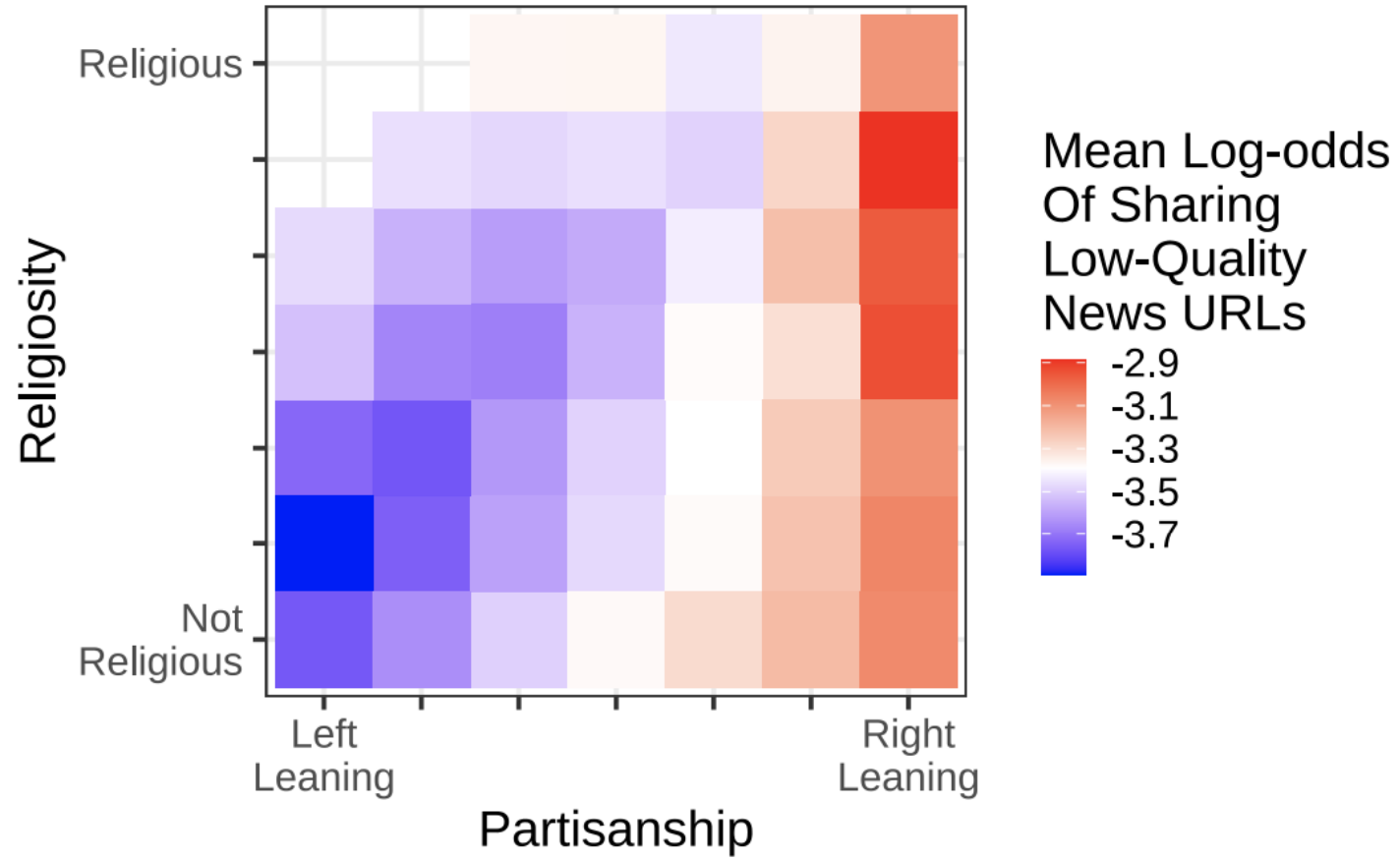# Welcome to CSE 440/441/540

ML and Society

Welcome!

