundations of machine learning, and gain practical skills to solve different problems.

Staff involved in the course

Lecturers

- Yun Sing Koh, Room 303-485, ykoh@cs.auckland.ac.nz (Course Coordinator)
- Pat Riddle, Room 303- 490, pat@cs.auckland.ac.nz
- Joerg Wicker, Room 303-526, j.wicker@auckland.ac.nz

Tutors

- Jordan Douglas, room 303-461, jdou557@aucklanduni.ac.nz

Timetable

Lectures

Mo 10:00AM - 11:00AM, 301-G050 (Science Chem, Room G050)
Tu 10:00AM - 11:00AM, 301-G050 (Science Chem, Room G050)
We 10:00AM - 11:00AM, 301-G050 (Science Chem, Room G050)

Tutorials

We 1:00PM - 2:00PM 301-G050 (Science Chem, Room G050)

Course Outcomes

A student will be able to:

- Demonstrate technical knowledge of the underlying principals and concepts of machine learning science.
- Apply efficient machine learning algorithms on a problem.
- Design evaluation procedures to evaluate a model.
- Interpret the results of machine learning run on real data.
- Assess the benefits/drawbacks of competing models and algorithms, relevant to real problems.
- Demonstrate your knowledge about cutting edge research streams and developments in machine learning.
- Recognise real-world problems suitable to machine learning.

Assessments

Requirements for passing

You have to pass both the theory [the exam and test] and the practical [i.e., assignments] components to pass this course. The exam is worth 60% of the total marks, mid-term test is worth 10% of the total marks, and the assignments are worth 30%.

Component	Percentage	Assessment
Practical	30%	Assignments
Theory	10%	Test
	60%	Exam

Assignments

There will be 6 assignments, each worth 5%.

The assignments will be submitted via the Canvas.

Test

The term test is worth 10% of your final mark. The provisional date for the test is 8 April 2019 from 6:30pm -7:30pm (Please note that this is subjected to possible change. You will be notified of any changes through Canvas). The test is closed book, and calculators are not permitted. Results will be emailed to you. If you have a test timetable clash, please contact the course coordinator, Yun Sing Koh, as soon as possible.

Exam

The final exam is worth 60% of your final mark. Please check Student Services Online for the exam time and date. The exam is closed book, and calculators are not permitted. Provisional exam results can be obtained from Student Services Online.

Lecture Schedule (Tentative)

Lecture Topics

Week 1

- Hypothesis Bias/ Regression
- Decision Trees

Week 2

- Ensembles

Week 3

- Statistics

Week 4

- Neural Network
- Biological Inspired Techniques: Genetics Algorithm, PSO

Week 5

- Feature Selection

Week 6

- Bayesian

Week 7

- Reinforcement Learning

Week 8

- Support Vector Machine
- kNN

Week 9

- k-Means and Partition based Clustering
- Hierarchal based Clustering
- DBScan

Week 10

- Data Streams
- Concept Drift

Week 11

- Association Rule Mining
- Pattern Mining

Week 12

- Anomaly Detection

Assistance

There are a number of places where you can seek assistance with your learning.

Office Hours

All staff have office hours when they are available to students. You are encouraged to come and discuss any matters arising from the course during those hours. Staff are also frequently available at other times.

- Yun Sing Koh: Tuesday 11- 1pm, or email for appointment
- Pat Riddle: Mon 3-4pm, Tues 11-12pm, or email for appointment.
- Joerg Wicker: Mon 2 - 4pm or email for appointment.

Lecture Recordings

All lectures are recorded. They may be a delay of 1 or 2 days before the lecture recordings are distributed through Canvas. You can find the lecture recordings on the Lecture Recordings.

Note: Although the lectures are recorded, some learning activities conducted in class do not translate well to the recordings. To maximise your learning opportunities, you are encouraged to attend the class in person.

Discussion Forums

The discussion forums within Canvas are regularly monitored by teaching staff. Please make use of the forums to ask any questions that you think might be of interest to other students. If your question is of a personal nature, or relates to a unique situation that will be of little interest to others, then please contact the teaching staff directly.

Textbook

Machine learning by by Mitchell, Tom M. c1997.

Tutorials

The tutorials will review the topics of the previous week's lectures and cover some material to help with assignments. Please bring along any questions you have about the course theory or assignments.

Help with Canvas

For help with Canvas see:

https://www.auckland.ac.nz/en/about/learning-and-teaching/CanvasHomepage/canvas-help-support.html

Handling illness or absence

If you must leave for family emergencies etc., PLEASE talk to the lecturer, or somehow get a message to the department. Very few problems are so urgent that we cannot be told quite quickly.

For problems affecting assignments or tests, see the lecturer, as soon as reasonably possible.

For illness during exams (or other problems that affect exam performance) please refer to the University information about Aegrotat and Compassionate Considerations:

https://www.auckland.ac.nz/en/for/current-students/cs-academic-information/cs-examiation- information/cs-aegrotat-and-compassionate-consideration.html

Academic Integrity

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting his or her learning. Where work from other sources is used, it must be properly acknowledged and referenced. This requirement also applies to sources on the world-wide web. A student's assessed work may be reviewed against electronic source material using computerised detection mechanisms. Upon reasonable request, students may be required to provide an electronic version of their work for computerised review.

For information on the University's Policy on Cheating, please refer to the web page:

http://www.auckland.ac.nz/uoa/home/about/teaching-learning/honesty