Minds and Machines

New York University, Spring 2011, V83.0015

Lecture Time	Tuesday & Thursday 9:30am-10:45am
Lecture Place	Silver Center for Arts & Science, Room 501
Website	Blackboard
Professor	Dr. William Starr (will.starr@nyu.edu)
Office	5 Washington Place, Office 409
Office Hours	Tuesday & Thursday 10:45-11:45am; By Appointment
Recitations	Sect 2: Mon 3:30-4:45, Silv 704
	Sect 3: Mon 4:55-6:10, 48 Cooper Square 116
Preceptor	Mr. Michael Schweiger (mgs305@nyu.edu)
Office	5 Washington Place, Office 315
Office Hours	Monday 2-3pm, Wednesday 12:30-1:30pm; By Appointment

Course Description

Throughout history, metaphors drawn from technology of the time have been proposed to understand how the mind works. While Locke described the newborn's mind as a blank slate, Freud compared the mind to hydraulic and electro-magnetic systems. In recent decades, many have followed Alan Turing's proposal to think of the mind as a kind of computer. Indeed, this idea is often said to be one of the foundational assumptions of cognitive science. What do cognitive scientists mean when they claim that the mind is a computer? What is a computer? Could a computer have a mind, emotions and conscious experiences? What is a mind and what are emotions and experiences anyway?

Readings

There are two required textbooks for this course:

- Andy Clark's *Mindware* (Oxford University Press, 2001)
- W. Daniel Hillis' *The Pattern on the Stone* (Basic Books, 1998)

Both are available at the NYU Bookstore and through Amazon. Some other readings will be made available electronically through Blackboard.

Advice: It is more important to have a basic grasp of the overall point of a reading than to understand any particular detail. Accordingly, I advise you to do each of the readings once quickly in a single sitting and then return to the details you missed. If, on a second reading, you can't sort out some specific detail, write down what you don't understand and bring it to class for discussion. Do your best to raise your question at a point in the class where that detail is relevant to what's being discussed. It is much more likely that you will get a satisfying answer if you ask your question at the appropriate time. In all the readings, it will be helpful to ask yourself 'what is the problem or issue at stake here?' and then 'what solutions or positions is the author arguing for here?'

Grading

- **25%: Essay 1, 1500 Word Limit** (≈ 5 pages) Due 03.10, the Thursday before spring break, at the beginning of lecture. Topics will be provided on Blackboard. In addition to turning in this paper copy, you must submit an electronic copy to Blackboard by 11:55pm on 03.10. Blackboard will submit this electronic copy to Turnitin.com, a plagiarism detection service. Your paper does not count as turned in until you turn in both a paper and an electronic copy.
- **25%: Essay 2, 1500 Word Limit** (≈ 5 pages) Due Monday 05.09, the last day of classes, at the beginning of **recitation**. Topics will be provided on Blackboard. In addition to turning in this paper copy, you must submit an electronic copy to Blackboard by 11:55pm on 05.09. Blackboard will submit this electronic copy to Turnitin.com, a plagiarism detection service. Your paper does not count as turned in until you turn in both a paper and an electronic copy.
- **30%: Pop Quizzes** Throughout the semester there will be 10 short pop quizzes given in lecture and recitation. These will be very basic comprehension quizzes with short answer questions. Sometimes they will be given at the beginning of lecture/recitation, in which case they will cover the readings for that meeting. Sometimes they will be towards the end of class, in which case they will cover the contents of that meeting. **It is therefore essential to your success in this class that you do the readings, attend lecture/recitation and ask questions when you do not understand the material.** Except in cases of documented and valid emergencies, you will not be able to make up missed quizzes. **If you have a problem making class regularly, drop this course**.
- **20%: Homework/In-Class Exercises** There will be a few in-class exercises in lecture and recitation, as well as a few homework assignments given out during the course of the semester. This is another reason why attendance and participation will be essential.

Website

There is a Blackboard site for this course. You can access it by going to home.nyu.edu, logging in and clicking on the 'Academics' tab. Your Blackboard courses will appear in a box on the right side of the page. Select "MINDS & MACHINES". It will be tremendously helpful for you to check site regularly. I will post some readings, this syllabus, lecture slides and announcements on the website. The discussion board can be used to post questions about the readings, assignments or lectures.

Schedule

Readings marked with '*' are optional. Readings may change as the semester goes on. Updated versions of this syllabus will be posted on Blackboard as changes are made.

Date	Notes	Reading	Topics
Week 1			*Introduction*
01.25			The Class
01.27	Snow Day	Snow Day	Snow Day
Week 2			*What's a Mind?*
02.01		[15: Ch.2], [9]*	Dualism
02.03		[15: Ch.4], [21]*	Identity Theory

