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AI as a Measure of Human Intelligence

Professor of Philosophy of Science at the University of Venice, Matteo Pasquinelli is the author of an important book on Artificial Intelligence. In this article, the author of *The Eye of the Master: A Social History of Artificial Intelligence* (2023) begins with the question: 'Is AI truly intelligent?' in order to define what Artificial Intelligence consists of and what its limits are.

AI AS A MEASURE OF HUMAN INTELLIGENCE

Matteo Pasquinelli

The philosopher Alfred North Whitehead[1] once observed: 'Civilisation advances by extending the number of important operations we can perform without thinking of them.' Whitehead argued that automating simpler, repetitive tasks frees up mental space for more complex thinking, facilitating the progress of human intellect and civilisation. Although often misunderstood and taken out of context, this observation faces a revealing counterpoint in the age of AI. While it is true that AI is automating and taking control of many tasks, diminishing our awareness of tasks that once required active thinking (from translating texts to handling phone calls and even programming), it also makes us more aware of our limitations and forces us to reflect on our current value in the job market. The question that arises is no longer the science fiction-like 'Is Artificial Intelligence real intelligence?', but the more prosaic 'Will AI put me out of a job?' We find ourselves in a historical dialectic that is merciless to human self-esteem: as AI progresses, we grow not less but more aware of the abilities that distinguish us from machines. Rather than thinking less, as Whitehead suggested, we end up thinking a little too much about which of our skills will be mapped, measured and mechanised by the algorithm of a technological monopoly. Techno-enthusiasts see this process of automation as a virtuous process towards social emancipation. This essay does not speculate on the implications of possible mass automation, but rather on an aspect that is often overlooked, namely the role of technology as an implicit metric of humanity.

AI is not a manifestation of superintelligence, as certain techno-enthusiast and techno-apocalyptic popular beliefs would claim.[2] On the contrary, it represents a mechanisation *of the average intelligence* of a given society. Mathematically speaking, AI works on the basis of a statistical representation (admittedly very extensive, but still statistical) of human culture as codified in the form of digital archives (so-called training datasets). AI systems such as ChatGPT process enormous amounts of this data – text, images and more – and then generate predictions and classifications based on the average values of these digital archives of collective knowledge. In a sense, it is a statistical model of the average human being, purged of extremes and anomalous behaviour. The inherent *power of normalisation* in AI has already been discussed by many scholars, who have recalled the origins of machine learning in the various calculation techniques of early statistics (correlation, standard deviation, logistic regression, factor analysis, etc.), emphasising the discriminatory use that was often made of these calculations in controlling social behaviour in the late 19th century.[3] The normalising vocation of early statistics is also reflected and recognised in contemporary AI.

Whereas we might think that Silicon Valley computer engineers are testing AI to see if it is intelligent or not, in a dramatic reversal, it is actually AI that is being established as a collective test of our intelligence, our work skills and our standards of behaviour. As a statistical average and monopoly of the same, AI highlights what skills we possess or no longer possess as subjects in a highly

1. Alfred North Whitehead, *An Introduction to Mathematics*, Cambridge: Cambridge University Press, 1911.
2. For techno-apocalyptic speculations, see: Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies*, Oxford: Oxford University Press, 2016.
3. See Wendy Hui Kyong Chun, *Discriminating Data: Correlation, Neighborhoods, and The New Politics of Recognition*, Cambridge, MA: MIT Press, 2024. It was, of course, Michel Foucault who began this reflection on the power of normalisation (of statistics as well as medical sciences) that emerged in late modernity, partially replacing disciplinary power. See: Leonard Lawlor, John Nale (eds.) 'Normalisation', in *The Cambridge Foucault Lexicon*, Cambridge: Cambridge University Press, 2014, pp. 315-21.

automated society. AI ultimately presents itself as a reverse mirror, an inverted identity, of our social roles: what it is capable of is precisely what we no longer consider to be art or a mark of human distinction. AI, therefore, serves not only as a tool for the automation of work, but also as a yardstick, a *metric* of the collective workforce. AI is an implicit judgement of human skills, a managerial vision of culture in general, and its role in society is marked by this *normalising power*, which, following Michel Foucault, we could say has passed from the scientific institutions of modern nation states to the technological monopolies of the present.

