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VOL 17 NO 1 A collection of articles, reviews and opinion pieces that discuss and analyze the complexity of mixing things together as a process that is not necessarily undertaken in an orderly and organized manner. Wide open opportunity to discuss issues in interdisciplinary education; art, science and technology interactions; personal artistic practices; history of re-combinatory practices; hybridizations between old and new media; cultural creolization; curatorial studies and more.

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COGNITIVE LABOR, CROWDSOURCING, AND CULTURAL HISTORY OF THE MECHANIZATION OF THE MIND

by

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In November 2005, Amazon Web Services started a web-based labor market where workers from across the world can choose and complete human intelligence tasks (HITs) designed by corporate developers. Labor required for fulfilling HITs varies: finding and matching information and images, translating text, transcribing audio, tagging images, answering surveys or visiting a blog. The amount of pay for each HIT ranges from one cent to several US dollars.

Amazon's virtual workshop emulates artificial intelligence systems by replacing computing with human brainpower. This human/machine assemblage powered by an "artificial artificial intelligence" platform represents a crucial formation on a global scale as it facilitates the supply of cognitive labor needs of mainly USA based businesses by providing a worldwide workforce.

Amazon branded this service as the Mechanical Turk, borrowing one of the names of the Automaton Chess Player invented in the 18th century by Wolfgang von Kempelen as a metaphor for the kind of relationship the service establishes between the cognitive labor force and the seemingly automated complex tasks. In both cases, the performance of the workers who animate the artifice is obscured by the spectacle of the machine. Kempelen's Turk was constructed and presented in 1770 at the court of the Empress Maria Theresa of Austria. The machine gave the impression that the pipe-smoking Turk mannequin, controlled by a sophisticated mechanism under the cabinet, could play serious chess against human opponents. However, the machine was actually manipulated by Kempelen's chess master assistant who was hidden beneath the pseudo-mechanism. The Turk was exhibited for over 84 years in Europe and the Americas and attracted famous challengers such as Napoleon Bonaparte, Charles Babbage and Benjamin Franklin.

AUTOMATA, AUTONOMY, ALTERITY

Kempelen's Turk is a significant representation of the techno-mythological idea of autonomous machines as it is a "mythic distillation of technical processes and machines." [1] The Turk was not just a machine but also the language that made it possible to explicate that myth. As in every technical media, it carried the inscriptions of discursive traditions and formulations that defined its cultural system of significations. This Automaton Chess Player, for the most part, conveyed a reflection of the desire to imitate and expand the human mind, which has been the main project throughout the history of the mechanization of the mind pursued by many notable figures including Pascal, Leibniz, Babbage, Wiener and Turing. This attribute would suggest the reading of the chess playing automata as a text that is constitutive of its visual, mechanical and performative system of referents that are centered on the major philosophical debate of its time: the Cartesian mind/body duality.

Cultural ambivalence toward the Cartesian duality was the common motivation for most automata projects of the 18th century. [2] Mainly fueled by the materialist, mechanist rejection of the Cartesian separation, its critics claimed that the functions of the mind and the soul dwelled in the body, and they emerged as a result of the interactions between the parts of the human body, which was imagined as animal machinery. This mechanistic view transformed not only the cultural attitude toward living creatures, but also machines, as it suggested that machines were also living beings. The reciprocal relationship between the animation of machinery and the mechanization of life was explored through the experimental apparatus of humanoid and animal automata and popularized through the debates instigated by their public exhibition in Europe. The 18th century automata performed their role

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mostly as simulations of the anatomy and physiology of living beings. For example, one of the most prominent automata exhibited in European courts was The Writer, which was constructed with life-like materials such as leather, cork, and papier-mâché. Even its skeletal structures were designed with the assistance of a surgeon. [3] The idea behind this creation was to impart an impression of the tenderness of living things. Built by Jacquet Droz, a Swiss watchmaker, The Writer was able to inscribe any message of up to 40 characters. It once wrote Descartes' pronouncement, "I think therefore I am," continuing with "I do not think...do I therefore not exist?" [4] Kempelen's Turk, on the other hand, formulated his question with a different emphasis, "Can I (the mind) exist without the body?" To this question, it gave two answers simultaneously: "yes" and "not yet." The actual answer was "not yet," as The Turk was indeed controlled by a human operator. However, the deceptive "yes" response was still valuable as a philosophical game. This particular function of the Turk clearly mirrors Descartes' utilization of the idea of animal-machine as a philosophical war simulator. [5] As a mirror image, however, it reverses the Cartesian idea of animal as machine and transforms it into machine as animal. As a result, Kempelen's automaton constructs a full conceptual circle out of the Cartesian duality, machine as animal as machine.

