University of Alberta

CMPUT 656: Interactive Machine Learning
Fall 2020

Instructor: Matthew E. Taylor (Matt)
E-mail: matthew.e.taylor@ualberta.ca (general)
cmput656@ualberta.ca (course-specific)
Web Page: https://sites.google.com/ualberta.ca/cmput656/home

Office Hours: Before & after class, and by appointment: https://matttaylor.as.me/schedule.php

Course Format: Online with synchronous (T/Th 11am-12:20pm) and asynchronous content

---

COURSE CONTENT

Course Description: How do you want to interact with AI systems? We don't know what tomorrow's AI systems will be capable of, but we do know that learning will be a critical component. Unlike traditional machine learning, interactive machine learning involves a learning AI and one or more humans. This can range from using humans to label data to human-in-the-loop to human-AI teaming. This course will provide you with the background and tools needed to conduct research in this emerging area. The primary goal of the class is to conduct a pilot study that, if successful, could lead to a conference paper at a venue like AAAI, NeurIPS, or CHI. To achieve this goal, students will learn basic skills required for human research, engage with interactive lectures, and read and discuss current research. Although the course will be recorded and made available to all interested students, students taking the course for credit will be expected to attend and participate in regular synchronous class meetings.

Course Prerequisites: This course will assume familiarity with machine learning --- students taking the class should have completed at least one prior machine learning course at the graduate or undergraduate level.

Course Objectives and Expected Learning Outcomes:

- Explain how human-AI interaction is different from AI-AI and human-human interaction
- Design and critique human-ML studies
- Read, present, and discuss research in interactive machine learning
- Write and present novel research in interactive machine learning

Course Schedule & Assigned Readings: *See website for updated schedule/assignments*

Course Schedule (subject to change)

	T	Th	Topic	Guest Speaker?	Work Due
1	9/1	9/3	Human-AI interaction	Kory Mathewson	Survey on background & interests, subscribe to discord
2	9/8	9/10	Background: human subject studies		
3	9/15	9/17	Human labeling & active learning		Short exercise in supervised learning
4	9/22	9/24	Human computation & crowdsourcing		
5	9/29	10/1	Decision Making tasks		Short exercise in reinforcement learning
6	10/6	10/8	Decision Making Tasks		Draft hypothesis & pilot study due
7	10/13	10/15	Intelligent tutoring systems & user modeling	Carrie Demmans Epp	
8	10/20	10/22	Explainability & interpretability	Avi Rosenfeld	Finalize hypothesis & pilot study
9	10/27	10/29	Teaming	Nathan Schurr	
10	11/3	11/5	TBD: class interests	Patrick Pilarski	
--	11/13	11/15	*N/A: Reading Week*		
11	11/17	11/19	TBD: class interests		Draft Report due
12	11/24	11/26	TBD: class interests		Peer Feedback on report due
13	12/1	12/3	Course Presentations		Final report + presentations due

Online systems used: The synchronous components of the course will be online using zoom. I recommend you download the app, as it is more stable and more capable than the web interface. We will also be using Discord and Poll Everywhere. I've been told that "Students MUST NOT use their @ualberta email address or CCID to register into the system and instead should use a non-identifying email address or account," even though their ualberta email addresses are shown in the public U of A directory. It will be easiest if your username on zoom, discord, and poll everywhere are the same, and I'll provide a way for you to tell me your username(s) so that I'm sure you get credit for participation. You can also use an eClass "anonymous ID": https://support.ctl.ualberta.ca/index.php?/Knowledgebase/Article/View/350/10/finding-your-anonymous-id-in-eclass

Students are expected to join zoom for the synchronous content. However, the content will be recorded and made available online. If you cannot attend a class for some reason, please let Matt know (cmput656@ualberta.ca). I know things are pretty hectic these days and I want to be flexible. I encourage students to turn on their cameras and use their microphones, but it is not required. Also, if you do not want to be recorded, please let Matt know and we'll figure something out (e.g., keep your video off, use the text channel to interact with the class, etc.).

LEARNING RESOURCES

Required Textbook: N/A - everything is freely available online

Course Fees: N/A

Optional Online Learning Resources:
Additional learning resources aimed at facilitating student learning, and perhaps including formative assessment tools, are available from the textbook publisher and may be accessed for a fee paid by the student to the third-party provider (e.g., the textbook company). Students choosing to access and use the online resources should note the following:

1. Registration in the system and any monetary transactions are of your own accord and not the responsibility of the University.
2. Students should be mindful of protecting their personal information and should be aware of how their personal information might be used and/or shared.
3. Students MUST NOT use their @ualberta email address or CCID to register into the system and instead should use a non-identifying email address or account.

Academic Success Centre:
The Academic Success Centre provides professional academic support to help students strengthen their academic skills and achieve their academic goals. Individual advising, appointments, and group workshops are available year round in the areas of Accessibility, Communication, Learning, and Writing Resources. Modest fees apply for some services.

A note from Mario (Chair of Computing Science):
Not being able to be out and about this summer as we'd have liked, and mindful that "Winter is Coming," it is of obvious importance that we strive to keep ourselves physically and mentally healthy.