- Plan:
  - Introduce ourselves
  - Tell you a little about what the course **is** and **is not**
  - Logistics
  - Break
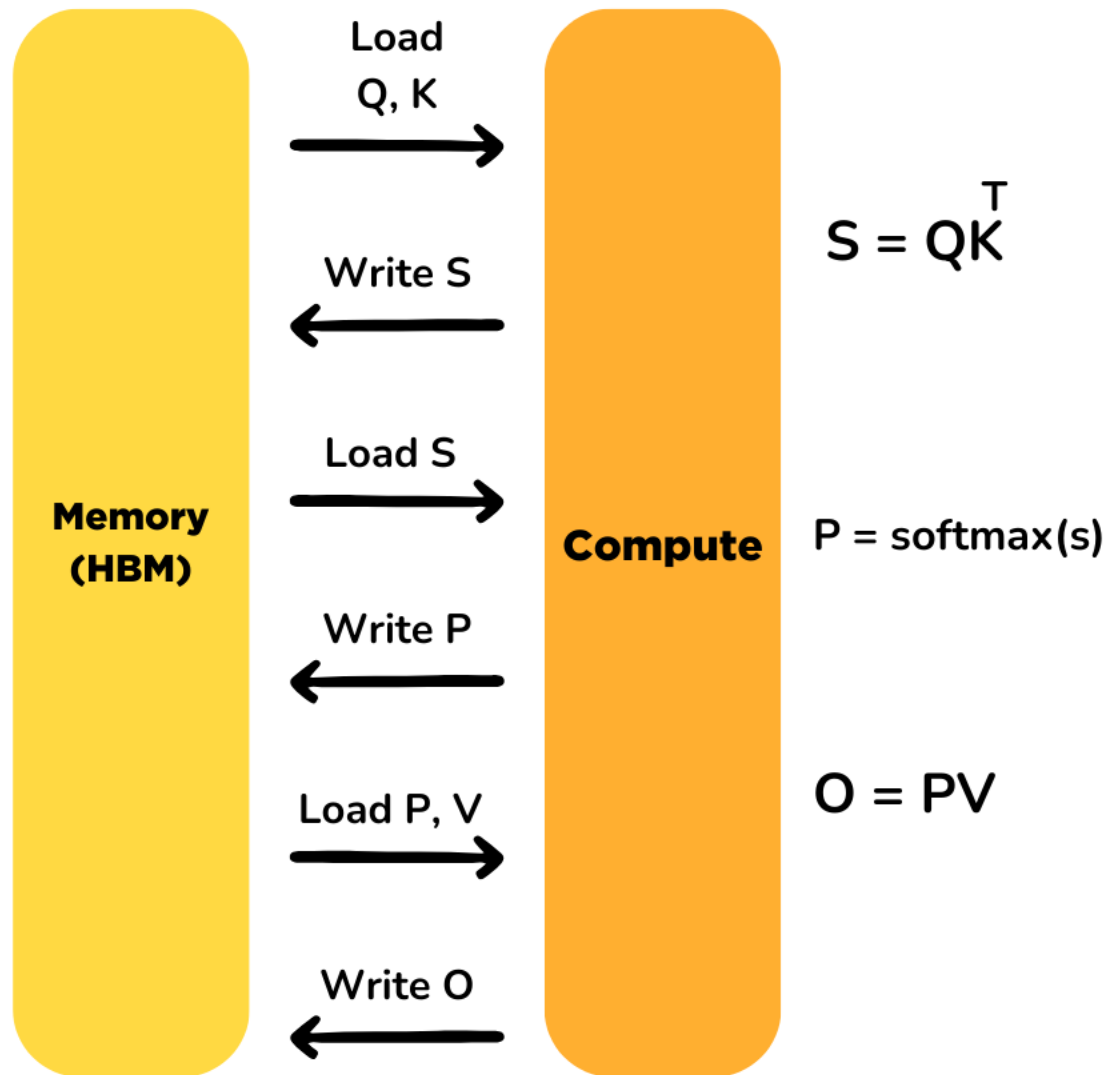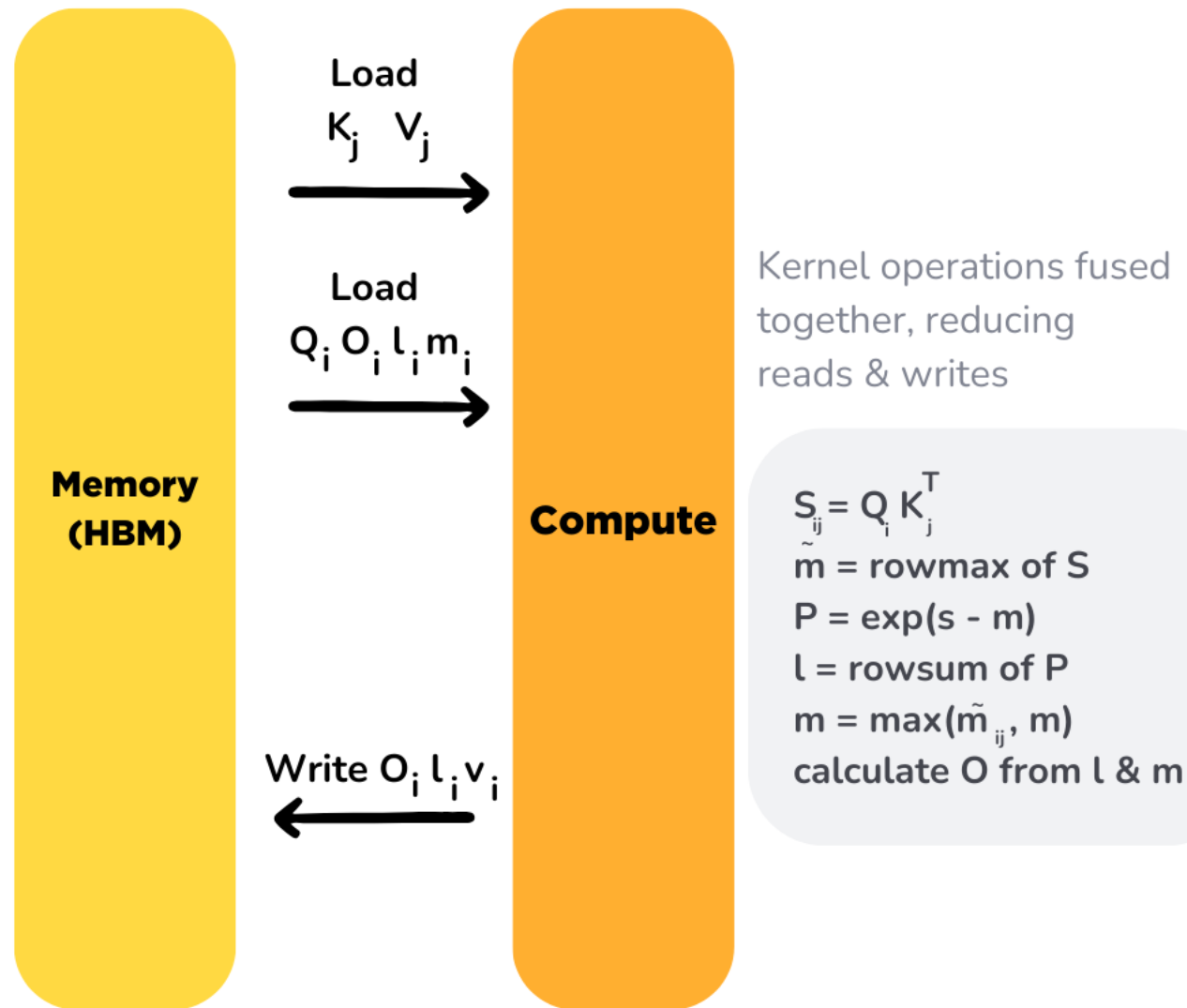 - Bit more about the course

