ISF 50: Interdisciplinary Perspectives on Artificial Intelligence

Spring 2019

University of California, Berkeley

TuTh: 2.00 – 3.30 pm

Room: 145 Moffitt

Lecturer: Shreeharsh Kelkar

Interdisciplinary Studies Field Major

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Office Hours: Wednesdays, 1-4 pm (or email for appointment; if my door is open, just knock and walk in)

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Course Description and Learning Objectives:

It's hard not to open a newspaper or magazine today and see claims being made for artificial intelligence. Advocates argue that software programs will now be able to even perform creative jobs (as opposed to just routine ones) and that this is both a matter of celebration and concern. Critics argue that these claims are hyperbolic, while others argue that they are too close to reality and an indication of how much autonomy we have ceded to machines. In this course, we will pick apart all of these claims. We will ask: how have different human societies conceived of "intelligence," natural or artificial, and how has this varied with place and time? How have different technical experts been influenced by the time, place, constraints, and patronage they operated under? How does contemporary AI intersect with regimes of calculation, capitalism, standardization, gender, and speech?   The class will be interdisciplinary in method as well as subject: we will study technical and popular material, philosophy and empirical work, engineering and social science literature, as well as science fiction.

Grade Determination:

There will be no exams in this class except a few surprise quizzes and a final assessment paper. You will be asked to write a total of three essays of (1000-2000 words) as well as thoughtful responses to the assigned readings on the forums. The grade breakdown is as follows:

> Attendance and class participation: 15 pts (This includes coming to class and participating in the group activities.)

> Forum posts (reflections on class readings and activities): 20 pts

Surprise quizzes: 20 pts

Paper 1 (10 pts), Paper 2 (15 pts) and Final Paper (20 pts)

Total: 100 pts

The grading scheme for the class is as follows:

Range and Grade
90<=A<=100
80<=A-<90
70<=B+<80
60<=B<70
50<=B-<60
45<=C+<50
40<=C<45
35<=C-<40
0<=F<35

Laptop Policy:

No laptops, tablets, or cell phones will be allowed during class unless I give you explicit instructions to use them. It might seem strange to ban computers in class given that this is a class about computing. But I have found that when computers are allowed, students, despite their best efforts, still end up surfing the web rather than paying attention. So consider this a dollop of paternalism on my part. There is a wide literature that shows that overall, students are distracted from the topic at hand because of their laptops and phones, and that students are often distracted by the laptops of other people.   For those of you that prefer to take your notes on your laptops, there's some research that shows that taking hand-written notes forces you to synthesize your points, thereby creating better notes.

Assignments

Paper 1 prompt (10 pts) (1000 words approx.)

Choose a film in which computers/computing plays a prominent role (see the list at the end though feel free to choose your own).   In the style of our readings and class discussion, analyze the relationship between computers and "intelligence" in these pop cultural artifacts. What is being assumed about computers or computing in these films?

List of movies (or television): 2001: A Space Odyssey, The Matrix, Ex Machina, Star Treks, Terminator, War Games, The Imitation Game, Blade Runner, Her, The Social Network, Mr.

Robot. Wikipedia, of course, has a much more comprehensive list:
https://en.wikipedia.org/wiki/List_of_films_about_computers
Paper 2 prompt: (15 pts) (1500 words approx.)

Write an Explainer on the history and meaning of artificial intelligence. An Explainer (about 1500-2000 words) is a piece of text where you explain a complicated policy, technology, or social issue to a general yet interested audience. See these Explainers in the online publication Vox. Since this is written for a general audience, you have to be able to explain sophisticated issues (the history of a technology, the stakes involved, etc.) in simple and clear language.

Final Assessment Paper prompt: (20 pts) (2000 words approx.)

Using the readings used in this class, write a sustained paper on the values in Artificial Intelligence. What is the relationship between AI and culturally salient categories of work, expertise, gender, and intelligence?

Class Plan

The class material is organized by keywords/concepts. Some of the important keywords/concepts are: work, labor, expertise, information, capitalism, and gender. This does not mean that the readings are exclusively about that concept; rather, you are encouraged to ask as you read: what is this reading about? How is this reading about [concept]?

The readings are organized chronologically; we start from the early modern period and then move through time. Sometimes however, I have juxtaposed more "modern" readings to make the connection to computing clearer.

The first-third of the class will look at the 1700-1950 period to think about how the concept of "intelligence" changed. The second-third of the class will take up the period from 1950-90 and talk about both philosophical debates about intelligence as well as practical systems that got built (e.g. expert systems). The final third of the class will look at new definitions of intelligence from disciplines as diverse as engineering, sociology, and cognitive science.

W		Concept or Keyword	Readings, Assignment and Class Lecture
1		Introduction.	No readings.
		Machines	Channell, David. 1991. Mechanical Organisms: From Automata to Clockwork Humans. In *The Vital Machine: A Study of Technology and Organic Life*. Oxford University Press, 30-45.
2		Minds	Haugeland, John. 1985. The Saga of the Modern Mind. From *Artificial Intelligence: The Very Idea*. Pp15-46.

