21A.850J / STS.484J The Anthropology of Cybercultures
Spring 2009

Student A

Booting up Baby

While at first it might seem curious, to say the least, to train robots to be able to identify and understand human facial expressions and the corresponding causes, the applications turn out to be interesting. I do not think that in the immediate future we will be interacting with robots that have a human form and/or sensibility in any meaningful way. They might elicit a reaction of wonder, and a need to teach them as we see that they are able to learn, but to develop an emotional response, or attachment, will be another order of difficulty. That being said, the use of trained robots to detect early signs of autism can be a useful application. Some other ideas come to mind. It might be possible to evaluate videos of persons and build a structured database of their emotional situation, like to say a way to evaluate news casts and TV programs. The project of Reality Mining at MIT Media Lab is working with software that evaluates the tone of voice of people speaking on the phone to determine their emotional situation. This could be used for example to predict upheavals or social unrest, or to gauge the seriousness of a situation. The use of robots or software is important due to the large quantities of information to be observed, evaluated and classified.

Eighteen Century Wetware

What I found very interesting in Riskin's paper is the idea of the different stages in the interpretation of the embodiment of intelligence and consciousness. This is an important idea that permeates our cyber-world. It took not very long after the end of Monism for scientific thought to explore the idea that man is not transcendental, that it resembles a material set of instructions and processes that can be explained and copied, however complex they might be. This of course led to the idea that the mere appearance of intelligent behavior was enough to declare that every aspect on a larger scale of consciousness and soul could be copied. It is however interesting that we have somewhat departed from the proposition of the simulation or reproduction of just human beings and behavior, to initiate the simulation of worlds, situations and social groups. It is as if we have decided that the reproduction of intelligence is hard after all, but that we can create reproductions of worlds and let humans play the part of the inhabitants, intermediated by various forms of identities, robots, programs, avatars and roles. In this simulation the relationship with the human "puppeteer" is less important. What becomes relevant is the social or situational narrative, the capacity to be part in the simulation of a story. Is there a significant difference between an online avatar and an automaton?

Student B

These two readings provide wonderful views into scientific and engineering practice. Keller reviews the robotics research taking place at MIT under Rodney Brooks. Riskin reviews a moment in history (the second half of the 18th century) when scientists, engineers and inventors used machines to simulate organic processes. She proposes that this period in history shares many paradigms with the current project in artificial

intelligence and robotics research that Keller describes.

Simulation and Analogy

Riskin strikes an important distinction between simulation and analogy upon which her argument hinges. Simulations "collapse" the difference between model and modelled while analogy simply provides a more graspable description for the phenomenon being studied. For her, simulation enables give and take that allows new learning to flow in both directions while analogy implies a stable set of assumptions about one phenomenon. Simulation enables a tightly coupled exchange between technical artifacts and models for physiological processes.

Keller does not seem to share the same open-ended view of simulation though she does not provide an explicit definition in this article. At the end, she raises a concern that a self-referencing system of modeled and model leads to circularity. The robots in Brooks's lab are designed using specific developmental models. And then these same robots are used to study the correctness of those models for human development. Still, she believes that scientists can learn from other successful implementations of simulation and exploit the power of simulations to achieve a spiral (rather than a circular) movement "with a forward momentum". In our session, I would like to discuss the two definitions to simulation in the articles further.

I am also fascinated by these two takes on simulation because they raise many issues about scientists' and engineers' relationships with their practice. As a scientist Keller emphasizes the ability to move forward towards new knowledge. The actors in Riskin's history are less bound by today's categorical distinctions between science and engineering.

Models of Animacy and Intelligence

Though Riskin sees a strong parallels in attempts to simulate life between the second half of the 18th century and the second half of the 20th century there are also some striking differences. For example, organic and physiological processes were indications of life in the early automata leading up to the extreme example of the defecating duck. Even in Riskin's analysis of speech the fascination was with the organic component parts that make the complex sounds we call language possible. In Brooks's and Breazeal's robots, speech is an indication of higher order cognitive abilities and intelligence. Even though these are embedded in material structures they simulate life because of how they are interpreted by other humans to indicate intelligence.