Date	Notes	Reading	Topics
Week 3			*What is Computation?*
02.08		[14: Ch.1]	Nuts & Bolts
02.10		[14: Ch.2]	Building Blocks
Week 4			*What is Computation?*
02.15		[14: Ch.3]	Programming
02.17		[14: Ch.4]	Computational Limits
Week 5			*Computational Minds*
02.22		[12: 3-11, 13-30]	Computational Minds
02.24		[6: Ch.1], [23]*, [8]*	Thought, Computation, Turing Test
Week 6			*The Mind as a Computer*
03.01		[6: Ch.2], [20]*	Symbol Systems
03.03	In-Class Video	[18]	Robosemantics
Week 7			*Intentionality*
03.08		[10: Ch.3], [14: Ch.6]*	Information, Representation
03.10	**Essay 1 Due**	[11], [17], [10: Ch.4]*	Intentionality
Week 8			*Spring Break*
03.15	**No Class**		Partying
03.17	**No Class**		Sleeping
Week 9			*The Brain & Levels*
03.22		[12: Ch.3]	How could the brain compute?
03.24		[16: 8-38],[12: Ch.4]*	Levels, Vision, Owl Sonar
Week 10			*Connectionism*
03.29		[6: Ch.4], [13: Ch.6]*	Connectionism
03.31		[13: Ch.7], [7]*, [6: Ch.3]*	Symbolic v. Connectionist Computation
Week 11			*Dynamic Minds, Pt.1*
04.05		[6: Ch.5]	Perception & Action
04.07		[6: Ch.6], [13: Ch.9]*	Artificial Life
Week 12			*Dynamic Minds, Pt.2*
04.12		[6: Ch.7]	Dynamic Minds
04.14		[6: Ch.8]	Cyborgs
Week 13			*Consciousness*
04.19		[5: Ch.1], [2: §1]*	Human Consciousness
04.21		[2: §6], [4: Ch.9]*	Machine Consciousness
Week 14			*Emotion*
04.26		[1], [22: Ch.10]*	What's emotion? Can a robot have it?
04.28		[3], [19: Ch.1]*	Affective Robotics

Date	Notes	Reading	Topic
Week 15			*Free Will & Self*
05.02		TBA	TBA
05.05		TBA	TBA
05.09	**Essay 2 Due**		

References

[1] Adolphs, R (2005). 'Could a Robot Have Emotions?' In JM Fellous & MA Arbib (eds.), *Who Needs Emotions?: The Brain Meets the Robot*, Series in Affective Science, 9–25. New York: Oxford University Press.

[2] Blackmore, S (2011). *Consciousness: An Introduction*. 2nd edn. New York, NY: Oxford University Press.

[3] Breazeal, C & Brooks, R (2005). 'Robot Emotion: a functional perspective.' In JM Fellous & MA Arbib (eds.), *Who Needs Emotions?: The Brain Meets the Robot*, Series in Affective Science, 271–210. New York: Oxford University Press.

[4] Chalmers, DJ (1996). *The Conscious Mind: In Search of a Fundamental Theory*. Oxford: Oxford University Press.

[5] Chalmers, DJ (2010). *The Character of Consciousness*. New York: Oxford University Press.

[6] Clark, A (2001). *Mindware: An Introduction to the Philosophy of Cognitive Science*. New York, NY: New York: Oxford University Press.

[7] Dennett, DC (1991). 'Real Patterns.' *Journal of Philosophy*, **88(1)**: 27–51.

[8] Dennett, DC (1998). 'Can Machines Think?' In *Brainchildren: Essays on Developing Minds*, 3–20. Cambridge, Massachusetts: The MIT Press.

[9] Descartes, R (2002). 'The Passions of the Soul.' In DJ Chalmers (ed.), *Philosophy of Mind: Contemporary and Classical Readings*, chap. 2, 21–3. New York: Oxford University Press.

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[11] Dretske, F (2002). 'A Recipe for Thought.' In DJ Chalmers (ed.), *Philosophy of Mind: Contemporary and Classical Readings*, chap. 46, 491–9. New York: Oxford University Press.

[12] Edelman, S (2008). *Computing the Mind*. New York: Oxford University Press.

[13] Franklin, S (1995). *Artificial Minds*. Cambridge, Massachusetts: The MIT Press.

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[15] Kim, J (2006). *Philosophy of Mind*. 2nd edn. Cambridge, MA: Westview Press.

[16] Marr, D (1982). *Vision: A Computational Investigation into the Human Representation and Processing of Visual Information*. San Francisco: W.H. Freeman.

[17] Millikan, RG (2002). 'Biosemantics.' In DJ Chalmers (ed.), *Philosophy of Mind: Contemporary and Classical Readings*, chap. 47, 500–8. New York: Oxford University Press.

[18] Parisien, C & Thagard, P (2008). 'Robosemantics: How Stanley the Volkswagen Represents the World.' *Minds & Machines*, **18(2)**: 169–178.

[19] Picard, RA (1997). *Affective Computing*. Cambridge, Massachusetts: The MIT Press.

[20] Searle, JR (1980). 'Minds, Brains, and Programs.' *The Behavioral and Brain Sciences*, **3**: 417–424.

[21] Smart, JJC (2002). 'Sensations and Brain Processes.' In DJ Chalmers (ed.), *Philosophy of Mind: Contemporary and Classical Readings*, chap. 9, 60–8. New York: Oxford University Press.

[22] Thagard, P (1996). *Mind: Introduction to Cognitive Science*. Cambridge, Massachusetts: The MIT Press.

[23] Turing, AM (1950). 'Computing Machinery and Intelligence.' *Mind*, **59(236)**: 433–460.