		Intelligence	Schafer, Simon. 1994. Babbage's Intelligence: Calculating Machines and the Factory System. *Critical Inquiry* 21(1).
3		Gender	Wise, M. Norton. "The Gender of Automata in Victorian Britain." In *Genesis Redux: Essays in the History and Philosophy of Artificial Life*, edited by Jessica Riskin, 163-95. Chicago: University of Chicago Press, 2007.
		Work	Irani, Lilly. "Justice for 'Data Janitors'." Public Culture 15 (2015). http://www.publicbooks.org/justice-for-data-janitors/
4		Class Exercise 1	Students divide into four groups and present the ideas of particular Enlightenment thinkers: Descartes, Hobbes, La Mettrie and Charles Babbage. Then they debate each other about what the mind is and what computation is.
		Continued.	Debate continued.
5		Information, Command, and Control	Edwards, Paul. 1996. 1: "We Defend Every Place": Building the Cold War World, 2: Why Build Computers? The Military Role in Computer Research. In *The Closed World: Computers and the Politics of Discourse in Cold War America*. MIT Press, 1-30, 43-73.
		Intelligence	Adam, Alison. 1998. AI in Context. In Artificial Knowing: Gender and the Thinking Machine. pp34-46. **Paper 1 due.**
6		Information Processing	Miller, George A., Eugene Galanter, and Karl H. Pribram. *Plans and the Structure of Behavior*. New York: Henry Holt and Company, 1960., chapter 1. Newell, Allen, and Herbert Simon. "GPS, a Program That Simulates Human Thought." In *Computers and Thought*, edited by Edward A. Feigenbaum and Julian Feldman, 279-93. Menlo Park, Cambridge and London: AAAI Press/MIT Press, 1995
		Against Information	Dreyfus, Hubert. 1995. Assumptions underlying persistent

		Processing	optimism. From *What Computers Can't Do: A Critique of Artificial Reason*.
			Weizenbaum, Joseph. 1976. Introduction. In *Computer Power and Human Reason: From Judgement to Calculation*. pp1-16.
7		Class Exercise	In the class, we debate over whether intelligence is information processing. Half of the class will argue from the AI side, the other half from the perspective of Dreyfus and Weizenbaum.
		Intelligence Turing Test	Turing, Alan M. "Computing machinery and intelligence." *Mind* 59.236 (1950): 433-460. Class Exercise: we will carry out the actual "imitation game" that is the basis of the Turing Test.
8			Class Exercise continued.
		Knowledge	Forsythe, Diana E. "Engineering knowledge: The construction of knowledge in artificial intelligence." *Social studies of science* 23.3 (1993): 445-477. In this unit, we look at how actual work and practices figure into conceptions of intelligence.
9		Work Expertise	Forsythe, Diana E. "The Construction of Work in Artificial Intelligence." Science, Technology, & Human Values 18.4 (1993): 460-479.
		Case-study: IBM Watson	Ross, Casey and Ike, Swetlitz. 2017. IBM pitched its Watson supercomputer as a revolution in cancer care. It's nowhere close. *Stat*. https://www.statnews.com/2017/09/05/watson-ibm-cancer/ Hernandez, D., & Greenwald, T. (2018, August 11). IBM Has a Watson Dilemma. *Wall Street Journal*. Retrieved from https://www.wsj.com/articles/ibm-bet-billions-that-watson-could-improve-cancer-treatment-it-hasnt-worked-1533961147

			Strickland, Eliza. 2018. Layoffs at Watson Health Reveal IBM's Problem With AI. IEEE Spectrum. https://spectrum.ieee.org/the-human-os/robotics/artificial-intelligence/layoffs-at-watson-health-reveal-ibms-problem-with-ai
10		Class Exercise	The class will debate and reflect on IBM Watson using the readings: what is the conception of work, knowledge, and intelligence as embodied by IBM's Watson program?
		Intelligence (Embodiment)	Brooks, Rodney. 1995. Intelligence without representation. From *Cambrian Intelligence: A history of the new AI*. This week begins the third and last part of the class: new ways of thinking about intelligence. **Paper 2 due.**
11		Intelligence (Rules)	Katz, Yarden. "Noam Chomsky on where artificial intelligence went wrong." (2012). Norvig, P. "On chomsky and the two cultures of statistical learning. On-line essay in response to Chomsky's remarks in [2](2011)." Of further interest: Manning, Christopher D. "Computational linguistics and deep learning." *Computational Linguistics* 41.4 (2015): 701-707.
		Intelligence (Cyborgs)	Desjarlias, Robert. 2011. Cyberchess. In *Counterplay: An Anthropologist at the Chessboard*. University of California Press, 152-183. Clark, Andy, and David Chalmers. "The extended mind." *analysis* 58.1 (1998): 7-19.
12		Intelligence	Collins, Harry M. *Artificial experts: Social knowledge and intelligent machines*. MIT press, 1993. [Extracts]
		Intelligence	Wise, J. MacGregor. "Intelligent agency." *Cultural Studies* 12.3 (1998): 410-428.

13		Humans and Machines	Suchman, Lucy. 2007. 13: Figuring the Human in AI and Robotics, 14: Demystifications and Reechantments of the Humanlike Machine. In Human-Machine Reconfigurations; Plans and Situated Actions, 2nd ed. Cambridge University Press, 226-258.
		Humans and Machines	Mindell, David. 2015. Beyond Utopian Autonomy. From *Our Robots, Ourselves: Robotics and the Myths of Autonomy*. Gray, Mary and Siddharth Suri. 2017. The Humans Working Behind the AI Curtain. *Harvard Business Review*. https://hbr.org/2017/01/the-humans-working-behind-the-ai-curtain
14		Class Presentations	
		No Class – Thanksgiving Weekend	
15		Class Presentations	
		Class Presentations	
16			**Final Assessment Paper due after RRR week**