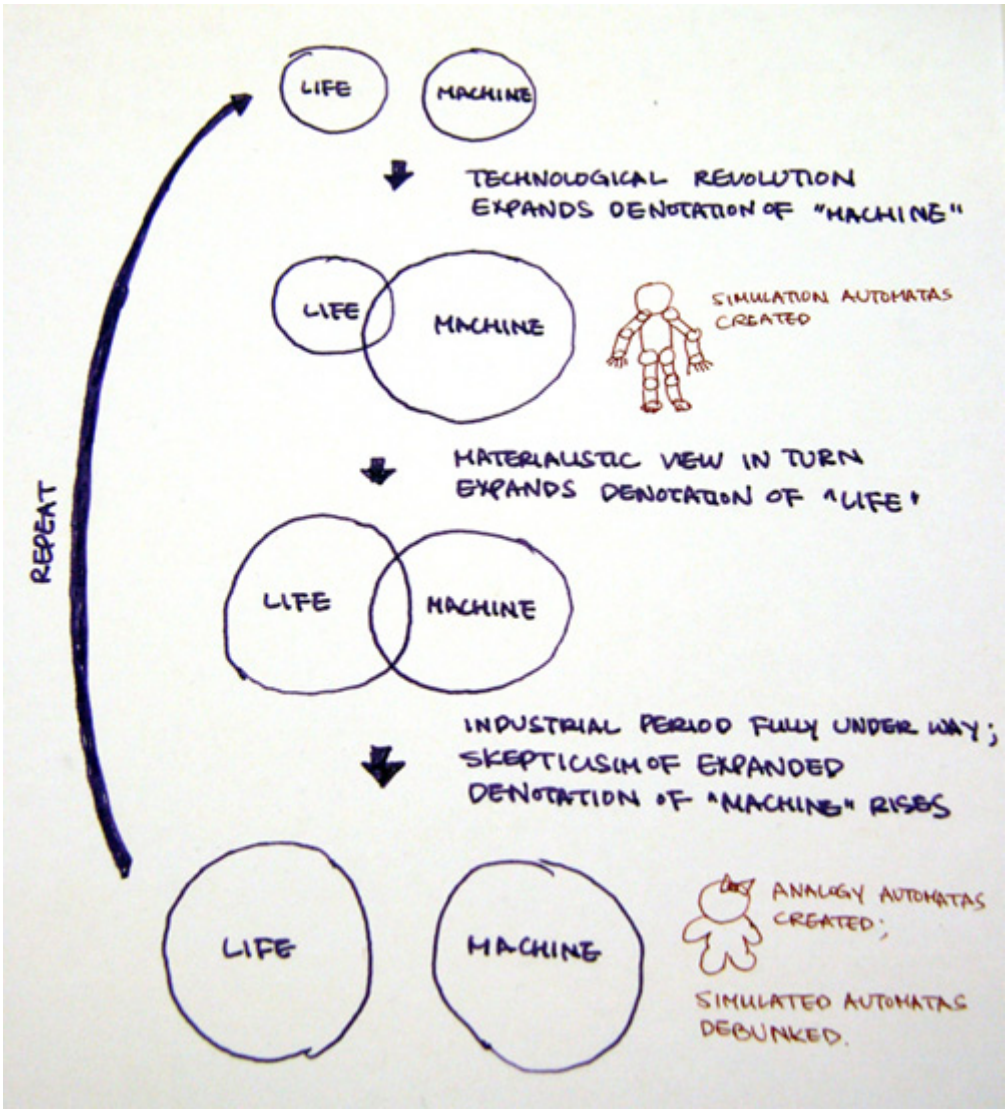
Interactivity plays a central role in establishing the robot's intelligent nature. The Jaqueet-Droz automata were not "interactive" per se while the most important aspect of the robots is their implied sociability and goal-oriented nature. Does this seductive aspect of the robots make them more "dangerous" simulations because humans around them begin to behave as if they were new beings? While the automata already imply people's willingness to recognize life-like qualities in machines they probably did not invoke the appropriate behavior in people. Today's robots are explicitly trying to invoke those

behaviors to make human-machine interaction more fluid and intuitive. Does this goal still lead to open-ended exchanges between simulation and nature? Or has the simulation simply become a means to achieving better control over technical artifacts? Or perhaps these interactions were already in place between the automata makers and their machines just like they exist between the robots and their "caretakers" as Keller calls them?

note: [You can view a movie clip of Breazeal's latest robot called Nexi here]

Student C

Here is the gist of Riskin's wetware article as I understood it:



While I find this hypothesis (in fact, dialectic and cyclic ones in general) very charming, I want to throw these two desires into the mix:

Desire 1: "You and I are both made of same things"

You are a two-year-old boy from Egypt and I am a thirty-two-year-old woman from Korea, but someday, I might adopt you or donate you a kidney: The desire to confirm the commonalities between all human beings and apply the commonalities to establish patterns, communicate, treat illness, sell to and buy from each other, and to predict outcome of a given situation assumes a mechanistic world view and supports the materialist view about life in general.