Owen, Micah, and Teddy

Akash

Kiran

Standard Attention Implementation

Memory (HBM) → Load Q, K → **Compute**

$S = QK^T$

Compute → Write S → **Memory (HBM)**

Memory (HBM) → Load S → **Compute**

$P = \text{softmax}(s)$

Compute → Write P → **Memory (HBM)**

Memory (HBM) → Load P, V → **Compute**

$O = PV$

Compute → Write O → **Memory (HBM)**

Flash Attention

Memory (HBM) → Load K_j V_j → **Compute**

Memory (HBM) → Load Q_i O_i l_i m_i → **Compute**

Kernel operations fused together, reducing reads & writes

$S_{ij} = Q_i K_j^T$

$\tilde{m} = \text{rowmax of } S$

$P = \exp(s - m)$

$l = \text{rowsum of } P$

$m = \max(\tilde{m}_{ij}, m)$

calculate O from l & m

Compute → Write O_i l_i v_i → **Memory (HBM)**

Initialize O, l and m matrices with zeroes. m and l are used to calculate cumulative softmax. Divide Q, K, V into blocks (due to SRAM's memory limits) and iterate over them, for i is row & j is column.

This course

- This course **is** about
  - Understanding the societal implications of ML
  - Understanding how ML is shaped by … societal implications
  - Challenging you with an unconventional project with no right answers (but a lot of wrong ones)
  - Deep collaboration
- This course is **not** about
  - Telling you how to build "fair ML"
  - Chatbots
  - Deep technical details about AI
  - Deep STS studies of AI

Our office hours

Kenny

Mondays: 11:30-12:20pm (335 Davis)

Atri

Thursdays: 1:00-1:50pm (319 Davis)

(NO Office Hours this week)

Things to remember

ATTEND, SUBMIT ALL THINGS ON TIME!

DO NOT CHEAT!

READ CAREFULLY!

Take care of yourself!

Be respectful of your classmates!

Academic Dishonesty

All your submissions must be your own work

Penalty:

Minimum: An **grade reduction in course**

Possible: **F** (or higher penalty) if warranted

YOUR responsibility to know what is cheating, plagiarism etc.

If not sure, come talk to me

Excuses like "I have a job," "This was OK earlier/in my country," "This course is hard," etc. **WON'T WORK**

WE DO NOT HAVE ANY PATIENCE WITH ANY CHEATING :

YOU WILL GET A GRADE REDUCTION IN THE COURSE

FOR YOUR FIRST MISTAKE

Generative AI Policy

In short, the course policy for the use of Generative AI is that any use of a Generative AI tool f purpose in the tool **must be explicitly approved by either Atri or Kenny**. This includes, but i limited to, the need for explicit approval to use Generative AI tools (e.g. ChatGPT) to help with and to ideate on projects. **Failure to follow this policy will result in a violation of the Acade Integrity rules for this course**.

Some notes on this policy:

- This is not us saying that the use of Generative AI is off limits (indeed as part of your proje will explicitly have to think about generative AI), but rather that there are good and bad us an instructional perspective, and we want to discuss these uses with you.
- We are unlikely to approve the use of ChatGPT to "fix" one's writing – we'd rather just see writing, imperfections and all, than a filtered version of it!

Accessibility Resources

Information included in the syllabus

In short, let us know and consult with Accessibility Resources

Preferred Name

If you prefer using name diff from UB records

Let us know and we'll make a note of it.

Critical Campus Resources

Critical Campus Resources

Sexual Violence

UB is committed to providing a safe learning environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. If you have experienced gender-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), UB has resources to help. This includes academic accommodations, health and counseling services, housing accommodations, helping with legal protective orders, and assistance with reporting the incident to police or other UB officials if you so choose. Please contact UB's Title IX Coordinator at ☎ 716-645-2266 for more information. For confidential assistance, you may also contact a Crisis Services Campus Advocate at ☎ 716-796-4399.

Mental Health

As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other issues you may experience. You can learn more about these programs and services by contacting:

Counseling Services ⬈

120 Richmond Quad (North Campus), ☎ 716-645-2720

Health Services ⬈

4350 Maple Road (at Sweet Home Rd.) , ☎716-829-3316

Health Promotion ⬈

114 Student Union (North Campus), ☎ 716-645-2837

One Stop-shop for the course

cse.buffalo.edu/mlsoc

ML&Society

Q Search ML&Society

Homepage
Syllabus
Schedule
TQEs/Discussions
Semester Project
Autolab
Bonus
People

Welcome!

This is the homepage for the course **ML and Society CSE 440/540**.

Important Links

On the left-hand side of the page, you'll find a number of useful links. Make sure to take a look at all of them! But here is a list of some of the important ones:

- The Semester Project page is the place to go for all things about the **COMBINED** semester-long course project!
- The Syllabus is the place to go for all things about **ML-SOC** course policy.
- Off-site, we'll be using Piazza for class-wide discussions.

