CSCI 77800: Ethics and Computer Science

Term: Fall Semester 2021

Professor: Sven Dietrich

Office Hours: TBA

Course Description:

"Your scientists were so preoccupied with whether or not they could, they didn't stop to think if they should." - Jurassic Park, Michael Crichton

Ethical concerns are frequently ignored in technical fields, but as a society we are discovering their immense importance. Algorithms can have unintended affects due to hidden bias, security and privacy can be affected negatively when decisions are made for technical merit or user convenience. Social networks have resulted in issues ranging from fake news to echo chambers and more. In this course we will explore ethical issues in computer science through a combination of programming assignments, case studies and discussions of current events.

Expected Learning Outcomes:

By the end of this course, students will be able to:

1. Create programs and computer-based systems that minimize negative ethical factors such as bias and unintended consequences.
2. Create programs and computer-based systems that maximize factors including accessibility, equity, and diversity.
3. Analyze existing computer systems to determine where factors such as bias, unintended consequences and other ethical concerns exist.
4. Understand how human factors can influence otherwise deterministic technical processes.

Required Text:

There is no required text for this course. Readings will be assigned from a variety of sources, as outlined in the syllabus.

Evaluation:

- Final project/paper: 30%
- Programming assignments: 30%
- Presentations / accompanying papers: 20%
- Other assignments: 10%
- Class participation: 10%

Standards note

Area	Standards Covered
IC	1,2,3,4,5,6,7
CT	2,3,4,5,8,9,10
CY	1,2,3
DL	4,5

Course Content and Organization:

Week 1 – Overview

- Discussion of what comprises "Ethical CS" based on in-class readings.
- Develop a list of features that the class considers Ethical CS.
- Reading:
  - https://www.theguardian.com/technology/2017/sep/18/apple-stopping-ads-follow-you-around-internet-sabotage-advertising-industry-ios-11-and-macos-high-sierra-safari-internet
  - https://harvardmagazine.com/2000/01/code-is-law-html
  - https://www.washingtonpost.com/news/grade-point/wp/2018/01/17/she-recorded-herself-making-racial-slurs-on-mlk-day-her-college-expelled-her/?noredirect=on&utm_term=.3cab8b3e5bfc
  - https://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/306868/
- Assignment
  - Write a one-page summary of a current topic concerning Ethical CS.
- IC 1-5

Week 2 - Using data / Analyzing data

- Review of Python
- Introduction to Pandas / NumPy / SciPy
- Readings:
  - https://pandas.pydata.org/pandas-docs/stable/10min.html
  - https://www.analyticsvidhya.com/blog/2016/01/complete-tutorial-learn-data-science-python-scratch-2/
- Assignment:
  - Write a program to explore the Titanic data (based on http://www.awesomestats.in/python-pandas-titanic/ <–link broken. Need fix.)

Week 3 - Looking at Census data (anonymity)

- Discuss privacy and anonymity as it relates to CS ethics (students' preconceived notions).

- Discussion of how anonymized data is not always anonymous and what that implies.
- Introduction to Census data. How it is represented, how to access it.
- Discussion of cleaning data.
- Readings:
  - Simple Demographics Often Identify People Uniquely, Latanya Sweeney http://dataprivacylab.org/projects/identifiability/paper1.pdf
  - Weaving Technology and Policy Together to Maintain Confidentiality, Latanya Sweeney http://dataprivacylab.org/dataprivacy/projects/law/jlme.pdf
- Assignment:
  - Write a program to analyze Census data to determine how unique you are based on zip code, gender, and birth date.
- CT 2 - 4, 9 - 10

Week 4 - Unintended consequences - when the motive is profit

- Class lab assignment:
  - Develop a simulation to assign airline seats. Regular customers get to select seats at purchase. Economy just select number of seats. Simulator decides how and when to assign them.
  - Discussion of consequences: families or passengers with needs separated, etc.
- Reading:
  - https://www.independent.co.uk/travel/news-and-advice/airline-flights-pay-extra-to-sit-together-split-up-family-algorithm-minister-a8640771.html
- Assignment: Redesign and rewrite seating system based on class conclusions.
- Term assignment:
  - Select and explore a topic relevant to Ethical CS (to be approved by the instructor). Create a presentation giving an overview of the issue, why it should be addressed, and possible solutions. The presentation should include program-based examples illustrating the problem and where appropriate to address solutions.
- IC 1, 3-7
- CT 4,5,8-10

Week 5 - Web privacy

- What information are we sharing when we access the web?
- http://webkay.robinlinus.com/
- https://www.whatismybrowser.com/
- Cookies - what are they and what are the implications?
- What is the data collected by companies whose services we use and how do/can they leverage it?
- Reading:
  - Google's GMail: a love betrayed?, Aaron Weiss https://dl.acm.org/doi/10.1145/997922.997938
  - https://motherboard.vice.com/en_us/article/yp3d8v/yahoos-gigantic-anonymized-user-dataset-isnt-all-that-anonymous
  - https://www.privacyrights.org/consumer-guides/online-privacy-using-internet-safely
- Assignment:
  - Short written assignment on how a service used by each student collects and uses their data.
- CY 1 - 3

Week 6 - Unintended Consequences, Part 2 – Internationalization

- Class lab assignment:
  - Develop a system that accepts resumes and scans them for set skills. The resume will extract names and phone numbers of the candidates. Resumes in the form:
    - Name, Date of Birth, Phone number, Skills (csv)
  - This will require a discussion and tutorial on regular expressions.
  - Run on set of international applicants. Discuss bias.
- Assignment: Redesign and rewrite resume scanner to better account for national bias.

