ECE 421 – Introduction to Machine Learning

Course Information

Winter 2021

1 Contacts

Instructor	email
Ashish Khisti, Course Coordinator	akhisti@ece.utoronto.ca
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1.1 Discussion Board

We will use Piazza for the class discussion board.

2 Required Text

Title: Learning From Data (2012)
Authors: Yaser S. Abu-Mostafa, Malik Magdon-Ismail , Hsuan-Tien Lin

3 Calendar Description

ECE421H1: Introduction to Machine Learning

An Introduction to the basic theory, the fundamental algorithms, and the computational toolboxes of machine learning. The focus is on a balanced treatment of the practical and theoretical approaches, along with hands on experience with relevant software packages. Supervised learning methods covered in the course will include: the study of linear models for classification and regression, neural networks and support vector machines. Unsupervised learning methods covered in the course will include: principal component analysis, k-means clustering, and Gaussian mixture models. Theoretical topics will include: bounds on the generalization error, bias-variance tradeoffs and the Vapnik-Chervonenkis (VC) dimension. Techniques to control overfitting, including regularization and validation, will be covered.

4 Learning Outcomes

Learn theory and practice of machine learning using the tensorflow package.

5 Timetable

Lectures

The lectures will be asynchronous and videos will be posted beforehand.

We will have a recitation for the lectures. Timings will be announced shortly.

Tutorials

Tut01	Thursday 10:00–12:00
Tut102	Friday 16:00–18:00

We will be assigning homeworks roughly every week and these will be due at the end of the week, typically friday by mid-night.

6 Grade Composition

Homeworks	10%
Assignments	45%
Midterm	20%
Final	25%
Total	100%

7 Midterm Date

Thrusday Feb 25th between 18:00-20:00 (Toronto Time)

8 Assessment Scheme

Assignments There will be three programming assignments in the course. These will be done individually using tensorflow package. Each assignment is worth 15% of the grade.

There will be some homework problems assigned, roughly every week, which must be submitted at the end of the week. These are due 10% of the grade.

Midterms and Final The mid-term will be a 2 hour exam distributed on date listed above. The final will be a 2.5 hour timed exam.

9 Course Outline

see Lecture 1 posted on quercus.

10 Notice of video recording and sharing (Download permissible; re-use prohibited)

At times during this course, some interactions including your participation, may be recorded on video and will be available to students in the course for viewing remotely and after each session.

Course videos and materials belong to the instructors, the University, and/or other source depending on the specific facts of each situation, and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

11 Academic Integrity Policies

http://www.academicintegrity.utoronto.ca/
https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019

12 Land Acknowledgement

I (we) wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

13 Inclusivity, Accommodations and Mental Health Support

13.1 Statement on Inclusivity

You belong here. The University of Toronto commits to all students, faculty and staff that you can learn, work and create in a welcoming, respectful and inclusive environment. In this class, we embrace the broadest range of people and encourage their diverse perspectives. This team environment is how we will innovate and improve our collective academic success. You can read the evidence for this approach here.

We expect each of us to take responsibility for the impact that our language, actions and interactions have on others. Engineering denounces discrimination, harassment and unwelcoming behaviour in all its forms. You have rights under the Ontario Human Rights Code. If you experience or witness any form of harassment or discrimination, including but not limited to, acts of racism, sexism, Islamophobia, anti-Semitism, homophobia, transphobia, ableism and ageism, please tell someone so we can intervene. Engineering takes these reports extremely seriously. You can talk to anyone you feel comfortable approaching, including your professor or TA, an academic advisor, our Assistant Dean, Diversity, Inclusion and Professionalism, the Engineering Equity Diversity and Inclusion Action Group, any staff member or a U of T Equity Office.

You are not alone. Here you can find a list of clubs and groups that support people who identify in many diverse ways. Working together, we can all achieve our full potential.

13.2 Statement on Accommodations

The University of Toronto supports accommodations for students with diverse learning needs, which may be associated with mental health conditions, learning disabilities, autism spectrum, ADHD, mobility impairments, functional/fine motor impairments, concussion or head injury, blindness and low vision, chronic health conditions, addictions, deafness and hearing loss, communication disorders and/or temporary disabilities, such as fractures and severe sprains, or recovery from an operation.

If you have a learning need requiring an accommodation the University of Toronto recommends that students register as soon as possible with Accessibility Services.
Phone: 416-978-8060
Email: accessibility.services@utoronto.ca

13.3 Statement on Mental Health

As a university student, you may experience a range of health and/or mental health challenges that could result in significant barriers to achieving your personal and academic goals. Please note, the University of Toronto and the Faculty of Applied Science & Engineering offer a wide range of free and confidential services that could assist you during these times.

As a U of T Engineering student, you have an Academic Advisor (undergraduate students) or a Graduate Administrator (graduate students) who can support you by advising on personal matters that impact your academics. Other resources that you may find helpful are listed on the U of T Engineering Mental Health & Wellness webpage, and a small selection are also included here:

- Accessibility Services & the On-Location Advisor
- Graduate Engineering Council of Students' Mental Wellness Commission
- Health & Wellness and the On-Location Health & Wellness Engineering Counsellor
- Inclusion & Transition Advisor

- U of T Engineering Learning Strategist and Academic Success
- My Student Support Program (MySSP)
- Registrar's Office
- SKULE Mental Wellness
- Scholarships & Financial Aid Office & Advisor

If you find yourself feeling distressed and in need of more immediate support resources, consider reaching out to the counsellors at My Student Support Program (MySSP) or visiting the Feeling Distressed webpage.