> **FEEDBACK IS MORE THAN WELCOME!**
> If you have any feedback about the course content, please email them to Kenny and/or Atri.

Prior versions

- ML and Society, Spring 2024
- ML and Society, Spring 2023
- ML and Society, Spring 2022
- ML and Society, Spring 2021

Sun, Jan 26:	**GROUPS ASSIGNED** by 11:59pm	
Mon, Jan 27:	**Icebreaker** (workshop)	
Wed, Jan 29:	**What is global inequality (Group discussion)**	Mon, Feb 3
	ML, Causation, and "Bias" 📄	**REFLECTION POST DUE** **Sun, Feb 4**
Wed, Feb 5:	**Stats Review, Causal Inference, and PGMs** 📄	
Sat, Feb 8:	**DISCUSSION SUMMARY DUE**	Details
Mon, Feb 10:	**Class Discussion** 📄	
Wed, Feb 12:	**Details on Causal Inference** 📄	
Sat, Feb 15:	**UNIT MIDPOINT SUBMISSION DUE**	Details
Mon, Feb 17:	**SWITCHED CLASS** **Understanding White Supremacy**	*Instructor:* Dalia **REFLECTION POST DUE** **Sun, Feb 18**
Wed, Feb 19:	**Team project working session**	
Sat, Feb 22:	**GROUP SUBMISSION DUE** **PEER SURVEY DUE**	

Class outline

Course Component	% of grade
Semester Project Submissions	50% (10 per group HW submission, 20 for the final group submission)
Midpoint Project Presentations	15% (10 for presentation, 5 for feedback)
Attendance	11% (with important caveats, see below)
TQE Summaries for Readings	9% (3% each; Drop lowest)
TQE Summaries for Guest Lectures	6% (3% each)
Class Discussion Participation	9% (3% each; Drop lowest)
Bonus	Up to 5%

Grading Scheme

All submissions in this course will be graded manually by us and we will use the following "level" system. For each question/part of an assignment, the student's submission will be graded at one of the following levels:

- `Level 0`: This means the student gets 0% of the points. This is for submissions where the student shows zero comprehension: either in understanding the problem or of its solution.-

- `Level 1`: This means the student gets 25% of the points. This is for submissions where the student does show some comprehension of the problem and/or the required solution but there is at least one flaw that cannot be repaired.-

- `Level 2`: This means the student gets 50% of the points. This is for submissions where the student gets the main idea but there are still flaws that can be repaired but only with a lot of extra work.-

- `Level 3`: This means the student gets 80% of the points. This is for submissions where the student has got the main idea but the execution is a bit faulty. However, these faults could be fixed without too much extra work.-

- `Level 4`: This means the student gets 100% of the points. The solution is almost perfect.

Instructions are not "suggestions"

SUBMITTING THE DISCUSSION SUMMARY

Your submission is due **as a PDF of at most one(1) page** on Autolab. The submission is **due by 11:59pm of the Saturday BEFORE the in-class discussion**. **You must submit a discussion summary for all the items as a whole if there is more than one assigned** (if there are multiple items then they would be fairly closely related to each other).

THIS IS AN INDIVIDUAL SUBMISSION

The discussion summaries are individual submission. You should **not be collaborating with anyone else** on the discussion summaries. Additionally, the **Academic Integrity policy on the use of Generative AI** also applies; see the syllabus for details.

DISCUSSION SUMMARY GRADE DISTRIBUTION

Here is the split of grades for the various parts of discussion summary (for a total of `100 points`):

- **THOUGHTS** : `30 points`.
- **QUESTIONS** : `30 points`.
- **EPIPHANIES** : `40 points`.

EACH DISCUSSION SUMMARY IS WORTH 3% OF YOUR GRADE

There will be three (3) discussion summary submission (see the calendar for the specific dates). Each discussion summary is worth 3% of your final letter grade.

Attendance is **critical**

Attendance points are **all or nothing**. Moreover, violating the attendance policy means that **your grade in the course will be at most a B+**.To receive full points (and avoid the letter grade limit), **both of the following must be true**:

1   **You do not miss more than three classes.** This includes the late policy and leave-early policy below. *Excused absences still count as missed classes, this is why we allow you to miss three!* If you have an exceptional circumstance in which 1) *all* of your absences are excused, and 2) you miss more than three classes, we will address the issue at that point.

