

Ethics and Robotics

Spring 2021

16-735

Instructors

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Class meeting times

Tuesdays and Thursdays, 12:20-1:40pm ET

Office hours

By appointment, via Zoom

Prerequisites and prior knowledge

None. This course is open to all students, although the work requires significant reading, class discussion, analysis and writing.

Course Description

This course contextualizes robotics, AI and machine learning within cultural conversation, ethics and power relationships in society. It will draw upon "AI and Humanity" as well as numerous other texts, including the autobiography of Frederick Douglass, Mindless by Simon Head, Surveillance Valley and Drone Theory. Our target audience is students who will participate in computer science and robotics research and can use this course to inform future research and career decisions.

Learning Objectives

Our goals for students of this course include:

- Critically evaluate the ethics of technology and its societal ramifications.
- Articulate future implications of a new technology through writing and creative storytelling.
- Create an ethics reflection module for curricular deployment in a technical course.
- Identify real-world examples of ethical implications of robotics research and evaluate the impact of related decisions.

Learning Resources

All reading materials will be provided in class, although purchase of the textbook "AI and Humanity" is recommended. Resources include articles, plays, book chapters, movies and documentaries.

Assessments

All assignments will be submitted on Canvas.

- Homework journal entries and reading analyses 40%
- Class participation in discussion 15%

- Peer reviews 15%
- Final presentation 15%
- Course Ethics Module Project 15%

Class participation

Particularly as this class will be largely on-line, in-class participation is very important for the students to learn to engage with one-another and with the instructors. We expect students to come to class prepared to engage, having completed the assigned reading early enough to reflect on the material for class. To create as convivial a class dynamic as possible, we hope that students can maximize the time their camera is on within zoom so that we can read expressions and attend to questions both with the digital “hands-up” markers but also with physical hands. Class will not be recorded to encourage real-time participation.

Guidelines for effective discussion

This semester involves the regular use of technology during class. Research has shown that divided attention is detrimental to learning, so we encourage you to close any windows not directly related to what we are doing while you are in class. Please turn off your phone notifications and limit other likely sources of technology disruption, so you can fully engage with the material and each other. This will create a better learning environment for everyone.

Grading Policies

Consistent attendance and basic preparation for class meetings is compulsory for successful completion of this course.

- If you are going to miss a class, let the instructors know beforehand.
You may miss two seminars throughout the term but all assignments are expected for submission on time, nonetheless.
- Any absence beyond two seminars throughout the term will negatively impact your grade, significantly reducing your Classroom Participation course grade.
- **More than two unexcused absences from seminars will significantly impact your grade.**

Because your assignment due dates are aligned with discussions in-class, it is important for your work to be turned in on time, so that you are prepared for discussions in-class. If an assignment is turned in after the deadline but before the class discussion, there is a 10% grade penalty. Submissions after the relevant class discussion are not accepted and earn a ‘zero’ grade for that homework assignment.

Course Policies

Diversity

We must treat every individual with respect. We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Each of these diverse identities,

along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus. We, at CMU, will work to promote diversity, equity and inclusion not only because diversity fuels excellence and innovation, but because we want to pursue justice. We acknowledge our imperfections while we also fully commit to the work, inside and outside of our classrooms, of building and sustaining a campus community that increasingly embraces these core values.

Each of us is responsible for creating a safer, more inclusive environment.

Unfortunately, incidents of bias or discrimination do occur, whether intentional or unintentional. They contribute to creating an unwelcoming environment for individuals and groups at the university. Therefore, the university encourages anyone who experiences or observes unfair or hostile treatment on the basis of identity to speak out for justice and support, within the moment of the incident or after the incident has passed. Anyone can share these experiences using the following resources:

Center for Student Diversity and Inclusion: csdi@andrew.cmu.edu, (412) 268-2150

Report-It online anonymous reporting platform: reportit.net username: *tartans* password: *plaid*

All reports will be documented and deliberated to determine if there should be any following actions. Regardless of incident type, the university will use all shared experiences to transform our campus climate to be more equitable and just.

Academic Integrity

We encourage you to discuss the learning resources with your peers, although writing assignments should be your own work. When you have discussed with another student, please list their names on your submission. Adding credit is a positive; it will not worsen your grade.