The Turk's apparatus, in contrast with other automata of the 18th century, did not act like a mere clockwork but gave the impression of a self-regulating system that could counter external actions within the symbolic logic of chess. As historian of technology Otto Mayr suggests the mechanical, political and economic ideas of self-regulating systems influenced the Enlightenment ideas of liberal autonomous subjectivity and democracy, in contrast to the idea of clockwork universe, which was the political universe of autocratic feudalism. The Turk's articulation of the idea of the self-regulating system by means of the symbolic universe of the chess game was partly enabled by the cultural alterity utilized in its performance. Until the 19th century, in Europe, the term Turk was used interchangeably with Muslim, referring to the subjects of Ottoman Empire, while the Ottomans never considered themselves as Turks as the term was used to denigrate the nomadic tribes in Anatolia. On the other hand, in the European imagination, chess as the proto-war simulator was introduced and mastered by the Orientals and epitomized their military power, until the spectacular halt of the Ottoman army in the Battle of Vienna in the preceding century. Therefore, the simulation [6] of the simulator in the example of the chess-playing automaton had a double significance in the articulation of the idea of the Cartesian autonomous mind: first, by the possibility of the abstraction of the key functions of the mind from the body, and, second, by the potential of putting that into the service of European colonial powers emancipated from the perennial threat of the Oriental.

The first layer of this experimentation is related to the peculiar coupling of the concept of autonomous mind with the body of Europe's "other" that mobilizes the negating potential of the automaton behind its mask, or the cultural alterity, thus harboring the heretical attempts of rationalist ideas under the alien turban of The Turk. This trickery indeed has its own history. Since the introduction of Byzantine and Muslim clocks and automata during the medieval period and until early modernity, the European conception of oriental automata functioned as a composite alterity by combining the unknown world of automata with the unknown world of the Oriental. [7]

Medieval Christian theology utilized this association in order to symbolically annihilate Islam by assigning the religion and its subjects to the "mindless" mechanical world of gears. [8] However, this connection also became a secure interface for the investigation of the

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pre-modern ontological dichotomies as they were projected onto the outer margins of the European cultural universe. [9] [10] This projection provided a fertile conceptual ecology that helped sustain the foundational ontological dualities such as known/unknown, sacred/profane, natural/unnatural, moral/immoral, human/inhuman or life/death, but without corrupting their separate lines of categorical contestations.

Similarly, Kempelen's chess-playing automaton and its mysterious source of mind power carried varying meanings. Mainly, the ontological alterity of The Turk for its credulous audience operated between two opposite ends, the mathematical and the metaphysical explanations of its intelligence. Some members of the unsuspecting audience such as "One old lady, in particular, who had not forgotten the tales she had been told in her youth...went and hid herself in a window seat, as distant as she could from the evil spirit, which she firmly believed possessed the machine." [11] On the other hand, the idea that this spirit may as well be a mechanical operator was already among probable explanations. The 17th century saw Leibniz's proposal of a universal symbolic language or algebra of thought. In fact, since the expansion of the commerce in Leibniz's time there was a search for a universal language that would allow European traders to communicate with the people in the new colonies. Lebniz's universal language could be manipulated by a logical calculation framework that was called calculus ratiocinator; the precursor model of modern computing. Chess is a perfect example for such symbolic systems, and when

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The Turk spoke the language of the symbolic via chess, it entered "the world of the machine." [12]

Not surprisingly, the chess-playing automaton faced the first major challenge to its coveted secret of modus operandi in its encounter with a real calculating machine. Edgar Alan Poe argued that the chess-playing automaton could not operate without the manipulation of a human agent, based on a thorough comparison of Charles Babbage's calculating machines with The Turk's performance. Poe concluded that "(t)here is then no analogy whatever between the operations of the Chess-Player, and those of the calculating machine of Mr. Babbage, and if we choose to call the former a "pure machine" we must be prepared to admit that it is, beyond all comparison, the most wonderful of the inventions of mankind."

