Faculty of Engineering | Electrical and Computer Engineering
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COURSE OUTLINE

ECE 579a: Practice of Applied Data Analysis

Term – SUMMER 2020 (202005)

Instructors:

Dr. Stephen W. Neville
Dr. Kin Fun Li
E-mail: sneville@ece.uvic.ca, kinli@ece.uvic.ca

Office Hours

Days: Wed.
Time: 2:30-3:30
Location: On-line via Blackboard or Zoom (link will be posted on the course web site)

Main course web page: https://onlineacademiccommunity.uvic.ca/sneville/ece-579a/
- A companion course web site will also be provided on CourseSpaces.

Note: All course emails **MUST** have "ECE 579a:" in the subject line and **MUST** be sent from UVic email accounts.

Emails without proper subject lines or sent from off-campus email accounts will likely be dropped by UVic's email spam filters or be automatically redirected to junk email folders.

Course Objectives

This course builds and augments the students' prior data analysis and statistical pattern recognition background by exploring the practice of data analysis through the analysis and discussion of selected industry and real-world data sets and data analysis problems and concerns. The course is project-focused and will involve significant student participation and interaction through team work, written reports, oral presentations, and in-class discussions. The course work will be performed in groups, with the size of each group being 2 students.

The course requires ECE 485/535 as its pre-requisite and ECE 537 as a co-requisite. As such. ECE 579a focuses on applying knowledge and understandings gained in ECE 535/485 (or equivalent course) and ECE 537 to the practice of performing hands-on data analysis for selected data sets and reporting the resulting insights, limitations, and concerns.

ECE 579a is **not** an introductory data analysis course and is not appropriate for students who have not already taken ECE 485/535 and are taking ECE 537 as a co-requisite. ECE 579a is an advanced course focusing on the practice of applied data analysis and the aspects and concerns that arise when trying to solve real-world data analytics problem domains and, as such, presupposes students already have a reasonable level of maturing and understanding regarding the foundation probability and statistics and statistical pattern recognition issues.

Learning Outcomes

Students successfully completing this course will gain an understanding of:

- How to apply the ECE 485/535 and ECE 537 knowledge, understanding, and skills to practical data analysis problems on industry data sets.

- How to understand and address computational issues concerns within data analysis problems.

- How to effectively present and discuss data analysis approaches, solutions, and insights to audiences with varying backgrounds and objectives.

- The practical impacts of classical statistical pattern recognition's No Free Lunch and Ugly Duckling theorems.

- The inter-dependent and concurrent nature of data analysis issues and concerns within real-world data sets.

If time permits, an understanding as to how such issues also apply to and impact supervised and non-supervised clustering methodologies, may be covered depending on the nature of the industry data sets selected for analysis.

Syllabus

The course will group (or team) based analysis of selected industry data sets.

- Apply data analysis and statistical pattern recognition techniques to real-world problems
- Understand and address issues and concerns in data analysis problems
- Perform hands-on data analysis for selected data sets and reporting the resulting insights, limitations, and concerns
- Practice team work, technical discussion, and effective presentation in the data analytics domain
- Effectively communicated data analysis results and processes to technical and non-technical audiences.

Topics discussed within the course will depend on the issues seen and that arise within each of the analyzed data sets, as well as issues and concerns raised in presenting the results and progress of these analysis (both via written reports and oral presentations).

A-Section(s): A01 & A02 / CRN 31651 & 31652
Days: Monday and Thursday
Time: 1:00pm-2:20pm
Location: On-line via Blackboard or Zoom (link will be posted on the course web site)

Required Text

Title: Pattern Classification (2nd Edition)
Author: Richard O. Duda, et al
Publisher: John Wiley & Sons, Inc.

Online Course Delivery:
As this course will be conducted *synchronously* online during this term, students will need to complete and submit exercises online.

Students will require access to a computer which has the following software installed:
- Matlab (student version available at: https://matlab.engr.uvic.ca/)
- UVic or Engineering VPN (available at: https://www.uvic.ca/systems/support/internettelephone/remoteaccess/index.php or https://servicecatalog.engr.uvic.ca/students/)
- PDF reader, e.g., Adobe Reader, or similar application (Adobe Reader is available at: https://get.adobe.com/reader/)
- Access to Microsoft Teams, UVic Blackboard, and Zoom video conferencing systems (information on these tools will become available on UVIC Learning and Teaching website: https://onlineacademiccommunity.uvic.ca/learnanywhere/)

Students are expected to participate and actively work on assigned course exercises in and during all on-line course periods. The course *cannot* be taken asynchronously.

