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Metaphors We Live By[1]

Three Commentaries on Artificial Intelligence and the Human Condition

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Prelude

In the following essay, I want to bring together three stand-alone commentaries, each dealing with a different facet of artificial intelligence, and each revolving around a different underlying metaphor: intelligence, evolution, and play. The first commentary constitutes an auto-ethnographic vignette, which provides a framework for the reflection on artificial "intelligence" and the alleged capacity of machines to "think"; both very problematic metaphors from the feminist perspective on (predominantly) female labour of bearing and rearing intelligent human beings. The second one is an insight into my current ethnographic fieldwork amongst high-energy physicists who use machine-learning methods in their daily work and succumb to a Darwinist metaphor in imagining the significance of evolutionary algorithms for the future of humanity. The third commentary looks into "playing" algorithms and brings into the conversation the much-debated anthropological category of an "alien" which, as I argue, is much more relevant in order to understand AI than a direct personification, bringing a non-human entity to life.

A New Non-artificial Intelligent Life is Born

I am looking at a newly born human being. Day by day I keep him company, as he practices increasingly complex bodily movements, senses the inner emotions of other bodies around him or reacts to a sea of indistinguishable voices, despite not being able to understand the meaning of a single word. While he keeps to his

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1 The title of a famous book published by George Lakoff and Mark Johnson in 1980. I want to thank Sonia Fizek for her invaluable help in revising this article.

own reflexes, I am witnessing a life-changing event: the emergence of an all but artificial intelligence. Slowly, the motor activities become increasingly controlled, the musculature is gradually building up, and the gaze seems to follow points of interest somewhat consciously, with a dose of curiosity and awe. A young human learns.

Seeing the development of a new life, makes me radically rethink the concepts of artificial intelligence and machine learning, and even more so the significance of language, which has the power to shape political reality.

Can machines think, asked Alan M. Turing almost seventy years ago (1950). His provocative metaphor until today conditions the way computer scientists tend to perceive the capacity of algorithms to process data and yield "intelligent" (or rather intelligible) results. The image of an intelligent machine has grown strong in the public eye. Today, we talk of "smart" infrastructures, smart TVs, smart homes, even smart cities; all exemplifying the so-called "smartness mandate" (Halpern, Mitchel, Gheoghegan 2017).

Can machines learn? It is no longer a question, but an assumption and a method used in almost every discipline reliant on big data, from physics, over marketing and finance to agriculture. Thinking and learning, inherently human qualities, when used with reference to machines seem to make little sense. They are often dismissed as innocent metaphors. But words have power. Not only do they describe the surrounding reality, but shape the way we think and act (Lakoff and Johnson 1980). In that sense, machine "intelligence" is much more than a rhetorical device. It influences our perception of it as an (in)human quality.

The concept of intelligence originates from a very specific and narrow understanding of what it means to behave as an intelligent entity. Christoph von der Malsburg, considered a pioneer of artificial intelligence and originally trained as a particle physicist, in his neurobiological research on intelligence focused mainly on visual cognition and memory (Malsburg 1990). It is not difficult to draw a parallel to the contemporary understanding of machine learning algorithms, often praised for their beyond human capacity to recognize patterns out of a pool of gargantuan data sets. To an anthropologist who considers anthropocentric criteria of difference to be fundamentally suspect, this oversimplified human versus machine metaphorical comparison seems somewhat disappointing in its naiveté, if not spine-chilling. Von der Malsburg triumphantly argued that human brains do not exceed the memory capacity of more than one gigabyte. But humans are not fed with raw data sets. And machines, unlike humans, do not necessarily have a palimpsestuous biological memory of experiences but rather are an extended memory, to play along with von der Malsburg's metaphor of a capacious container for data storage.