Poe's rejection of the possibility of a "pure machine" enabled him to imagine that the solution to this puzzle included a very particular type of human machine assemblage, which was also a direct challenge to the idea of autonomous subject. As James Berkley argues, Poe's "vision of subjectivity hence implied a quite different relationship between organism and environment than had the subject of liberal humanism" [13] and, hinted at "the possibility of transcending the conventional limits of the individualized human subject." [14] Berkley's argument suggests that becoming post human is a function of a mimetic behavior; however, he seems to ignore the role of the Orientalist depiction of the Turk as the interface of this mimetic transfer. Nevertheless, Poe's essay is significant as a reflection on a prominent theme in the American psyche, especially with the evocation of terror and anxiety caused by the emergence of post human embodiment and subjectivity.

STERILE ARTIFICE

The techno-mythical object that replaced mechanical automata in the 20th century is based on a different formulation of the human machine assemblage. Robots, in contrast to automata, do not perform by means of their outside appearance but mainly by their utilitarian functions in accordance with their role in the industry for highly automatized production conditions. [15] Through the concept of robot, the automation has become a social and economic idea, because the automatic machines are designed to imitate or replace human functions. The artificial intelligence project has been a significant part of this project but has not been very successful in replicating a variety of tasks that can easily be completed by humans. Amazon's Mechanical Turk is a product of a recent instance of such failure.

After several futile and expensive attempts of the artificial intelligence (AI) programs enlisted by Amazon.com to find duplicate product pages on their website, the project engineers turned to humans to work behind computers. This was the first motivation to build Mechanical Turk (MTurk) before opening it up to private developers in return for a commission from each completed Human Intelligence Task.

Amazon's virtual workshop maintains a transient, task-based and limited-time relationship between the worker and the requester and does not support a direct communication between the parties. Approximately half of the workers, or "Turkers", are from the USA with the other half from over 100 different countries. A majority of the non-USA Turkers are from India, representing 33% of the overall workforce. [16]

The Turker community seems to have varied responses to the claims of exploitation through this crowdsourcing system. Some USA based Turkers oppose those claims as they state that their interest in MTurk is solely motivated by the novelty of the experience.

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MTurk has recently gained some attention in the USA media, particularly after the economic crisis, through the stories of people who use MTurk in order to replace income from a recent unemployment. Although the kind of income that could be produced in MTurk may not entirely compensate for an income lost from a traditional full-time job, many Turkers still see it as a convenient and flexible work that could pay $8-$15 a day. For example, Tamara Wilhite, a technical writer and science fiction novelist living near Dallas, Texas, started working on MTurk after her husband lost his job. In a radio interview conducted by Marketplace (produced by American Public Media), she says MTurk "(...) is very useful as a supplemental income. That's something that I do after I put my own children to bed, who are 3 and 6 years old. I would not use this as a replacement to a job." [17] Mark King (Manchester, NY) also uses MTurk for an extra income while looking for a full-time job in construction: "Most people sit and play around on the computer, play different games all day long, and they get nothing for it. At least this, you get a little bit in return." [18]

On the other hand, workers from countries such as India or China appear to be mostly interested in MTurk as a primary income source, although some of them find MTurk undervalues their labor. For example, Rajesh Mago, a computer freelancer from New Delhi criticizes MTurk in his blog as follows: "...they call the assignments posted by their requester as HITs (Human Intelligence Tasks). So, is the human intelligence worth cents only? LOL! I know no one is forcing anyone to do these assignments but yet it doesn't justify the usage word "intelligence"– a mockery of human brain." [19]

Mago states that he completed more than 10,000 HITs working for a few hours a day for MTurk through 2008. He earned $572.62. His HIT approval rate was 98.2%; in other words, about 2% of his completed tasks were rejected by the requesters. According to Mago, requesters do not give any credible reason for their rejection. In addition, even the payments for accepted works are most of the time delayed, a matter that appears to affect many other Indian Turkers. Rajesh Mago does not work for MTurk anymore and, in retrospect, he concludes "MTurking was kind of addictive as I always challenged myself to test and experiment and work for low-paying HITs thinking that I will be able to make decent money. But, MTurk requesters are pretty smart; they had done more R&D than me and were sure that they would get the work done at the lowest rates or for free!"