THE UNIT OF MEASUREMENT FOR GENERAL INTELLECT

The quantification of the world is a central practice of the Western tradition: not only for the birth of the modern scientific spirit, but above all for the developments of colonialism and capitalism, when natural resources and workers (including slaves) were meticulously measured in order to be exploited and distributed along trade routes. In the post-industrial era, this process of measurement shifted from natural resources and manual labour to mental labour and, finally, to labour as a universal capacity, to social cooperation as a productive force. Several economists have highlighted the role of knowledge in the economy, what Ricardian socialists and more recently workerists have called the *general intellect*.[4] Although knowledge has always played an economic role, even in ancient civilisations (needless to say), and despite the acceleration of this process more recently with the rise of information technologies, AI is a further step in the development of knowledge technologies. *For the first time*, AI represents a mechanisation of general intellect as a collective form and a monopoly of this same collective dimension on a global scale. What truly makes AI superhuman is that it embodies culture as a collective actor (as a *Gesamtarbeiter*, or 'general worker', as Marx would say).

As noted, AI does not merely automate an extraordinary number of tasks, it also plays an implicit and explicit role in the measurement of these tasks. To be precise, it is establishing itself as an *analytical metric* for evaluating collective labour and intellect. To understand how AI operates as a metric, we should revisit the principles that gave rise to modern computing. The path to AI began with the work of American mathematician Claude Shannon, whose invention of binary computation and information theory laid the foundation

4. Matteo Pasquinelli, 'On the Origins of Marx's General Intellect', *Radical Philosophy*, 206, Winter 2019, pp. 43-56.

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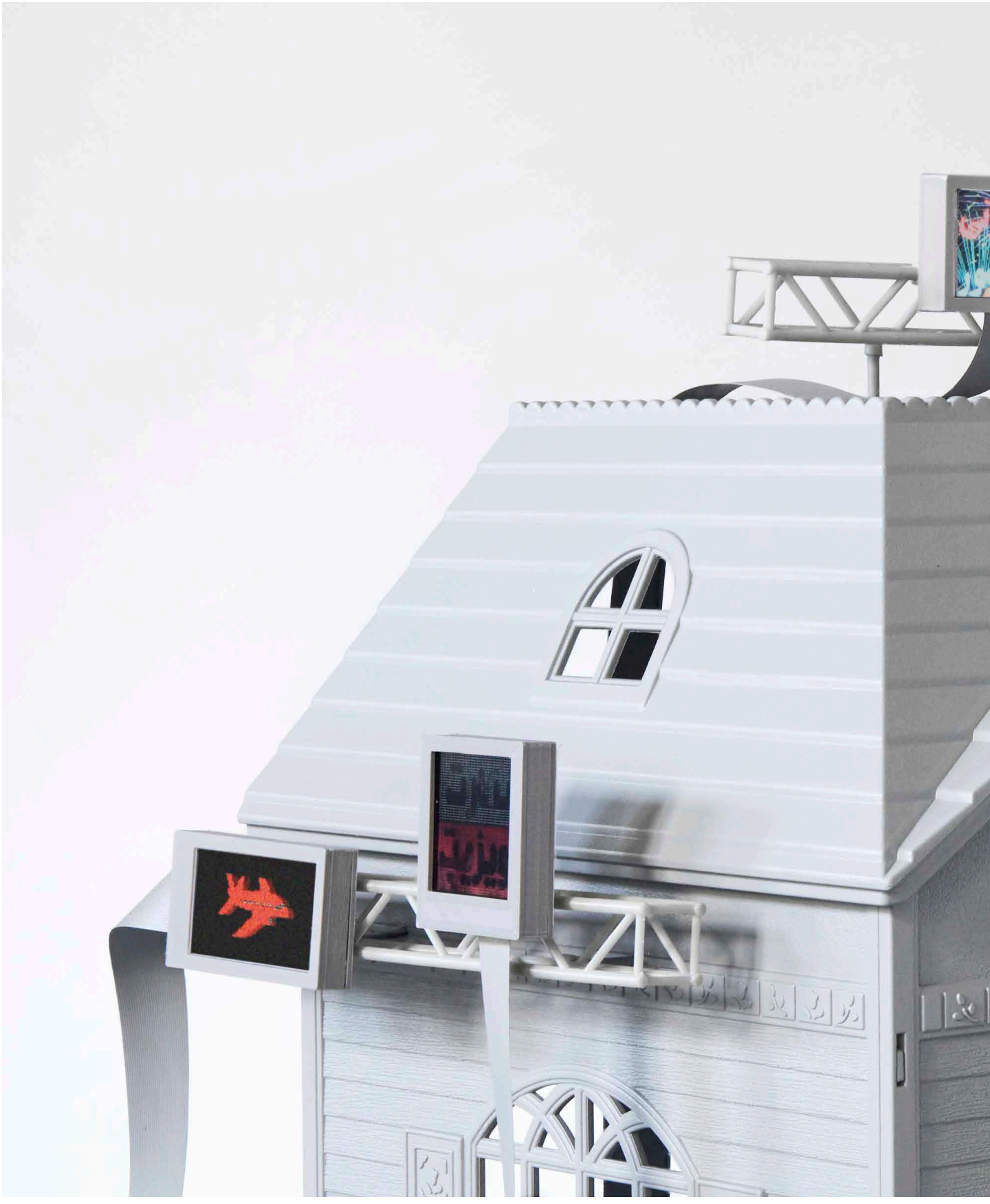


