Business 9802 – Fundamentals of Management Science Research

Winter 2020

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Wednesdays 9:00 am – 12:00 pm
Location: IVEY 2102
(12 Sessions)

COURSE DESCRIPTION
The majority of the central problems of machine learning including regression, classification, and clustering have been addressed using heuristic methods even though they can be formulated as formal optimization problems. So far optimization has played a very limited role in solving these problems, primarily based on the belief that using optimization models are computationally intractable for machine learning. However the recent algorithmic advances in integer and convex optimization combined with hardware improvements have resulted in an astonishing speedup in solving optimization problems. The objective of this course is to revisit some of the classical machine learning problems and demonstrate that they can be solved by using optimization techniques.

COURSE OBJECTIVES
This course demonstrates to students how modern optimization techniques can be used to solve large scale instances in machine learning models:

- The goal of the course is to introduce students to the use of mixed integer and convex optimization for machine learning models and to formulate such problems.
- Students will learn software skills to model and solve the mathematical formulations and to conduct and report experimental results.
- The course involves a project in which the student selects a problem related to machine learning and optimization and is expected to perform modeling, analytical solution and experimental evaluation.
COURSE ACTIVITIES / GRADING / METHODS OF EVALUATION / EXPECTATIONS / CLASS CONTRIBUTION / ATTENDANCE

20% Class Contribution
40% Leading Articles Discussion (Presentation, Scribing, Code development)
40% Project

MATERIALS / REQUIRED READING
- Articles assigned in class.

ACADEMIC OFFENCES: PLAGIARISM AND ACADEMIC INTEGRITY

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

SUPPORT SERVICES: HEALTH AND WELLNESS

Students who are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western’s Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca, and our own McIntosh Gallery http://www.mcintoshgallery.ca. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other
relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html.

STUDENT ACCESSIBILITY SERVICES
Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are encouraged to register with Student Accessibility Services, a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both SAS and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction. For more information, see http://www.sdc.uwo.ca/ssd

DETAILED SESSION SCHEDULE

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