CROWDSOURCING AS AN UNREGULATED GLOBAL LABOR MARKET

Mago's case highlights the unregulated nature of the emerging global cognitive labor market and evokes the Gastarbeiter (guest worker) program of the economic wonder years of postwar Germany in terms of its interest in temporary global workforce. The German Gastarbeiter program has been a prominent model for establishing immigration without rights legislative system and it has recently inspired USA lawmakers during the fiery political debate on immigrant worker program (H-1 visa) for the USA Information Technology (IT) industry. [20] The German Gastarbeiter program initially allowed only male workers from Yugoslavia, Greece, Spain and Turkey on a temporary immigration status. These men were required to work up to 80 hours a week, supplying the labor needs of the booming post-war German industry at a much lower minimum wage than that of the domestic labor, exploited in a state of exception outside of the normal legislations, rights and union protections.

A similar kind of state of exception through the formulation of an unregulated labor market as a main

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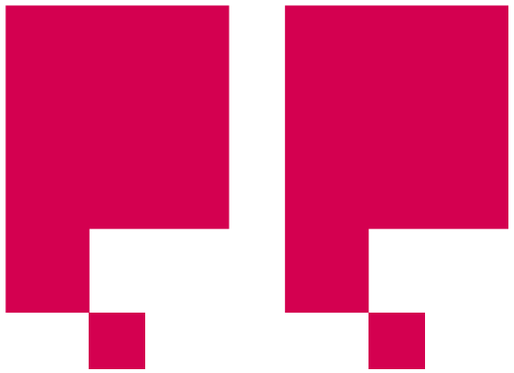
constituent of the network economy is currently under way for cognitive labor, enabled by the process of disembodiment of information, which is a creation of postwar cybernetics. One of the main products of the cybernetic discourse is the decontextualized construction of information with significant presumptions that can perhaps be seen as ideological, for example, an Anglo-American preference for digital information over context dependent analog information. [21] Carolyn Marvin has suggested that this preference mainly means an "ideological call for born-again unity in a clean and rigidly uniform world, a world more like ours than anyone else's." Precisely because of such ideological implications, the network Gastarbeiters has become much more attractive to the neoliberal agenda within the context of the post 9/11 risk society and its fear rhetoric. As a result, the crowdsourcing apparatus, I would argue, clearly presents itself as an immediate solution with its sterile cyber sweatshop that filters cognitive labor from the culturally, politically and biologically contaminated bodies of the global south.

The MTurk outsourcing model is also an expression of the global labor market as a platform for determining the value of standardized cognitive tasks. However, some of these tasks create value only when they are fulfilled by a multitude of people, such as surveys where the statistical accuracy requires a certain level



Crowdsourcing reverses this relationship if we maintain the object/subject dichotomy; the machine becomes the processing center of the system extending toward individual human minds.

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of variety in the responses of participants. These two factors, the standardization of cognitive tasks and their significance as collective data, are crucial for the crowdsourcing paradigm as it transforms the consideration of the value of a task by the skill level of individual workers into value created by the variance produced in the kind of solutions within a particular cognitive task. From the requester's perspective, the uniformity of responses is not a desired quality and something to be avoided. This aspect of crowdsourcing concurs with the ideological premise of digital information with its emphasis on sterile and uniform environment because MTurk maintains a lab like sterility of the requester control room by means of rigidly defined algorithmic tasks designed to valorize the mapping of the variations of the paths taken in that algorithmic labyrinth. This process transforms cultural diversity into a factor that enriches the data and creates the core value of the mapped information, i.e., information as described by the anthropologist Gregory Bateson, "the difference that makes the difference." [22] Bateson's argument in his influential work, Steps to an Ecology of Mind, was crucial in reformulating the Cartesian mind-body duality into an embodied cognition framework. Bateson's view has an emphasis on the tools we use as extensions of our bodies and thus our cognitive processes and establishes the mind as the innermost core of the cognitive process and the body and the surrounding artifacts as the externalities that define the demarcation lines. Crowdsourcing reverses this relationship if we maintain the object/subject dichotomy; the machine becomes the processing center of the system extending toward individual human minds.