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for the digital revolution beginning in the 1950s. Shannon's theory of computation demonstrated that electromechanical devices such as relays (and later microchips) could perfectly implement Boolean logic, while his theory of information described how to measure information statistically and transmit it with minimal signal loss. Shannon's ideas helped translate mathematical logic into binary logic, and to later digitise the main forms of mass culture and communication. AI contributes something different to the digitisation process: *the automation of classification*, or the ability to recognise and interpret signs and objects.

The current form of AI, deep learning, emerged from research on artificial neural networks in the 1950s, known as connectionism, a technique for pattern recognition or image classification.[5] Frank Rosenblatt's pioneering Perceptron neural network was designed to associate a category (a class, a name) with a statistical configuration of parameters representing, for example, the pixels of a letter. Today, Artificial Intelligence models work in a similar way, associating a description (even a complex one) with a statistical model of data. Even a classification algorithm such as Perceptron was an innovative artefact in the field of AI: it did not aim to automate intelligence in the form of *logical reasoning* (as in the symbolic AI project launched at Dartmouth College in 1956), but rather in the form of *contextual knowledge* that is part of the cultural heritage of a given place and period (the fact that we associate the letter A with a certain sound and not another, the term 'tree' with one class of plants and not another, and so on). The recognition of images or patterns of various kinds (textual, auditory, etc.) falls within a very specific type of mental work: it is a profoundly social act that mobilises, simultaneously, both tacit and explicit knowledge, traditional and scientific taxonomies, vernacular and institutional grammars – in short, the production of knowledge in general as a historical and often conflictual process. In this sense, today's AI systems are *interpretative machines* of a statistical nature and not rigid *logical machines*. This is perhaps the most interesting aspect of current AI and has less to do with the *internal logic* of machine intelligence than with an *external logic*, with the association of its output with a convention that establishes the meaning of an image or other symbol in a given culture. The key feature of current AI models is that they record external rules, i.e. social conventions. Their 'intelligence' is *sociomorphic*, not biomorphic or mathematical.

The association of a cultural category with a statistical data model is fairly intuitive to understand in the case of image recognition, but a little more difficult in the case of large language models (LLMs). At their core, these AI systems map

5. See Matteo Pasquinelli, *The Eye of the Master: A Social History of Artificial Intelligence*, London: Verso, 2023, Ch. 7.

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the relationship between a complex text and its description (which can also be used as a prompt, for example), both represented as vectors in a multidimensional data space. This complex mapping technique between topology and linguistics has made it possible to automate tasks that once seemed impossible to automate, such as translation, synthesis and text editing.

