CPSC 532H
ML+Optimisation

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What makes this course different?

• no frontal lectures
• blocks of whole-class meetings interspersed with 1:2 consulting
• peer-assessment
• oral exam
Suggested Topics

• algorithm configuration / parameter tuning / hyperparameter optimisation
• algorithm selection / model selection
• performance prediction / modelling
• (hyper-)parameter importance / sensitivity analysis
Suggested Topics

• program synthesis, automated programming, genetic programming
• automated debugging
• meta-learning, transfer learning
Course Timetable

- 09/03-10: Intro, Setup

- Block 1, 09/12-10/01: Preparation / consultation for content modules

- Block 2, 10/03-22: Content modules
Course Timetable

• Block 3: 10/24-11/05
  Work / consultation on projects

• Block 4: 11/07-11/26
  Project presentations

• 11/28:
  Wrap-up, concept evaluation
Questions to be asked of papers and projects:

• What is the likely / actual impact of this work?
• What are strengths / weaknesses of the work?
• How does this work related to other modules / projects?
Content Modules

• Designate primary reading
  (1-2 papers, book chapters, online resources)

• Focus on learning outcomes
  (explicit learning goals)

• Do not plan for a presentation followed by questions / discussion ...
Content Modules

• ... instead: intersperse brief bursts of presentation with activities (group discussion, small group discussion, working through example, …)

• Facilitate discussion, be prepared to lead

• Be able to answer questions, give help - you are the expert!
Content Modules

- Develop and hand in concept document + all materials (will be evaluated)
Projects

• **Goal:** demonstrate good understanding and command of method or technique from the literature

• Can use own implementation or implementation found elsewhere, but need to understand it completely

• Need to address a research question or hypothesis (clearly stated)
Projects

• Strive to work with real data from an interesting application, but be realistic in what can be achieved within ~3 weeks.

• Cannot just repeat an experiment / study from the literature.

• Need to explicitly justify all choices, decisions (methods, data, …)
Projects

- Prepare and deliver a 45min project presentation + discussion
- Hand in presentation concept + materials, workshop-paper-style project report
Peer Assessment

• Anonymous peer-reviewing of all content and projects and materials. All students provide ratings, 3 (selected by me) will provide detailed reviews.

• **Reviewer rating:** Reviewers rate each other (and I do as well). Reviewer ratings will impact weighting of reviews and reviewer assessment by me.
Peer Assessment

• Rich reviewing of project report: Reviewers have the option of anonymously giving feedback on early versions of materials, which author can use to improve report.

• Presenters / authors rate reviewers; those ratings can affect reviewer evaluation if they are consistent.
Final Exam

- Oral exam, 20-30min
- Scheduled during exam period (probably very early), order randomised subject to constraints (other exams).
- Can cover all content modules (incl. primary reading) and own project (incl. related reading)
Course Registration

• Limited to 12 seats
  (because of course mechanics)

• Submit transcript along with a brief statement of interest (\(\leq 100\) words) by Friday, 6 September, 18:00 (tomorrow) to me via e-mail.
Course Registration

• Based on the information received, I will select the 12 students to be registered, based on their academic preparation and motivation (breaking ties uniformly at random) by Monday, 9 September, 12:00.

• Those who don’t get a seat can still be wait-listed or audit.
AV Recording

- I plan to record all content and project presentations (audio+video), make available to registered students and everyone else in the department.

- Recordings can (and will) be used for assessment.

- **Do not** apply for course registration if you don’t consent to this.
Tutorial on Monday

• “Programming by Optimization: A Practical Paradigm for Computer-Aided Algorithm Design” (IJCAI-13 tutorial) by Holger Hoos, Frank Hutter, Kevin Leyton-Brown.

• 12:30, location TBA via e-mail to all graduate students.

• See also: www.cs.ubc.ca/labs/beta/Projects/PbO_Tutorial/