As seen in:

- Babel: Film about four interrelated sets of situations and characters taking place all over the world, based on the fundamental human emotions
- IKEA: Products with universal appeal, ergonomic virtues and economic distribution
- The Lady's Dressing Room: Jonathan Swift's 1730 poem in which the protagonist discovers his true love Celia "shits"

Desire 2: "I cannot let you control my body and mind"

If we figure out all the DNA sequences, will we start engineering babies for sex slaves?: An opposing force against the materialist view is the fear of manipulation and control. As we gain more knowledge about the way life operates, we fear the transparency will enable abusive and unjust control of life. Well guess what, you might manufacture some bodies, but there is this mysterious thing called "soul" that makes us human beings and we will never understand what it is made of. Opacity guarantees that arbitrary control and manipulation will never be fully successful.

As seen in:

- Ghost in the Shell: Manga and animation film about a post-cyberpunk society where a "Puppet Master" commits a large number of crimes through "ghost hacking", breaking into and taking control of human minds
- Dollhouse: TV series about "Dolls" who have had their personalities wiped clean so they can be imprinted with any number of new personas, including memory, muscle memory, skills, and language, for different assignments
- Christianity: God made us in his shape and that makes us special

Still reading Keller's :)

Student D

In one of the links sent around, the article’s author notes, “Cloaca is not a commentary of science and is not either meant to be useful. The artist actually refused to sell one of his machines to a diaper company that hoped to use it for tests.” If the writer correctly understands the artist’s intentions, how might we understand a device that explicitly

challenges scientific expertise even as it generates its own authority (witnessed in the value of the machine-generated excrement in the art market)? As I read Riskin's wetware article, I found myself wondering about the relationship between automata, the medicalization of the body, and taboo. Madame du Coudray's birthing machine pushes the boundary to what might be acceptable in public - deeply wrapped up in notions of sexuality, pollution, and (the medicalization of the) women's bodies. According to du Coudray's biographer, she built these machines explicitly as teaching devices to improve the sorry state of birthing in France, suggesting that her machines rendered visible a process that was previously private or taboo. Riskin's article mentions that she sent many copies of the machine that she sent to midwives around France but in fact she also traveled around the country to personally train many of them in techniques that greatly improved the safety of the childbirth. Here's a map – note the places where she, and presumably her machines, were turned away.

Riskin writes that machines in this era focus on capturing life processes, automata that was "sensitive and passionate," but Du Coudray's birthing machine maintains a much different position than the Draughtsman Lady-musician. Riskin notes, "Her breathing was what spectators most often commented upon. It made her seem not only alive, but emotional. She appeared moved by the music she played" (102). This phrasing – the attention to implicit emotion - reminded me of Media Lab graduate Kelly Dobson's work. She recently designed a robot called Omo a watermelon-sized rubber egg that 'breathes' and senses the breathing of anyone around her. Like the robots that Keller writes about, she's pushed automata a logical next point to explore the emotional relationship between people and machines. Dobson's website notes, "People and machines co-evolved as companion species." According to Dobson, she designed Omo to be therapeutic but not necessarily try to soothe. She's exploring a feedback loop between a machine and a person.
Similarly, Keller notes that research at Rodney Brooks' Cog Lab focuses on how to make a machine "an active participant in an affective and intersubjective dialogue with its caretaker." Interestingly tensions around stirring emotions with machines exist much as they did when du Coudray built her birthing machines. One of former student of the Lab has since begun building a robot specifically to help autism in young children. I t does lead me to wonder how developmental robotics will shape us – and whether any contemporary of the Draughtsman Lady-musician ever found her an affective device.