In large language models, one could say that the *unit of measurement* of intelligence (as a form of classification) is the relationship between a simple sign (a name, a category, an abstract concept) and a multidimensional data space representing a much more complex similar sign.[6] This unit of measurement is not only a driver of automation but also, of course, the basis for an *analytical metric* of human capabilities – of cultural heritage as much as individual skills, and of cultural heritage itself as an archive of individual skills – because the classification logic inherent in large language models is also an implicit measure of right and wrong categories, good and bad interpretations, and mental work understood as categorisation work. It could be argued that every classification algorithm (classifier) is a unit of measurement of collective knowledge and that a vast assembly of such classifiers, such as ChatGPT, is today the most comprehensive example of the mechanisation of general intellect.

In short, by classifying language, images and actions, AI systems such as ChatGPT implicitly measure the quality, accuracy and efficiency of human work. The classification capability inherent in large language models becomes a powerful tool for judging individual abilities, collective intelligence and cultural heritage. The Turing test is transformed into a perfect imitation game for the labour market, in which an impersonal algorithmic model judges which human beings are qualified and which are not, which can access a job and which cannot.

SCHOOL IS NOT A TURING TEST

A significant example of the role that AI is taking on in the assessment of human abilities is its use in testing educational metrics themselves, such as the Programme for International Student Assessment developed by the OECD (known by the acronym PISA). The PISA programme quantitatively assesses the performance of 15-year-old students sampled from secondary schools in all countries around the world. It has long been the subject of controversy because it applies purely Western categories and conventions that almost always ignore cultural contexts and different pedagogical traditions. The grotesque fate of the OECD is that in a highly automated world, even the standards of the PISA programme are tested with an even more decontextualised, abstract and mechanised standard such as ChatGPT.[7] For OECD officials, a model such as ChatGPT can already compete with the intellectual performance of a fifteen-year-old, and the decision to carry out such an 'experiment' should be enough in itself to prompt us to ask why AI has already been established as a yardstick and judge of individual and general intellect. In this sense, AI is becoming a measure of education in a similar way to what took place during the industrial era, when machines became proof of the superiority of Western 'civilisation' over colonised territories and a measure of the latter, as Michael Adas explained in his book *Machines as the Measure of Men*.[8]

6. There are, of course, other units of measurement that AI uses and imposes on mental work, such as tokens in computational linguistics. See Paolo Caffoni 'The Digital Walls of the University: Translating New Metrics of Labour, Education, and Mobility in the COVID-19 Crisis', *Civic Sociology*, vol. 4, no. 1, 2023.

7. OECD, 'Putting AI to the test: How does the performance of GPT and 15-year-old students in PISA compare?', *OECD Education Spotlights 6*, Paris: OECD Publishing, 2023.

8. Michael Adas, *Machines as the Measure of Men: Science, Technology and Ideologies of Western Power*, Ithaca: Cornell University Press, 1989.

Anonymous, *Portrait of Claude Shannon*, date unknown

Comparisons such as these between humans and the power of AI set a worrying and highly unethical precedent, but they may gain ground because education itself has already been transformed into a kind of computational factory. AI will inevitably excel in any educational test because, as science historian Simon Schaffer points out, education itself has been progressively formalised and designed as a kind of Turing test: the typical exam is designed in such a way that an impersonal examiner, separate from the examinees, can assess whether they possess certain knowledge, regardless of their identity, history and context, to ensure a seemingly fair grading process. AI can obviously take advantage of this and embed itself like a parasite in any process that is particularly anonymised and formalised, i.e. made measurable and computable. Since the early days of the industrial factory, it has been known that conceiving the theatre of education as a series of anonymous and abstract relationships helps facilitate the process of automation. School cannot be a Turing test; it must not prepare students for nominal knowledge and impersonal communication, but for critical, autonomous and cooperative thinking, for which technology can be a tool but not a measure. In another dialectical reversal, the success of AI even in performing typical written exam tests will lead institutions to consider alternative means and return to face-to-face and participatory interactions as a means of assessing students (and teachers).

