

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 (≤ 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/