Student E

Representations and Simulations
Response to Jessica Riskin's "Eighteenth Century Wetware" and Evelyn Fox Keller's "Booting Up Baby"

Perhaps the clearest point of connection between Riskin and Fox-Keller's readings is their concern with the potential of simulations to make explicit–and actually modify--people's conception of the subject of the simulation itself. In "Eighteenth Century Wetware" Riskin shows how simulation in its current sense –a model of the natural world used for scientific inquiry- existed as an "epistemological entity" (p.98) before the word's

modern use, in late eighteenth century examples of artificial life and artificial intelligence. In the evolution of automata Riskin sees a field where the definitions of life, emotion, and intelligence are under constant negotiation. Automata, Riskin wants us to see, not merely depict life, but reveal the very way in which the notion of life is constructed by their creators. In the constantly shifting boundary of the 'automatable' Riskin sees proof of this interplay, between concepts and artifacts, in the early history of artificial life.

"Eighteenth century wetware, then, made manifest, not a reduction of animals to machinery, but a convergence in people's understanding of animals and of machines." (p.115)

Fox-Keller's "Booting Up Baby" takes a closer look to a particular AI community –mainly centered around MIT- and traces the robot's changing goals to point out what she construes to be an apparent "disturbing circularity" between the simulations and the subject of the simulation, where the development of the model takes its own dynamic and changes the model itself. This is reminiscent of Stefan Helmreich's argument in Silicon Second Nature, where it is shown how some Artificial Life researchers made explicit claims about the life-ness of their programs, pointing at the epistemological problems that arise from a discourse where the metaphorical domain of a simulation is set loose. Perhaps more generous, Fox-Keller wants us to see this projection of the simulation onto itself –and onto the subject- as a defining feature of "techno-scientific practice".

The opposition between simulations and representations present in Riskin's paper called my attention. Riskin takes Descartes's automata –which didn't mimic physiology- to exemplify a 'representational' attitude which conflicts (or contrasts at least) with the attitude of his heirs, who attempted to "collapse the distance" between automaton and subject by incorporating some mechanistic representation of physiological processes. Both are cases of mechanism, in one, the mechanism as representation, maintains the distance, the artifice becomes a pointer, an abstraction. In the other, mechanism as model –or simulation-, the artifice is taken to be alive, or at least, to provide insights into how life works. Vaucanson's duck entails a strong claim: life is mechanism.

The argument seems a bit unclear, however, when the notion of simulation as a functional model –that is, defined by its abstract structure- is later changed to involve material similarity as a proof of the "simulationness" of an artifact. Material similarity is arguably a representational, non-functional, or even cosmetic property of a simulation. The claim doesn't feel consistent with the opposition between "representation" and "simulation" that seems to be central to the paper. Are the elastic-gum veins proposed by Vaucanson more of a simulation? Or more of a representation?

Student F – Nadya Peek

I appear to have faultily read Schaffer's account of Babbage's Calculating engine instead of Fox-Keller's article, so my response is accordingly off, but regardless:

Riskin compares the relation of man to machine in the seventeenth and eighteenth century to the current relation of man to machine. The definition of machine has changed significantly over those centuries, and gone from a puppeted automaton to a computer. Riskin writes specifically of how the development of the machine has changed the comparison of life and the machine, and how its development has affected the perceived separation of mind and body.

Wetware is a term coined not so long ago to separate what is now known as hardware from biologically based systems-- brains, nerves and other systems associated with the mind. Wetware is currently viewed as separate from hardware, and those who work on one uncommonly involve themselves with the other. Previously however, it was thought that to be able to mimic the abilities of man, namely the directed use of the human body to produce actions and speech, it would be necessary to also mimic the physiology of man. The first attempts to synthesise speech were done by means of the production of either vocal tracts, made to mimic the human vocal tract in as much detail as possible. This simulation through reproduction was carried through to other human processes, and automata appeared for less communicative purposes: defecating automata, birthing automata. But also automata for more specific processes, such as the infamous non-automata, the chess-playing Turk.

When Babbage began his work on his analytical machine, he no longer attempted to reproduce the processes as they were executed in human computers. Instead he used mechanical parts to create the calculation process necessary. Nowadays, speech synthesis is in no way done by means of the recreation of the human vocal tract, although Wim Delvoye's poop machine Cloaca still attempts to model the human gastrointestinal system, but even this is not done by mimicking the shapes of the human organs. Babbage was reportedly the first man to substitute mechanical performance for an intellectual process, and thus began the divorce of what were human abilities into human and machine abilities. Babbage continued to reposition humans within the process for creating his analytical machine, and thus was also one of the causes for the development of the factory as it is known today, with the marriage of directed human labour and consistent machine.