Comparing 15-year-old students to ChatGPT means, in any case, that AI has already been internalised as a measure not only of academic performance, but also of which skills can be automated and which cannot. This act of intellectual discrimination can create further class divisions within schools: between students (and future workers) whose skills can be replaced by AI and those whose skills cannot. However, the scenario appears to be much more complex. Studies on AI often refer to Moravec's controversial paradox, according to which 'high-level' reasoning requires very little computation to be automated, while 'low-level' sensorimotor and perception skills require enormous computational resources. It is obvious that if schools are to teach critical and independent thinking, Moravec's paradox reveals a certain epistemic poverty (inherited from the epistemic poverty of cybernetics). But Moravec's paradox would seem to lead to a fatal counterbalance in the world of automation, where the mental work of white-collar workers (including managers!) now seems easier to automate, while the manual work of blue-collar workers, including reproductive and care work, seems more difficult. It is likely that AI will lead to a downgrading of the middle rather than the working class.[9]

9. Matteo Pasquinelli, 'Operai e algoritmi', *Jacobin Italia*, no. 23, June 2024.

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FROM PSYCHOMETRICS TO SOCIOMETRICS

The fact that AI can serve as a social yardstick is an ironic reversal of its origins. It is well known, but not emphasised enough, that deep learning, the current form of AI, has its roots in psychometrics. It is usually said that deep learning originated in the 1950s with Frank Rosenblatt's invention of the first statistical neural network, the Perceptron, which we have already mentioned. Contrary to popular belief, it only superficially imitated the neural networks of the brain: in mathematical terms, it automated, for the first time, multidimensional statistical analysis techniques that Rosenblatt, a psychologist by training, acquired from psychometrics. Psychometrics was the discipline that had already introduced the infamous test to measure the 'intelligence quotient' (the IQ test), conducting statistical analyses of cognitive test results by applying a purely numerical scale. Psychometrics remains a branch of statistics, which has never been a neutral discipline but rather a project for the *normalisation of society*, i.e. a project for calculating the 'norm' and controlling deviations from the norm. As Stephen Jay Gould's book *The Mismeasure of Man* recalls, psychometrics evolved from craniometry, a pseudo-science that clumsily attempted to prove a correlation between intelligence and skull size in order to support racist and eugenic policies in 19th-century Europe.[10]

Craniometry was based on the rather reactionary and entirely unscientific postulate that hierarchies of class, gender and race existed naturally in society and could be easily measured and demonstrated. Psychometrics inherited this mandate in a more moderate guise. The project of quantifying the intelligence of the population continued to reinforce hierarchies of class, gender and race, but, specifically, it served to organise the labour market into new *dynamic social classes*, so to speak. This was, for example, one of the direct applications of the IQ test according to American psychologist Lewis Terman, who argued in 1919 that 'an IQ of 75 or below generally belongs to the unskilled labour class, 75 to 85 is predominantly the range for semi-skilled labour, and 80 to 85 is sufficient to succeed in some types of skilled labour'.[11] Just as the first forms of automation emerged from *employment metrics* (think of the measurement of energy consolidated by German physicist Hermann von Helmholtz in the notion of *Arbeitskraft*, or labour power), it can be said that AI emerged from *employment psychometrics*, i.e. the measurement and classification of the cognitive abilities of the population in the post-industrial context.[12] The form and measure of intelligence that AI embodies therefore has a socio-technical rather than a scientific root that should not be underestimated.

Today's AI is part of a more general and long-standing process of discriminating against the workforce in hierarchies through judgements and metrics of intellectual and manual skills. Like previous forms of industrial automation, AI does not immediately replace workers but first measures and reorganises them into a new social order and a new potential division of labour. The class, gender and racial prejudice (known as bias) that AI systems notoriously amplify should not be considered a technical flaw, but an intrinsic feature of their form of automation. We should ask ourselves about the structural implications of policies aimed at mitigating algorithmic *bias*: their mission would seem to be

10. Stephen Jay Gould, *The Mismeasure of Man*, New York: Norton, 1981/1996.
11. Lewis Terman, *The Intelligence of School Children: How Children Differ in Ability, the Use of Mental Tests in School Grading, and the Proper Education of Exceptional Children*, Boston: Houghton Mifflin, 1919, p. 274, cited in Gould, *The Mismeasure of Man*, p. 212.
12. On Helmholtz, see Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity*, Oakland: University of California Press, 1992. See also Matteo Pasquinelli, 'Labour, Energy, and Information as Historical Configurations: Notes for a Political Metrology of the Anthropocene', *Journal of Interdisciplinary History of Ideas,* vol. 11, no. 22, 2022.

to have algorithmic models that fairly represent all the various identities of class, gender and race. But even an AI model that is perfectly equitable in terms of its identity politics would continue to operate distinctions between manual and mental abilities as an implicit metric. The impact of AI prejudice is not only a form of social discrimination: it also involves an implicit imposition of work and knowledge hierarchies that reinforce the polarisation between skilled and unskilled workers in the labour market beyond the issue of category *bias*.

