Artificial Intelligence, or the Demonization of Mental Labor

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The hand is the cutting edge of the mind.
— Jacob Bronowski.[1]

To make machines look intelligent it was necessary that the sources of their power, the labor force which surrounded and ran them, be rendered invisible.
— Simon Schaffer.[2]

Daemonic processes are slaves that work tirelessly and, like all slaves, define and challenge the position of the master.
— Wendy Chun.[3]

1. Driving on Artificial Neural Highways

At the end of the twentieth century, nobody would have ever thought to call a truck driver a cognitive worker. At the beginning of the twenty-first century, the development of self-driving vehicles based on machine learning imposes a new understanding of manual skills such as driving, revealing that the most valuable component of work in general has never been just manual, but social and cognitive. The rise of Artificial Intelligence is all but disclosing its past genealogy as a long process of extraction, alienation and demonization of mental labor out of manual labor—realizing less the old myth to replicate the human mind than the new governance of labor and its *political division.*

A self-driving car automates all the micro-decisions that a driver must take on a busy road. Its artificial neural networks *learn*—that is, *imitate*—the human correlation between the visual perception of the road scenario and the mechanical actions of vehicle control (steering, accelerating, stopping) within the framework of ethical decisions to be taken in a few milliseconds in case of danger detection (for the safety of persons both inside and outside the vehicle). Nevertheless, driving remains essentially a social activity, which follows both codified rules (with legal constraints) and spontaneous ones, including a tacit "cultural code" according to which any driver is supposed to interact within a specific locale. Driving in Mumbai—it has been said many times—is not the same as driving in Oslo.

Three aspects of automation are illuminated here. First, machine intelligence grows imitating human activities at large: that is, an extended division of labor that encompasses codified rules as much as social conventions. Second, the most difficult components to automate by algorithms are the forms of spontaneous and tacit knowledge. Third, the most valuable part of work is cognitive and creative, since it can manage such spontaneous rules and invent

new ones in order to fix problems and face unexpected scenarios. Eventually, Artificial Intelligence comes to question old-school political thought and its controversial opposition of manual labor against mental labor. All work is both mental and manual; all work is *neural*.

2. The Division of Mind and Hand

The first actual "division of labor" was the separation of hand from mind, i.e. of manual from mental labor, that emerged from the workshops of the Renaissance to be fully severed in the greasy dungeons of the industrial factories. Here workers became prostheses of "a vast automaton, composed of various mechanical and intellectual organs, acting in uninterrupted concert for the production of a common object, all of them being subordinate to a self-regulated moving force" (as Marx himself recorded quoting Andrew Ure).[4] This was a long process of capture of collective knowledge by state and economic apparatuses, by both institutions of knowledge and technologies of knowledge, that eventually turned mental labor into a *Geist*—a ghost, more than a spirit, that political theory still struggles to grasp. Extorted from workers, mental labor assumed the nature of a half-visible demon—an issue to be exorcized by canonical Marxism as much as by managerial capitalism.

The distinction of mind and hand is not only typical of modern societies, it has belonged to Western culture since the opposition of *episteme* and *techne* in Ancient Greece, which later became functional to define social hierarchies: "Self-appointed mental workers, such as philosophers, scientists, policy-makers and bureaucrats, then as now, claimed and constructed the dominion of their 'understanding' over hand-workers and their crafts. They relied on the mutual reinforcement of coercive rhetoric and brutal deed. The easy acceptance of their categories has left us with a historical map shaped by oppositional and hierarchically ordered pairs: scholar/artisan, science/technology, pure/applied and theory/practice."[5]

The expression "mindful hand" (Roberts and Schaffer) celebrates the ingenuity of labor beyond the opposition of theory and practice, yet not in order to romanticize craftsmanship.[6] Rather than cultivating the provincial "heroism"

of craftsmen in a reactionary way, the *mindful hand* stresses the convivial and experimental dimension of any act of design and invention. Also, the "heroes" of the so-called Scientific Revolution, such as Galileo, learnt more in clandestine workshops, secret libraries, and nomadic classrooms than in universities.[7]