Week 7 - Politics and Policy

- Class lab assignment: Design and build a system to set up congressional voting districts on a grid city.
- Discussion of political bias and gerrymandering.
- Assignment: Use NYC Data (housing, income etc) to improve class lab assignment
- Reading:
  - https://en.wikipedia.org/wiki/REDMAP
  - https://en.wikipedia.org/wiki/Maptitude
  - https://bdistricting.com/2010/
- DL 4,5

- IC 1-3,7
- CT 2-4,8-10

Week 8 - Social Justice and Computer Science Education

- An overview of the CSforALL movement.
- Why is CSforALL a social justice issue?
- A discussion of what is taught in K12 (broken down by grade band).
- An analysis of the K12 CSTA standards, K12 CS framework and the ACM Code of Ethics.
- What is Computational Thinking and how does it relate to CS?
- Mini class exercises in computation thinking.
- Can CS in any form contribute to reducing the achievement gap?
- Reading:
  - https://ethics.acm.org/code-of-ethics/
  - https://k12cs.org/ (vision section)
  - https://c.ymcdn.com/sites/www.csteachers.org/resource/resmgr/CSTA_BugsInTheSystem.pdf
  - Selections from https://www.csteachers.org/page/ResearchandReports

Week 9 - Hidden Bias

- Class lab assignment:
  - Design and write a movie recommendation system.
  - Accumulate a database of recommendations.
  - Explore and discuss the possibilities of hidden bias in recommendations and where real examples appear on the internet.
- Assignment:
  - Written assignment on current examples of hidden bias and possible solutions.
- Reading
  - https://dl.acm.org/citation.cfm?id=2604991

Week 10 – Midterm Exam

Week 11 – Accessibility

- Class lab assignment:
  - Overview of the Flask web platform.
  - Design a simple web site w/form.
  - Discussion: Accessibility issues.

  - Review issues of accessibility and standards:
    * https://www.w3.org/TR/WCAG21

- Assignment: Refine web site to conform to accessibility standards.
- Reading:
  - http://flask.pocoo.org/docs/0.12/tutorial/
  - https://medium.com/salesforce-ux/7-things-every-designer-needs-to-know-about-accessibility-64f105f0881b
- IC 6

Week 12 - Software Models

- Commercial vs Freemium vs Free.
- Free vs Open Source.
- Discussion of the GNU Manifesto and open source movement.
- Review and discussion of licenses (https://opensource.org/licenses)
- Discussion of the practical and ethical implications of open source software.
- Exploration of Github / GitLab and other open source repositories.
- How can I participate in open source?
- Assignment: Find an open source project, Submit a pull request.
- Reading:
  - https://joyofandroid.com/mobile-gaming-addiction/
  - https://www.gnu.org/gnu/manifesto.html

Week 13 - Miscellaneous Topics

- Case study: Net Neutrality
  - https://en.wikipedia.org/wiki/Net_neutrality
  - NY Tech community mobilization and response
- Case study: Digital Divide
  - http://time.com/4718032/the-digital-divide/
  - https://www.nycmesh.net/
- Case study: Accessibility for programmers
  - https://www.bootstrapworld.org/blog/accessibility/User-Interface-REPL.shtml
  - https://www.bootstrapworld.org/blog/accessibility/Describing-Images-Screenreaders.shtml
- Case study: Security vs convenience
  - [https://www.pcworld.com/article/257793/why_convenience_is_the_enemy_of_security.html] (https://www.pcworld.com/article/257793/why_convenience_is_the_enemy_of_security.html)
- IC 6

Week 14 - Student project presentations

Week 15 – Final Exam

Academic Integrity Statement

"Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures."

ADA Statement

"In compliance with the ADA and with Section 504 of the Rehabilitation Act, Hunter College is committed to ensuring educational access and accommodations for all its registered students. Hunter College's students with disabilities and medical conditions are encouraged to register with the Office of AccessABILITY for assistance and accommodation. For information and appointment contact the Office of AccessABILITY located in Room E1214 or call (212) 772-4857 /or TTY (212) 650-3230."

Hunter Policy on Sexual Misconduct

"In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).

b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link: http://www.cuny.edu/about/administration/offices/la/Policy-on-SexualMisconduct-12-1-14-with-links.pdf

Syllabus Change Policy:

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice

Students will be informed of any changes to the class syllabus via direct email.