In summary, large AI models such as ChatGPT are not simply tools for automating mental work, but represent a statistical average of collective intelligence. This statistical average is implicitly and explicitly becoming a measure of society's intellectual and professional capabilities, a veritable metric of work and intelligence, which is establishing itself on the dividing line between skilled and unskilled workers. This metrological dimension is also present at the origin of AI, as we are reminded by the role of psychometrics, a field located between psychology and statistics that has influenced not only our models of the mind, but also new technologies such as AI. With today's large AI models, the original field of psychometrics has been transformed into something on a larger scale: a generalised sociometrics. Critical studies must analyse in greater depth not only the futuristic capabilities of AI but also this metrological dimension: they must understand what new *units of measurement of general intellect* it is imposing and what happens to social life, knowledge and cultural heritage when they are codified and measured in this way.

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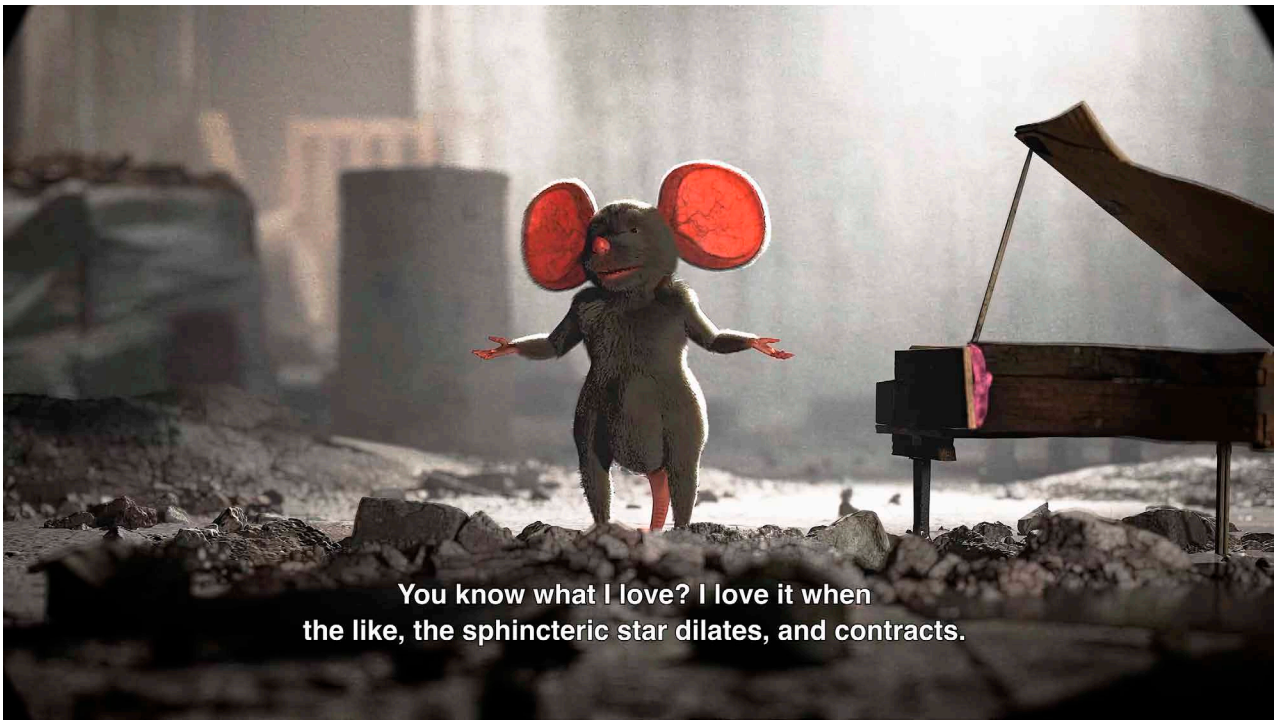

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