3. The Automation of Mental Labor

The separation of the *mindful hand* during the Industrial Revolution prepared, even at the time, the terrain for the design of the first *machine intelligence*: that is, its parasitic Doppelgänger. In the first page of his book *On the Economy of Machinery and Manufactures* (that was published in 1832 and influenced Marx's theory of machine), Charles Babbage admits it was the idea of the Calculating Engine that pushed him to study the automation of manual labor in factories and workshops across England and Europe.[8] As the highest form of the division of labor, computation watched over the unfolding of the Industrial Revolution from the outset.

On the Economy of Machinery and Manufactures contains an interesting and forgotten chapter entitled "On the Division of Mental Labour," which is about the analysis and decomposition of manual calculation into small modular steps in order to mechanize them. It should be remembered, by the way, that the word "computer" originally denoted a human being whose task was to carry out repetitive calculations by hand. The analysis of manual calculation was translated by Babbage into a mechanical algorithm in which the rotation of cylindrical clocks in a discrete fashion replaces the movements of hand and pencil on a piece of paper. After being used to measure labor time and its productivity, here the clock hand comes to automate the human hand itself.

The implementation of logarithmic tables into rotating cylinders is the intuition behind Babbage's design for the Difference Engine and Analytical Engine calculators—prototypes of modern "non-human" computers. Babbage's "machines were organised like factories of numbers" for "the fabrication and exhibition of reliable numbers"—that is, of large numerical tables free of human errors that were used in astronomy and were crucial to navigation.[9] Babbage is always remembered as the pioneer of modern computation, yet the intimate

relation of such algorithmic procedures with the industrial milieu and its production of knowledge and “intelligence” is striking.

The word “intelligence” had a different meaning, however, in nineteenth-century Britain, for it meant both knowledge of the productive process and surveillance of labor. In this respect Babbage is the very pioneer of the cybernetic factory, as he was pursuing the mechanization of management via computation. “Babbage's new science of operations, an algebra of machine analysis designed to describe the engines' work, was proposed as a discipline of complete generality both within the surveillance of mental labour and in the manufacture of exact values. Initially designed to ‘see at a glance what every moving piece in the machinery was doing at each instant of time’, this panoptic notation was proffered as a technology of universal management.”[10]

4. The Algorithm of the General Intellect

What people name “Artificial Intelligence” is a long historical process of crystallization of social conventions, collective knowledge, personal data and individual labor into privatized general algorithms used for the automation of complex tasks: from driving to translation; from object recognition to music composition. As Babbage framed the industrial machine as an apparatus that imitates and replaces a previous division of labor in order to amplify it, likewise Artificial Intelligence can be described as an apparatus that imitates and replaces a previous division of mental and social labor. The growth of Artificial Intelligence follows the same diagram that historians of science (such as Schaffer) identified in the formation of industrial science out of mundane places such as workshops and informal education. For this reason also, a more accurate term than Artificial Intelligence would be that of machine learning.

Today all AI applications are based on machine-learning algorithms that extract patterns out of data according to the logic form of statistical distribution.[11] Machine-learning systems are not “intelligent” at all. They are just the most

effective algorithms for *information compression* ever designed, as they turn large datasets into a few logical patterns.[12]

Machine learning is composed by two basic elements: vast training Data that are extracted from the world, and statistical Models that compress such world data in operative patterns. The training Data are spontaneously provided by social behaviors (anonymously tracking mobile phones across the city, for instance) or manually crafted by screen labor that is outsourced to the Global South via platforms such as Amazon Mechanical Turk (old colonial relations are self-evident in the AI business, too). Machine learning verticalizes the labor that is sedimented in collective Data and distills it into statistical Models in order to control new machines and manage society. In this sense, machine learning is the algorithmic incarnation of Marx's idea of the general intellect outside the factory: that is, the accumulation of science, scientific labor, and collective intelligence into machine design and social control as a main productive force. According to the scheme of machine learning qua general intellect, labor is represented by Data, and collective intelligence by statistical Models that turn labor data into computational capital.[13]