Above all, human intelligence and memory do not stand in an one-dimensional relationship to each other. Intelligence is an embodied process, highly depen-

dent on received attention and care. It is enough to take a quick look at a newly born human to dismiss the blind enthusiasm of computer science to create artificial life. In this context, machine learning seems like an empty disembodied metaphor. It is the body (of the infant and their mother), which is central in the development of intelligence. For a newborn, the physical and the psychological are inseparable. The body and the mind are not yet split, subject to Cartesian dualism. They do not exist as separate entities, or rather exist in a mutual embrace. All is embodied, and all is mindful. Facial expressions, gestures and voice operate without the socio-cultural censor. Their face slowly learns how to laugh, at first coincidentally, later in a more focused manner. It seems, as if the baby's consciousness was gradually contracting to a fully developed "I". At first small threads appear like, then they expand, grow and open to become a mindful being. But before that happens, the baby simply exists. Infants develop their intelligence in dealing with the environment. They demand to be noticed and perceived although they are not able to understand what attention really is.

All those daily observations I have been collecting as a feminist mother and an anthropologist have lead me to believe that any comparison of human and artificial intelligence must be considered bizarre if not utterly pointless at best. The observations of the social and emotional complexity of an infant, whose head accounts for a third of its body weight and who has no language and can be more than language at the same time, have made it clear to me that the concept of an undifferentiated intelligence as such is the most dangerous aspect in the political debate on AI. At the heart of research on artificial intelligence lies an extremely oversimplified and disembodied understanding of the term, which not only overestimates machine intelligence and underestimates the biological complexity of humans, but brings with it the danger of dismissing the significance of being a responsible human agent altogether.

While neuro-computer scientists spent time dreaming of self-replicating algorithmic intelligence, uncounted female bodies keep nourishing and nurturing the yet to be born human intelligence. While science keeps appropriating humans as embodied metaphors to praise the artificial life instead, a true wonder of creation a female body is capable of, remains barely touched by the admirable gaze of the (overwhelmingly male) techno-scientific world. It is the politics of embodied care (Hamington 2001) or politics of care in technoscience (Martin, Myers, Viseu 2015) that needs to be brought back into a larger social conversation on artificial intelligence and its relation to what it means to be human.

Anne Dippel

The Promethean Dream of Artificial Intelligence in Physics

In my usual anthropological fieldwork I do not study infants, but sit vis-à-vis scientists who work with artificial intelligence; to be more precise with very specific machine learning algorithms, which are able to sieve through endless data of particle decays. The European Center for Nuclear Research (CERN) is home to quite a few high-energy particle physicists who see themselves as "gods playing with the help of the computer". At CERN, researchers increasingly rely on supervised machine learning in their everyday work. Already in the 1980s the so-called MVA (multivariable analysis), a form of machine learning, was deployed at CERN (Galison 1997).

At first, high-energy particle physicists developed algorithms for pattern recognition of rare subatomic collision events independently of computer scientific expertise. The communities of physicists and computer scientists were not always as strongly connected as they are today. With the establishment of the "particle accellerator Large Hadron Collider" (LHC), however, those two seemingly distant communities merged. High Energy Physics has experienced a gradual "informatization" of its knowledge base, dependent on high-performance computers capable of storing data density and performing the Monte Carlo analyses required to predetermine events and test theories on the basis of physical measurements.

In the past 15 years more and more computer scientists have entered the everyday research practice as CERN annual statistics indicate, supporting physicists in coding and simulating experiments (CERN Annual Statistics Website 2019). CERN invests in computer scientists and in different areas of computer research, from machine learning algorithms to quantum computing. The "trained" algorithms collect, detect, and analyze seas of data. Contemporary high-energy physicists may be described as "code sorcerers" (Chun 2013), making sense of the world through the lens of pseudo-random algorithms. Thus, it is no surprise that their visions for the future of humanity are so deeply conditioned by the logics of the algorithmic infrastructure "living" around them. Most of the physicists, however, would dismiss this assumption. They tend to perceive algorithms as mediated tools, which may have the capacity to extend our minds, but at the same are entirely controlled and tamed by physicists. Both categories, the human and the machine, are clearly separated, each having a different role and hierarchy in the experiment. Physicists are convinced of the superior position of humans vis-à-vis algorithms, however intelligent. If there is any doubt about the semiotic-material analysis of physics, it usually is voiced outside of the field, for example in media studies or philosophy, i.e. disciplines, that reflect the "mediatedness" of contemporary knowledge in natural sciences. Physics sees itself as an impartial referee, untouched by the logics of the medium. In other words, how and what the observer sees remains uninfluenced by the apparatus devised to see the observed.