Nowadays some machines are moving back to the recognisable realm of automata, as Cynthia Breazeal's research group at the Media lab attempts to make more and more personal and affective robots. For the functions that they envision for their robots, namely face to face interaction and discourse with humans, is it necessary that we recreate the human physiology again, because that is how we recognise emotion? Or would it be more effective to abstract the discourse from the face and create software-based systems of interaction?

Neil Gershenfeld's and Joe Jacobson's groups are both creating logic gates at the cellular level, and are currently sequencing these into cellular computers. Is now the time that hardware and wetware are rejoining?

Student G

Riskin proposed interesting phenomena that movement in A.I. has repeated twice during the last three centuries. These repetitions are framed through a series dichotomy of Analog and Simulation in eighteen century 'wetware'. Starting from the way machinist-mechanist tried to create an analogy of animal's movement (Maillard's Swan) and the way they tried to simulate human physiological quality, later on. In another framework of differentiation, Riskin also distinguished the purposes of these ancient A.I. avant-garde that: however meticulous and realistic Jaquet-Droz family's machine are, such as writer, lady-musician and draughtsman, they are basically a replica of human movement without any indication that it will actually replace part of human activities. On the other hand, the goal of a machine that result from analogy of the human body are much more obvious, namely Sebastien artificial hands for those who lost their arms. The same goes to Mme. Du Coudray 'Birthing Machine's' that can act as anatomical model to teach the midwifery.

In addition to Riskin comparison, the dichotomy then aroused again in earlier period of industrial revolution, where most industry manufacturer tried to create analogy of a certain part of body instead of simulating the whole part of the body in a single entity. More recently after the golden age, hardware technology such as Robotic Arms in mimicking arms movement and Sonar as analogy of bat hearing, are continuously expanding the practice of analogical movement, known as bio-mimicry. In medical technology, simulating human organ are became more essential and critical issue in order to achieve its functional value rather than just pursuing visual deceiver as in 18th century. As animal and human body 'mutilated' and explored through a different scientific analogy, this modern A.I. artifacts are no longer purposeless. Furthermore, Rodney Brooks arguments that software of the mind cannot be abstracted from its hardware are somehow reflecting how analogy are once again demarcated from simulation.

Yet, unlike their predecessor in 18th century where there was a rare connection of simulation and analogy products, this time, there is a vague gate in the demarcation of analogy and simulation, in which there is a controller unit connecting the two approaches using the analogy of how human brain works as well as simulating the human mind and human thinks. Further more, as one can see during the 17th to 20th timeline of how this analogy and simulation were shifted, I suspect that there is no way one can separate the quest toward Artificial Intelligence in two different movement such as analogy and simulation. Instead, analogical movements in AI development were always intending to use simulations as starting point and vice versa.

For this, I have to use a different framework in defining analogy. Antoniades in his book 'Poetic of Architecture' stated that the way designer acquire ideas from nature can be categorized in three sequences. Literal Analogy, Non-Literal Analogy and Combined Analogy. For examples, an analogy of tree can be translated by literally use the form of tree, or non-literally learn the quality that tree can provided, i.e. photosynthesis, shading, structure and other functions. In addition, a combination of literal and non-literal analogy would mimic the quality as well as the appearance of the three, for example a tree-like structure. Thus, instead of went through parallel direction, the quest of machinist and

materialist was gradually shifted back and forth in circular process, which I argue using Antoniades' classification, were dynamically changes between literal analogy and non-literal analogy. This gradual changes can be traced from the invention of mimicking duck movement, writing, speaking into today incremental experiment in humanoid technology, which is much likely close to combined analogy.

Nonetheless, Riskin's historical insight in wetware machine and Keller's optimism in humanoid robots convey at least two main reasons why one should concern of where they stand in today AI innovation. First is that every natural phenomenon including human is worth to translate either literally or non-literally in order to establish the future foundation for AI, Secondly, there should be an intense dialogue between literal and non-literal approach as a guidance toward a purposeful machine.