With respect to the latter, this week I learned from a colleague in the Department of Psychiatry about the Centre for Online Mental Health Support, and I thought I should share this for everyone's benefit. What caught my attention is that the Centre offers remote and no-cost group sessions ("limited to only 15 individuals per group and will involve 3 sessions each lasting 45 mins.") and has a wide range of programs (e.g., Adults, Parents, Support for those Living Alone, Helping Mood During COVID 19, just to name a few) and resources.

I hope this may be of use, and please be mindful that even if you don't feel the need for such programs and resources, some people close to you may (and may not realize that).

Cheers.

PS.: Note that this is above and beyond other services the University provides.

GRADE EVALUATION

Assessment	Weight	Date
Class Participation (interacting during class, doing short reading responses, providing feedback on other's work, etc.)	20%	*Term*
Brief paper presentation	5%	*Term*
1st Exercise	5%	*Term*
2nd Exercise	5%	*Term*
Draft hypothesis & pilot study	10%	10/9
Finalized hypothesis & pilot study	10%	10/23
Draft report	10%	11/20
Final presentation	15%	12/1
Final report	20%	12/13

There will be at least 3 short exercises during the term. The best marks for the top 2 exercises will be used to calculate your grade.

Note that your report and presentation will be evaluated on their quality, not whether your data proves/disproves your original hypothesis. Put differently, running a pilot study and finding out you should not continue putting time into your idea can still be a perfectly acceptable outcome.

Grades are unofficial until approved by the Department and/or Faculty offering the course.

POLICIES FOR LATE AND MISSED WORK

Missed Term Work:
The two exercises, the draft hypothesis & pilot study, the finalized hypothesis & pilot study, and the draft report will all have their grade reduced by 10% every day late. For example, if the exercise on supervised learning is submitted 36 hours after the deadline, the earned mark will be multiplied by 0.8.

Missed Presentation:
If the final presentation is not done on time, or the final report is not submitted on time, the student will receive 0% for the work. A student who cannot complete the final presentation due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for an excused absence. To apply for an excused absence, you must contact the instructor within two working days of missing the assessment or as soon as possible. If an excused absence is granted, then you will be given an extension. An excused absence is a privilege and not a right. There is no guarantee that an absence will be excused. Misrepresentation of facts to gain an excused absence is a serious breach of the Code of Student Behaviour. In all cases, instructors may request adequate documentation to substantiate the reason for the absence at their discretion.

Missed Assessments Where the Cause is Religious Belief:
For an excused absence where the cause is religious belief, a student must contact the instructor(s) within two weeks of the start of Fall or Winter classes to request accommodation for the term. Instructors may request adequate documentation to substantiate the student request.

A student who cannot complete their final project due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for an extension.

REMOTE DELIVERY CONSIDERATIONS

Technology for Remote Learning:
To successfully participate in remote learning in this course, it is recommended that students have access to a computer with an internet connection that can support the tools and technologies the University uses to deliver content, engage with instructors, TAs, and fellow students, and facilitate assessment and examinations. Please refer to Technology for Remote Learning - For Students for details. If you encounter difficulty meeting the technology recommendations, please email the Dean of Students Office (dosdean@ualberta.ca) directly to explore options and support.

Please contact the instructor by the add/drop deadline if you do not have access to the minimum technology recommended. The instructor will make arrangements for accommodating students who contact the instructor. Failure to do so may result in a zero in any assessment that depends on the minimum technology.

Student Resources for Remote Learning:
Online learning may be new to you. Check out tips for success and find out more about online learning on the Campus Life page, and specifically on the Student Resources for Remote Learning page.

STUDENT RESPONSIBILITIES

Academic Integrity:
"The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.governance.ualberta.ca) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University."

All forms of dishonesty are unacceptable at the University. Any offence will be reported to the Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offences. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science, the sanction for **cheating** on any examination will include **a disciplinary failing grade** (NO EXCEPTIONS) and senior students should expect a period of suspension or expulsion from the University of Alberta.

Students are expected to familiarize themselves with the Academic Integrity resources (covering the topics of cheating, collaboration, plagiarism, and substantial assistance) on the website of the Office of the Dean of Students. Here's a one-page summary of things you shouldn't do.

Appropriate Collaboration: Many activities and work in this class will involve collaboration. Please be sure to note all collaborators and the extent of the collaboration. Students are expected to maintain collegial and respectful interactions online, whether by video, audio, or text.

Students Eligible for Accessibility-Related Accommodations:
Eligible students have both rights and responsibilities with regard to accessibility-related accommodations. Consequently, scheduling exam accommodations in accordance with Accessibility Resources deadlines and procedures is essential. Please note adherence to procedures and deadlines is required for U of A to provide accommodations. Contact Accessibility Resources for further information.

Recording and/or Distribution of Course Materials:
Course resources, including the synchronous and asynchronous recordings, are protected under the CC by 4.0 license. This means that you are free to share and adapt any of this material, as long as you give appropriate attribution to the creator(s).

Policy about course outlines can be found in Course Requirements, Evaluations Procedures and Grading of the University Calendar.

Disclaimer:
Any typographical errors in this Course Outline are subject to change and will be announced in class.