School of
Engineering and Computer Science
Te Kura Mātai Pūkaha, Pūrorohiko

Prescription

This course is concerned with data mining concepts and techniques, especially neural networks and genetic programming. It mainly focuses on the following topics: data mining and knowledge discovery in databases; data mining techniques such as nearest neighbour, naive Bayes, support vector machines, neural networks, genetic algorithms and genetic (automatic) programming; image analysis operations such as feature extraction and image recognition; and performance evaluation of data mining/ machine learning/image recognition systems. The course considers applications ranging from general classification, clustering and optimisation tasks to engineering applications.

Course learning objectives

Students who pass this course will be able to:

1. Understand the key concepts, theories, and tasks of data mining and knowledge discovery in databases (KDD). (BE 3(a)); (BSc COMP 3)
2. Understand the main strengths and limitations of commonly used data mining algorithms and how to apply them to (Engineering) applications. (BE 3(a), 3(d)); (BSc COMP 1, 3)
3. Understand key concepts and tasks in computer vision and image processing. (BE 3(a)); (BSc COMP 2, 3)
4. Select/develop good features and algorithms for object recognition, particularly classification. (BE 3(a), 3(b)); (BSc COMP 1, 2, 3, 4)
5. Use neural networks and genetic programming techniques for data mining tasks such as regression and classification. (BE 3(a), 3(b), 3(d)); (BSc COMP 1, 2, 3, 4)
6. Select an appropriate criterion to evaluate a data mining/learning system such as a classifier. (BE 3(a), 3(d)); (BSc COMP 2, 4)
7. Learn/practise oral communication skills via presentations or demonstrations and writing skills via project reports. (BE 2(b)); (BSc COMP 4)

Course content

This course will address a variety of data mining concepts, algorithms, methods and techniques, particularly learning/adaptive methods. The practical projects in the course will enable you to gain experience with a number of these algorithms and methods and explore how they work and their limitations. The exam will assess your understanding of the relevant concepts, theories and algorithms. This course will also provide the background for doing a research project or a thesis in data mining and machine learning related areas, particularly neural networks and genetic programming techniques on pattern recognition tasks, such as classification and clustering problems.

Withdrawal from Course

Withdrawal dates and process:
https://www.victoria.ac.nz/students/study/course-additions-withdrawals

Lecturers

Bing Xue (Coordinator)

bing.xue@vuw.ac.nz 04 4635542

352 Cotton, Kelburn

Yi Mei

yi.mei@vuw.ac.nz 04 4635233 ext 8016

353 Cotton, Kelburn

Teaching Format

During the trimester there will be two lectures per week. Some of the lecture slots may be used as tutorials, demonstrations, helpdesks or project work.

Please note that you are strongly encouraged to attend the lectures --- due to the nature of the course, attending the lectures for discussions is necessary. Based on the past experience, those who do not attend enough (e.g. 26) lectures and join the discussions often fail the course. If you cannot attend the lectures for discussions for some special reasons, you can let the lecturer know in advance so that some necessary arrangements can be made.

Student feedback

Student feedback on University courses may be found at:
www.cad.vuw.ac.nz/feedback/feedback_display.php

Dates (trimester, teaching & break dates)

- Teaching: 08 July 2019 - 13 October 2019
- Break: 19 August 2019 - 01 September 2019
- Study period: 14 October 2019 - 17 October 2019
- Exam period: 18 October 2019 - 09 November 2019

Class Times and Room Numbers

08 July 2019 - 18 August 2019

- **Monday** 13:10 - 14:00 – 106, Alan MacDiarmid Building, Kelburn
- **Thursday** 13:10 - 15:00 – 106, Alan MacDiarmid Building, Kelburn

02 September 2019 - 13 October 2019

- **Monday** 13:10 - 14:00 – 106, Alan MacDiarmid Building, Kelburn
- **Thursday** 13:10 - 15:00 – 106, Alan MacDiarmid Building, Kelburn

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Mandatory Course Requirements

In addition to achieving an overall pass mark of at least 50%, students must:

- Submit both projects with reasonable attempts
- Obtain at least a **D** grade on the final exam.

If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.

Assessment

This course will be assessed through projects and a final examination.

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Project 1	Week 6	CLO: 1,2	20%
Project 2	Week 12	CLO: 1,2	20%
Exam (2 hours)	TBC	CLO: 1,2,3,4,5,6,7	60%

Penalties

The penalty for assignments that are handed in late without prior arrangement is one grade reduction per day. Assignments that are more than one week late will not be marked.

Extensions

All the projects must be handed in on time unless you have made a prior arrangement with the lecturer or have a valid medical excuse (for minor illnesses it is sufficient to discuss this with the lecturer).

Any assignment extension request with a special case should be made to Dr Bing Xue or Dr Yi Mei before the submission deadline.

Submission & Return

There will be two projects, which involve both programming and writing, and they will need to be submitted via the School online *web submission system* and also to the School *handin boxes*. Details of the submission methods will be described in the project descriptions, which will be posted onto our course web site.

Workload

In order to maintain satisfactory progress in COMP 422, you should plan to spend an average of 10 hours per week on this course. A plausible and approximate breakdown for these hours would be:

- Lectures and tutorials: 3 hours
- Readings and projects: 7 hours

Teaching Plan

See: https://ecs.victoria.ac.nz/Courses/COMP422_2019T2/LectureSchedule

Communication of Additional Information

All online material for this course can be accessed at https://ecs.victoria.ac.nz/Courses/COMP422_2019T2/

Links to General Course Information

- Academic Integrity and Plagiarism: https://www.victoria.ac.nz/students/study/exams/integrity-plagiarism
- Academic Progress: https://www.victoria.ac.nz/students/study/progress/academic-progess (including restrictions and non-engagement)
- Dates and deadlines: https://www.victoria.ac.nz/students/study/dates
- Grades: https://www.victoria.ac.nz/students/study/progress/grades
- Special passes: Refer to the Assessment Handbook, at https://www.victoria.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf
- Statutes and policies, e.g. Student Conduct Statute: https://www.victoria.ac.nz/about/governance/strategy
- Student support: https://www.victoria.ac.nz/students/support
- Students with disabilities: https://www.victoria.ac.nz/st_services/disability/
- Student Charter: https://www.victoria.ac.nz/learning-teaching/learning-partnerships/student-charter
- Terms and Conditions: https://www.victoria.ac.nz/study/apply-enrol/terms-conditions/student-contract
- Turnitin: http://www.cad.vuw.ac.nz/wiki/index.php/Turnitin
- University structure: https://www.victoria.ac.nz/about/governance/structure
- VUWSA: http://www.vuwsa.org.nz

Offering CRN: 2324

Points: 15
Prerequisites: COMP 307, one further 300-level COMP, ECEN, NWEN or SWEN course
Duration: 08 July 2019 - 10 November 2019
Starts: Trimester 2
Campus: Kelburn