Students are also expected to engage in the on-line course delivery and interactions in manners consistent with the Faculty of Engineering's policy on Professional Behaviors. (http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf).

The UVic FAQ for on-line course delivery (due to Covid-19) can be found at: https://www.uvic.ca/covid-19/students/classes/index.php

The Faculty of Engineering's FAQ (due to Covid-19) can be found at: https://www.uvic.ca/engineering/home/covid/index.php#faq

UVic's orientation to on-line learning student course is available at: https://www.uvic.ca/til/onlinelearning/home/for_students/welcome-to-online-learning/index.php

Assessment: Due dates to be announced

Class Participation (active attendance): 20%
Progress Reports: 15%
Progress Presentations: 15%
Final Project:
- Report 25%
- Presentation 25%

Important: All deadlines and schedules for this course reference Pacific Daylight Time.

Notes:
- Students *must* successfully pass the course participation component to pass the course.
- Students *must* successfully pass the final project report and presentation to pass the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Graduate Calendar.

https://www.uvic.ca/calendar2020-05/grad/index.php#/policy/B13jeiMdE?bc=true&bcCurrent=07%20-%20Grading&bcItemType=policies

Note to Students:
Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Course Withdrawal Deadlines:
- May 16, 2020: Withdrawal with 100% reduction of tuition fees
- June 6, 2020: Withdrawal with 50% reduction of tuition fees
- July 1, 2020: Last day for withdrawal (no fees returned)

Accommodation of Religious Observance:
https://www.uvic.ca/calendar2020-05/grad/index.php#/policy/SkmigiMOV?bc=true&bcCurrent=17%20-%20Accommodation%20of%20Religious%20Observance&bcItemType=policies

Policy on Inclusivity and Diversity:
Engineering: https://www.uvic.ca/engineering/about/equity/index.php
Academic Calendar: https://www.uvic.ca/calendar2020-05/grad/index.php#/policy/HkQ0pzdAN

Standards of Professional Behaviour:
You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.
http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Academic Integrity:

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Graduate Calendar for the UVic policy on academic integrity.

https://www.uvic.ca/calendar2020-05/grad/index.php#/policy/BJujesM_E?bc=true&bcCurrent=02%20-%20Policy%20on%20Academic%20Integrity&bcItemType=policies

In particular, software tools may be used to assess student submission for similarity to other students work (past or present) and to Internet available materials. Submitted work deemed by such processes to have high similarity will not be marked, will receive a zero grade, and be deemed as not having met the requirement to be a student submission for the given exercise and/or exam.

Equality:
This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation. You may want to contact the Centre for Accessible Learning located in the Campus Services Building: https://www.uvic.ca/services/cal/. The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

Course Lecture Notes:
All course materials supplied to students in this course have been prepared by and copywritten by the instructor and are intended for use in this course only. These materials are *NOT* to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy constitutes a breach of academic integrity as defined in the UVic Calendar as well as a breach in the Faculty of Engineering's Standards for Professional Behaviour Policy.

Sexualized Violence Prevention and Response at UVic:
UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. We encourage students to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support, please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Whether or not you have been directly impacted, if you want to take part in the important prevention work taking place on campus, you can also reach out:
> **Where:** Sexualized violence resource office in EQHR; Sedgewick C119
> **Phone:** 250.721.8021
> **Email:** svpcoordinator@uvic.ca
> **Web:** www.uvic.ca/svp

Office of the Ombudsperson:
The Office of the Ombudsperson is an independent and impartial resource to assist with the fair resolution of student issues. A confidential consultation can help you understand your rights and responsibilities. The Ombudsperson can also clarify information, help navigate procedures, assist with problem-solving, facilitate communication, provide feedback on an appeal, investigate and make recommendations.
> **Phone:** 250-721-8357

Email: ombuddy@uvic.ca
Web: https://uvicombudsperson.ca/