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At the same time, the convictions of an almost sterile human-tool separation are accompanied by the speculations of a future cyborg, a human of tomorrow enhanced by artificial intelligence and almost inseparable from it. Such cyborgian visions are shared by many physicists, especially those working in the departments devoted to more speculative and future-oriented research at CERN, for instance on the so-called evolutionary algorithms inspired by the principles of biological evolution (reproduction, mutation, recombination, selection). It is here that one can find computer science visionaries like Rodrigo Suarez, one of my informants. In machines he sees a continuum of intelligence, developing from a single cell to a fully-fledged human and reaching their final state in a computer. Even if he is not entirely convinced that AI could reach a human-like status, he dreams that one day humans could evolve and live eternally, free from fear and illness, as cyborgs enhanced by artificial intelligence. Rodrigo Suarez does not see any difference between the concepts of intelligence of a biological cell, a computer or that of a human being. In our conversation I drive him to the edge of his argumentation, but for Rodrigo Suarez (and many other computer scientist) these exist only advantages of an eternal life, even if the immortality dream is to be reached by the fittest few. The principle of evolution does not account for fairness or justice for all. There seems to be a crude Darwinist opinion embedded in the algorithmic concepts that drive current research politics on AI. While computer science is bringing man back to the centre, natural culture research decenters him. The enlightenment figure spelled with capital "M" (Tsing 2015) reclaims his position of power. Evolutionary algorithms, still in an early developmental stage, rest on the dream of fusing "epistemology and ontology" (Bruder 2018, 153), as well as mind and body with technology, contributing to the raise of *homo automaton sapiens*.

For some this might be just a narcissist dream of production and reproduction (uterus envy?), maybe even a hubris in the ancient Greek sense, a way of playing Prometheus or Eva, trying to steal the flame or the apple (Dippel 2011). It is hard to find balance, it seems, between techno-optimism and techno-pessimism, especially for a scientist working as one of the new shamans of technology. Regardless, any politics of artificial intelligence needs to take humans into account.

Artificial Intelligence as an Alien at Play

The Promethean dream seems to be best illustrated when machines and humans "face" each other at a play table, in a direct ludic confrontation. In the recent history of cybernetics several pivotal games took place, for instance Mac Hach VI versus US Chess Federation player (1967) or the iconic IBM's supercomputer Deep Blue versus Garry Kasparov (1996, 1997). In both cases the human was defeated

by the sheer power of computation. In 2015, a very different contestant entered a global scene. Alpha Go, a computer program able to play the game of Go (much more strategically complex than chess), won against a human player. Following the first victory, it went on to beat the professional Go player Lee Sedol. AlphaGo uses a Monte Carlo tree search algorithm (the same method used in high-energy physics at CERN) to find new optimal moves.

Such examples show how deeply the longing for human-machine comparison is embedded within the history of technological development. Humans are the standard that serves for technology as the main criterion in terms of intelligence. The game between Lee Sedol and AlphaGo has also raised the question of "alienness"—does artificial intelligence play in a different way than humans do? Can we use the category of "play" with reference to an algorithm at all? Do computers play? All the above questions are more complex than it seems, especially when taking into account the fact that AlphaGo opted for moves which, in their appetite for extreme risk, seemed almost inhuman. As the Deep Mind team emphasizes: "AlphaGo's strategy embodies a spirit of flexibility and open-mindedness: a lack of preconceptions that allows it to find the most effective line of play" (DeepMind.com). Artificial intelligence tends to deal well with a vision of a potentially harmful sacrifice, if it leads to an unparalleled compensation in the game. On a more general philosophical level, we could say that it has no consciousness or any understanding of its own possible "death". This opens a very different playfield, in which every decision can be as risky as the logics of checks and balances allows for.