2   **You have no unexcused absences during the third week of a unit** These combined courses are the most critical components of the course. We want you there.

Attendance, additional notes

LATE POLICY

We understand that sometimes it might be hard to get to class on time but if you are **more than three (3) minutes late, you will be considered late to the class.** *Two lates will be counted as one absence*.

LEAVE EARLY POLICY

If you just leave the class before it ends, then you will lose the attendance for that day as well.

BRING AN INTERNET CONNECTED DEVICE

Please bring a device so that you can connect to the Internet in class since attendance will be on Autolab. During the lecture, we will show you a pass phrase, which you will have to enter into Autolab. *Please refrain from sending this information to your friends if they are not in class*. Doing so would be considered an academic integrity violation, which would lead to a failing (F) grade

Attendance on Autolab
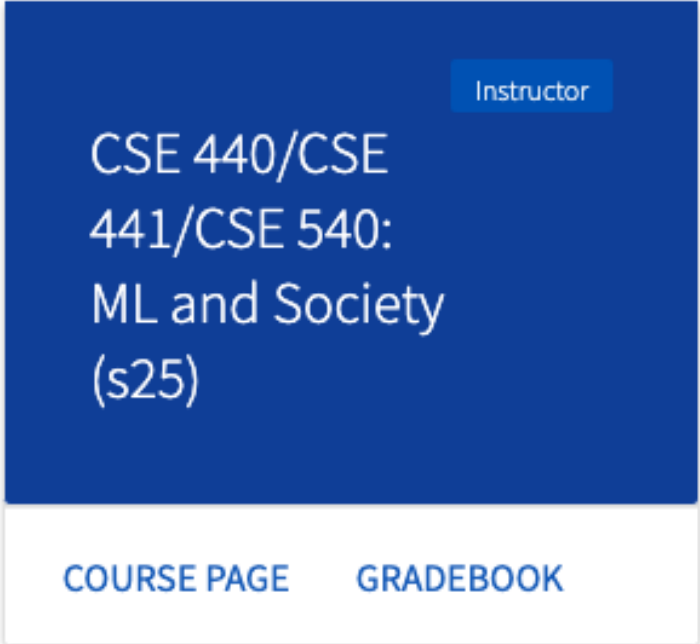
This is what you should see when you login

Courses

Current ────────────────

Instructor

CSE 440/CSE
441/CSE 540:
ML and Society
(s25)

COURSE PAGE   GRADEBOOK

You should see a link for attendance

CSE 440/CSE 441/CSE 540: ML and Society (s24)

Section:
Number of grace days remaining: **0**

[COURSE WEBSITE]   [GRADEBOOK]

Assessments

Attendance

January 24
Start: Jan 23 at 10:00am | **Due:** Jan 24 at 10:45am

You need to enter a pass-phrase

_____

What is the pass pharse for today?

_____

☐   I affirm that I have complied with this course's academic integrity policy as defined in the syllabus.

SUBMIT

_____

Pass-phrase for today: Joy Buolamwini

Fast Company Cover - Most Creative People in Business

Coded Bias Documentary (Netflix/PBS)

Ted Talk - 1M+ views Fighting Bias in Algorithms

#DecodeTheBias Olay Campaign

If you need a reminder

Autolab

THE LINK TO AUTOLAB

We will be using the UB CSE extension to Autolab for submission and grading of ML and Society assignments, attendance and project. You can access Autolab via https://autolab.cse.buffalo.edu/.

AUTOLAB LOCATION HAS CHANGED SINCE SUMMER 23!

If you had used Autolab *prior* to the fall 2023 semester then you had used the previous version, which is still available at https://autograder.cse.buffalo.edu. You can access your old classes there but from Fall 2023 semester onwards, please use the updated location: https://autolab.cse.buffalo.edu/

More course logistics in 2nd half of today

Read the syllabus carefully!

UNDER CONSTRUCTION

This page is still under construction. In particular, nothing here is final while this sign still remains here.

PLEASE NOTE

It is **your responsibility** to make sure you read and understand the contents of this syllabus. If you have any questions, please contact the instructor.