As a result of this integration, workers of the apparatus not only produce information for the desired algorithm, but are, in turn, produced by the algorithm, disciplined by its process flows into a particular mode of problem solving that eventually determines the efficiency of their labor and thus their livelihood. We also need to consider the fact that the processes that inform MTurkers' tasks are the culture producing algorithms that feeds the production and consumption cycle of the networked economy. However, the inherent effect of this application is to create neatly classified, systematized bits of culture. This is the source of the innermost paradox of the system, a gradual reduction of the difference that defines the economic value of its products by approximating the unpredictable variety of tastes, expressions, metaphors and conceptual affinities into singular ontologies. Although this convergence into a singular ontology is a reflection of one of the main goals of the MTurk system, that is, teaching machines to accomplish tasks the way humans do, MTurk apparatus also teaches humans how to think within an algorithm. The net effect of this would be the approximation of the natural and the algorithmic languages into a homogenous third space. One way to consider this third space would be in terms of the Marxian concept of alienation.

MTurk divides cognitive tasks into discrete pieces so that the completion of tasks are not dependent on the cooperation of the workers themselves, but organized from the outside by the interaction modules that are compatible with MTurk's operation platform. By the elimination of the cooperation aspect of the cognitive work, the labor power becomes a "variable capital" in the Marxian sense because the labor power needs the activation and organization of the capital in order to create value.

I think the atomization of the cognitive labor environment is only one aspect of the alienation that needs to be considered in the case of MTurk. Another effect of MTurk's particular cognitive task flow design is its algorithmic nature that could be considered in relation to the externalization of reasoning through mental representations and operations taking place on the

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human/machine interface. Since the algorithmic language that is used to define human intelligence tasks operates on the interface of this intelligence translation process we also witness the extension of the protocol, the paradigm of the network control apparatus into human cognitive processes.

CONCLUDING REMARKS

If the network is the assembly line of cognitive labor, as suggested by Hardt and Negri, then the Mechanical Turk is its model labor market. As the network shifts the object of control from the bodies to the collective mind, the Mechanical Turk achieves this objective by foreclosing the collective cultural production to cognitive workers by atomizing them in the assembly line and by confining them to the algorithmic language of the machine.

The two aspects of alienation designed into MTurk clearly undermine the cooperative aspect of immaterial labor as claimed by Tiziana Terranova, Hardt and Negri [23] and many others. However, there have been very interesting projects addressing the lack of cooperative action on MTurk. For example, Irani and Silberman's Turkopticon is a program that aggregates the feedbacks of workers on the tasks and fairness of requesters and ranks them based on a scoring system. TurkersTalk is another MTurk talkback apparatus and a very promising platform for cooperation which is hosted by Talkshoe, an online community call service that provides tools for groups of people to interact by audio recordings, chats and video conferencing. ■

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    And then to have a wretched puling fool,
    A whining mammet, in her fortune's tender,
    To answer 'I'll not wed; I cannot love,
    I am too young; I pray you, pardon me.–

    (*Romeo and Juliet* Act 3 scene 5, lines 184–188) William Shakespeare, *Romeo and Juliet*, (Murrietta, CA: Classic Books Company, 2001).
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14. Ibid., 358.
15. For the playwright, Karel Capek who popularized the concept in 1920, the Czech word *robota*, which means drudgery, serf labor or servitude, was more preferable over the word *labori*, or worker. Robot is a cognate word with *arbeiter*, the German word for worker. Their Indo-European root *Orbh* means deprived of free status or bereft of father.
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