Artificial intelligence remains in a non-existential relationship to anything that matters to humans (cf. Dippel 2018). After all, machines have been created precisely for the purpose of relieving or facilitating the existential condition of humankind (cf. Giedion 1982). One could argue from an anthropological perspective that man—the "capital M guy that made the anthropocene" (Tsing 2015)—has created a "metaphorical counterpart" of himself (Lévi-Strauss 1973, 238); a dispositive of difference in times when the conventional border regulations between humans and other living creatures have become questionable. I see thus two major pathways in the visions of AI. On the one hand, we can observe the production of an artificial intelligence as a "metaphorical counterpart", to extend upon the anthropologist Claude Levi-Strauss and his comparison between humans and birds. Both species form relationships and build nests amongst many other similarities, but there is one thing that we as humans cannot do—flying. In that sense birds are seen as a metaphorical counterpart, in which the dream of flying and extending our limited capacities is stored. Artificial intelligence is like a bird of sorts. It allows us to see what we are and what we are not; what we dream to become, but can perhaps never be. On the other hand, the inclusive version of artificial intelligence based on the concepts of a "third nature" (Richter & Rötzer 2018), of cyborgs

(Haraway 1991) and of nature-culture (Gesing, Knecht, Flitner & Amelang 2019), existing regardless of the political sphere and the social consequences.

The first concepts of artificial intelligence, as Norbert Wiener famously put it, were about creating modern slaves (1972, 72). The old fears of the relationships between master and servant are reflected in the debates about the politics of artificial intelligence since its early days (Winner 1977). Instead of looking for an order that would enable a better society, the current concepts blindly reproduce existing relations of domination and post-colonialism. The vision of artificial intelligence today succumbs to mostly neoliberal and positivist worldview, pushing the ideal for a never ceasing automated work (Gregg 2018). Fostering class-biased dreams to bring an end to the working class, it serves predominantly elitist fantasies. It does not consider creating a sustainable environment allowing humans to find their place within nature. Instead, it fosters nature as "the other" that needs to be dominated through technology.

But technology tends to wander off in unforeseeable directions, providing fertile ground for ideology (Latour 2006). Current issues around social media are serving as a very fitting example here. Made to connect friends and families across the globe, they have become disruptive and manipulative tools in the political sphere, deeply influencing the human capacity to understand complex texts or to keep attention for an extended time. This perhaps trivial example only shows that it is of paramount importance today to investigate artificial intelligence not only from a specifically technical angle, but in a broader socio-cultural and political context. As researchers and as citizens, we need to stay alert.

"Fed" by the People and for the People

Artificial intelligence should be seen for what it truly is, a technological alien. To neglect this "alienness" or otherness of AI it so to misunderstand its capacity to lead to a utopian potential for other politics. In fact, only by treating AI as the technologically Other allows us to see it as something that "eludes the orders of self and culture, while at the same time challenging them" (Leistle 2015). And to challenge the status quo, we may begin with a conscious use or criticism of powerful metaphors, attributing to AI either human capacities or embedding it within a specific socio-political framework (in this case, a neo-liberal and positivist one).

The White House report on artificial intelligence of the late Obama administration reads: "Developing and studying machine intelligence can help us better understand and appreciate our human intelligence. Used thoughtfully, AI can augment our intelligence, helping us chart a better and wiser path forward" (Technology Council Committee 2016, 7, 39). Such grandiose political assumptions, however, should be embedded in a new social reality, where every citizen

has open access to the AI-driven goods. Researchers, politicians, the private sector and public opinion need to come to the point of communalization and people's empowerment of artificial intelligence, which may be difficult imagine in the current political and economical system. In that sense, AI should be owned by the people, because it is overwhelmingly "fed" by the people, for instance in a daily practice of using digital technology and thus allowing technology companies to collect our data in order to feed their algorithms shrouded behind corporate non-disclosure agreements. The future of humanity and AI should not succumb to a Darwinist vision. In this utopian context, artificial intelligence could be a true medium, and a mediator—not a dark privatized Leviathan, manipulated for those who love to lead war, hold power, and accumulate resources. For a vision like this to come true, a larger social dialogue is needed reaching beyond the optimization logics of fast computing and automated labour. It asks for humans that practice *vita activa* and take on responsibility instead of dreaming to outsource it to a techno-god.

With this remark I would like to bring this essay to a closure for a much more demanding creature is waiting to be nourished, not with raw data, but with milk, attention and care. His intelligence will require many more years to develop, independent from the super-computer's calculating power and Monte Carlo search algorithms. Feeding my son requires much more than "having enough content" (Stokel-Walker 2019). It is a labour of love, passed by women and men from generation to generation since the beginning of humanity. One, which does not need a "metaphorical counterpart" in technology.

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