TABLE OF CONTENTS

Semester-long Project

What is the Impossible Project?

The Impossible Project is a radical pedagogical paradigm created by Prof. Dalia Muller.

🔗 OK, so what is *our* Impossible Project?

> **ENDING GLOBAL INEQUALITY!**
>
> The impossible project that y'all will be tackling this semester is `Ending Global Inequality`.

This is not your usual project

Most of you are probably used to assignments and projects with a well defined goal and outcome. Specifically, there is always a right or wrong answer and at the end of the project, you are expected to come up with a functioning artifact. Not so here.

IP logistics

Logistics

> **CONTRIBUTION OF YOUR PROJECT SCORE TO FINAL GRADE**
> The project in total is worth 50% of your final grade.

Here is how the 50% weightage for the project will be further divided down:

Project Component	% of FINAL course grade
Group HW 1 Submission	$5 + 5 = 10\%$
Group HW 2 Submission	$5 + 5 = 10\%$
Group HW 3 Submission	$5 + 5 = 10\%$
Group Final Submission / Finale presentation	$10 + 10 = 20\%$

> **GROUP SCORE VS. INDIVIDUAL SCORE**
>
> For each of the four components of the Impossible problem is divided 50% into `groups score` and 50% for `individual score`.
>
> Everyone in the group will get the same score for the `group score` for HWs 1-3 and the final presentation. Note that this is worth 25% of the total grade and for future reference, we will refer to these points as `group score`.
>
> We will talk about the individual score (which is based on peer surveys) later on.

ALL OTHER DETAILS ARE TBD AND WILL BE PROVIDED SOON!

Gen AI

[Safe space]

- How do you use GenAI right now?

- What's the most "out there" use of generative AI by someone that you know?
  - What are some uses of generative AI that might actually benefit society?
  - What are some uses of generative AI that might harm society?
  - What are some creepy uses of generative AI?
  - How is "generative AI" different from "AI"? From "ML"?
  - Where will we be in 5 years? 10 years? 100 years?

Questions/Comments?

TQEs and Discussions

In-class discussions

In-class discussions will be based on a (set of) paper(s), video(es), and/or podcast(s). The paper/video/podcast(s) will be assigned at least a week in advance of the in-class discussion. **By default you are supposed to read/watch/listen the entire paper/video/podcast** (we will post on Piazza on what exactly we expect y'all to read if this is *not* the case). Further, y'all are supposed to **read/watch/listen BEFORE coming to the in-class discussion**. In the spirit of trust but verify, y'all will have to submit a *TQE Response* before the class (for more details on this, see below). During the class, everyone is expected to actively participate in the class discussion on the assigned reading (for more details on this, please see below.)