In any manner of presentation, it is the responsibility of each student to produce her/his own original academic work. Collaboration or assistance on academic work to be graded is not permitted unless explicitly authorized by the course instructor(s). Students may utilize the assistance provided by Academic Development, the Global Communication Center, and the Academic Resource Center (CMU-Q) unless specifically prohibited by the course instructor(s). Any other sources of collaboration or assistance must be specifically authorized by the course instructor(s).

In all academic work to be graded, the citation of all sources is required. When collaboration or assistance is permitted by the course instructor(s) or when a student utilizes the services provided by Academic Development, the Global Communication Center, and the Academic Resource Center (CMU-Q), the acknowledgement of any collaboration or assistance is likewise required. This citation and acknowledgement must be incorporated into the work submitted and not separately or at a later point in time. Failure to do so is dishonest and is subject to disciplinary action.

Instructors have a duty to communicate their expectations including those specific to collaboration, assistance, citation and acknowledgement within each course. Students likewise have a duty to ensure that they understand and abide by the standards that apply in any course or academic activity. In the absence of such understanding, it is the student's responsibility to seek additional information and clarification.

For a full description please refer to: <http://www.cmu.edu/policies/documents/Cheating.html>

Students with Disabilities

If you wish to request an accommodation due to a documented disability, please inform your instructor and contact Disability Resources at 412.268.6121 or getchell@cmu.edu as soon as possible. Please also visit this website for basic information:

<http://www.cmu.edu/disability-resources/students/discussing-accommodations.html>.

Wellness

Take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is almost always helpful.

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website at <http://www.cmu.edu/counseling/>. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

CaPS: 412-268-2922

Re:solve Crisis Network: 888-796-8226

If the situation is life threatening, call the police

On campus: CMU Police: 412-268-2323

Off campus: 911

If you have questions about this or your coursework, please let us know.

Schedule

| Wee k | Date | Topic | Assignment Due |
|----------|------|-------------------------------------|---|
| 1 | 2/2 | Intro to the course | Introductions and pre-course survey |
| | 2/4 | Surveillance, Information, Humanity | See "Arkangel" Black Mirror episode; initial journal reflection due |
| 2 | 2/9 | Surveillance, Labor | Journal entry on chapter 5 of AIH |

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| | 2/11 | | Simon Head: Mindless |
| 3 | 2/16 | Economy and the Industrial Revolutions | Labor and capital discussion & talk; journal entry on chapter 4 plus selections of Head's Mindless |
| | 2/18 | | |
| 4 | 2/23 | RUR | Journal entry on the Rossum's Universal Robots play, in-class discussion |
| | 2/25 | ML & Bias | Introduction to inequity and bias in machine learning, case study on COMPAS |
| 5 | 3/2 | Safety and trust | Driverless cars, in-class discussion of Duhigg New Yorker article and Boeing 737-max |
| | 3/4 | Safety and trust | Student presentations: side-by-side of paper and news article |
| 6 | 3/9 | Final project introduction | Small group thinking on what good curricular integration looks like |
| | 3/11 | Regulation | Student reports on what regulations / ethics considerations are in place by what organizations |
| 7 | 3/16 | Mike Skirpan guest lecture | |
| | 3/18 | | Mid-semester course feedback |
| 8 | 3/23 | Learning objectives | Final Project: Group formation and 3 candidate courses due |
| | 3/25 | Active learning | |
| 9 | 3/30 | Military Robotics | Read selections of Drone Theory; Journal writing |
| | 4/1 | David Danks | |
| 10 | 4/6 | Visionaries and public reception | Discussion on Kurzweil, Musk, etc. |
| | 4/8 | Movie day | Faculty interview, topic/theme identification, learning objectives due |
| 11 | 4/13 | Movie day | |
| | 4/15 | NO CLASS (Spring Carnival) | |
| 12 | 4/20 | Final Project Module Pitches | Peer review forms |
| | 4/22 | Feedback meetings | Final project groups meet with instructors for feedback |
| 13 | 4/27 | Robotics, AI & Law | |
| | 4/29 | Futuring | Write your own Black Mirror episode |
| 14 | 5/4 | | Final project due; in-class curricular presentations to |

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| | | | other course faculty |
| | 5/6 | Last day of class | Journal entry: final reflection; in-class curricular presentations (if we need 2 days) |