As much as the industrial machine grew out of the experiments, know-how, and skilled labor of workers, engineers, and craftsman, the statistical Models of Artificial Intelligence grows out of the Data produced by social conventions, collective knowledge, personal data, and individual labor.[14] Artificial Intelligence is the ultimate transfiguration of mental labor into a collective demon working tirelessly and invisibly in the backroom of capital.

Notes

[1] Jacob Bronowski, *The Ascent of Man* (London: Little, Brown & Co., 1975), p. 116.
[2] Simon Schaffer, "Babbage's intelligence: Calculating Engines and the Factory System," *Critical Inquiry* 21.1 (1994), p. 204.
[3] Wendy Chun, "On Sourcery, or Code as Fetish," *Configurations* 16.3 (2008).
[4] Karl Marx, *Das Kapital. Kritik der politischen Ökonomie*, vol. 1 (Hamburg: Meissner, 1867) [translated as: *Capital: A Critique of Political Economy*, vol. 1 (London: Penguin, 1981), p. 544].
[5] Lissa Roberts, Simon Schaffer, and Peter Dear, eds., *The Mindful Hand. Inquiry and Invention from the Late Renaissance to Early Industrialisation* (*History of Science and Scholarship in the Netherlands,* vol. 9, 2007), p. xiv; see also p. xiii.
[6] As done, for example, by Peter Sloterdijk with reactionary poses: "Whoever has no interest in craftsmen should therefore be equally silent about heroes." In: Peter Sloterdijk, *You Must Change Your Life* (London: John Wiley & Sons, 2014), p. 292.
[7] "Galileo's relations to technology, to military engineering, and the artist-engineers are often underrated. When he studied medicine at the University of Pisa, mathematics was not taught there at all. He learned mathematics privately from Ostilie Ricci who was a teacher of the Accademia del Disegno, a school for artists and artist-engineers. As a young professor of mathematics and astronomy at the University of Padua, he lectured privately on mechanics and engineering and established working-rooms in his private house where craftsmen were his assistants—the very first university-laboratory. He started his researches with studies on pumps, on the regulation of rivers, and on the construction of fortresses. His first printed publication describes a new measuring tool for military purposes. His detection of the law of falling bodies is intimately connected with the needs of gunnery. The shape of the curve of projection had often been discussed by the gunners of his time. Galileo was the first one who was able to solve this problem. From 1610 onwards he wrote only in Italian, no longer in Latin. This also shows his relations to the lower ranks of society, his aversion to university-scholars and humanists." In: Edgar Zilsel, *The Social Origins of Modern Science* (History of Philosophy of Science, Dordrecht: Springer, 2002), p. 5.
[8] Charles Babbage, *On the Economy of Machinery and Manufactures* (London: Charles Knight, 1832), p. iii.
[9] Simon Schaffer, "Babbage's Intelligence: Calculating Engines and the Factory System," *Critical Inquiry* 21.1 (1994), p. 276.
[10] Ibid., p. 204.
[11] Matteo Pasquinelli, "Machines that Morph Logic: Neural Networks and the Distorted Automation of Intelligence as Statistical Inference," *Glass Bead*, Site 1 (2017).
[12] The steep ratio of such information compression measures the inhuman quality of machine intelligence, which means, by the way, also the percentage of errors that affects even the most efficient algorithms (with fatal outcomes if they are used for the automation of ethical tasks such as driving).
[13] Matteo Pasquinelli, "Italian Operaismo and the Information Machine," *Theory, Culture & Society*, vol. 32 (3) (2015).
[14] The debt of machine intelligence to personal data is clear and it is opening a new front of struggle for privacy yet to be understood and politicized.