> **THERE IS NO "RIGHT" ANSWER**
> As y'all will see in many parts of the course there will not be a "right" answer. This is more so in the case of the in-class discussions. The discussion are not for you to say *what you think we want you to say* but rather they are an opportunity for us (and the rest of the class) **to hear what YOU think about the topic**. So please participate accordingly!
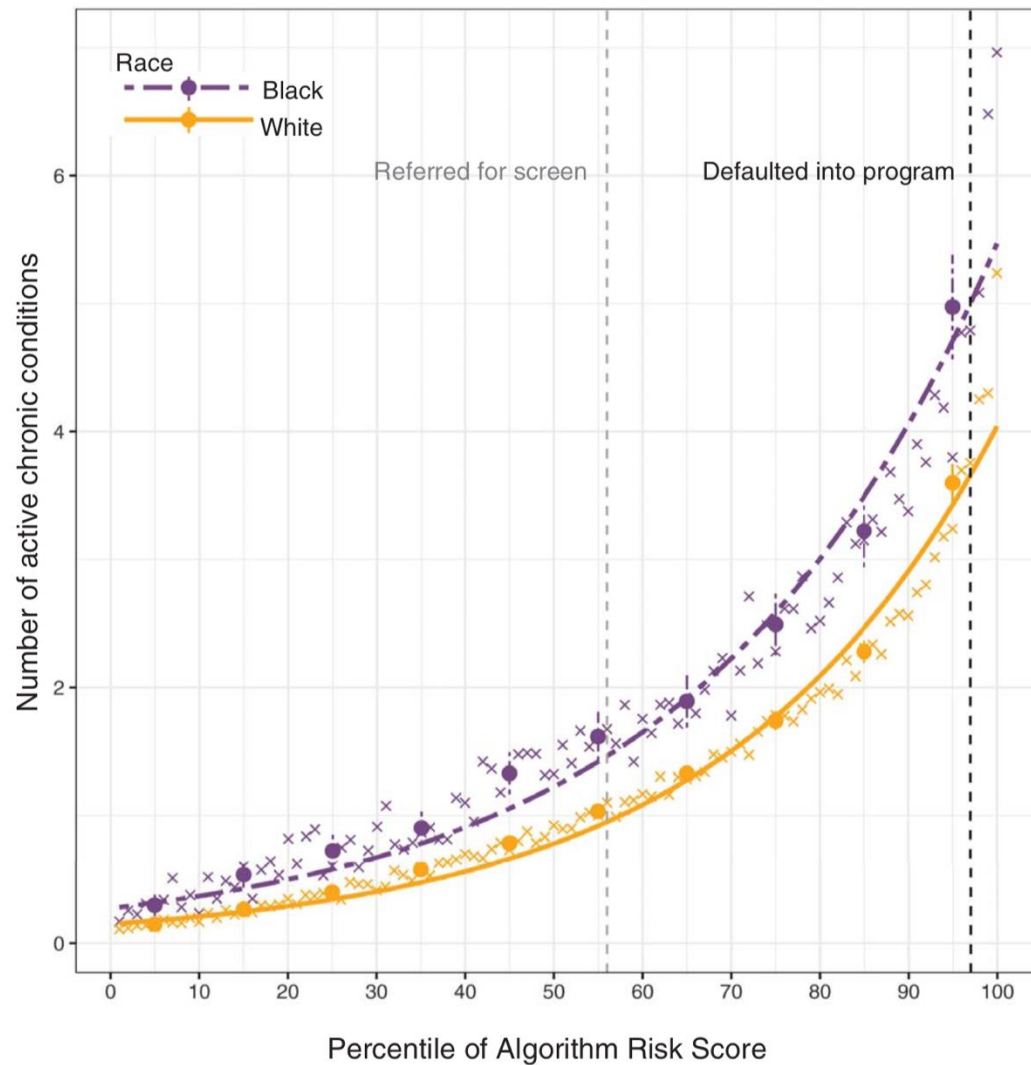
Why this course?

Fig. 1. Number of chronic illnesses versus algorithm-predicted risk, by race. (A) Mean number of chronic conditions by race, plotted against

Obermeyer, Z., Powers, B., Vogeli, C., & Mullainathan, S. (2019). Dissecting racial bias in an algorithm used to manage the health of populations. *Science, 366*(6464), 447–453. https://doi.org/10.1126/science.aax2342

One Month, 500,000 Face Scans: How China Is Using A.I. to Profile a Minority

In a major ethical leap for the tech world, Chinese start-ups have built algorithms that the government uses to track members of a largely Muslim minority group.

Anna Lauren Hoffmann @annaeveryday · 33m   ⌄

How it started: How it's going:

FACEMASH   The New York Times

We are let in for our looks? No. Will we be judged on them? Yes.

Who's Hotter? Click to Choose.

A Genocide Incited on Facebook, With Posts From Myanmar's Military

💬 1   🔁 60   ♡ 147   ⬆

Uncomfortable discussions...

Disagree with what someone SAID NOT who you think they ARE

Same principle replace "race" by other topic

Amazon Basics Microwave, Smart microwave, Works with Alexa
by Amazon

⭐⭐⭐⭐☆ ⌄ 1,783 customer reviews | 564 answered questions

Price: **$59.99** ✓prime

▲
134 votes
▼

Question: Since you have to stand there to put popcorn or whatever in the microwave, why does it need to be voice controlled?

Answer:

By Diane Fillmore on November 24, 2018

⌄ See more answers (25)

Microwave	with Dot (Charcoal)	with Dot (Heather Gray)
$59.99	$109.98	$109.98
✓prime	✓prime	✓prime

WORKS WITH ALEXA
Control this with your device:

⌄ See More