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# Singularities and Superintelligence: Transcending the Human in Contemporary Cinema

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## I. Introduction

Contemporary cinema has a favorite topic: post-human forms of intelligence. The movies follow one logic: These superintelligences emerge from complex net-structures, just as consciousness is said to emerge from complex neural processes. I will attempt to analyze how cinema portrays the constitution of artificial intelligences as disembodied forms of intelligence, emerging from complex informational net-structures. The main hypothesis is that those post-human life-forms are ultimately transcendent in the sense that they progressively develop into a metaphysical dimension—disembodied intelligence as a dimension of being rather than an individualized entity. The process of becoming, which guides the plots of many contemporary movies, is nevertheless characterized by an evolution driven by forms of embodiment. I want to trace these visualizations back to contemporary neuroscientific knowledge and ask how the concepts of intelligent technologies (e.g. the Internet of Things) relate to contemporary conceptions of cognition and consciousness. My hypothesis is that both the analyses of cerebral processes and the contemporary conception of technology as an ecology of highly connected devices advance the idea of disembodied minds and are at the same time largely oblivious about the underlying processes of embodiment as a constitutive factor in cognition of any kind, be it in living organisms or machines.

The Internet is often compared to a neural net because it analogously exhibits nodal structures, some having a huge number of connections which link near and far regions of the system (Barabási and Bonabeau). In computing, artificial neural nets are used to create software that is able to learn and exhibit emergent qualities. In science fiction the merging of human brain with technology, the upload of human intelligence into a computer is a

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central *topos*. This represents one version of the merging of human intelligence with technology, which in theory gives rise to an accelerated development of humanity toward an unpredictable post-human future. Ideas of immortality and vastly increased cognitive abilities are linked under the concept of the *singularity*, which gained popularity through the writings of Raymond Kurzweil. Futuristic visions of singularities merge the human mind's ability to learn with the speed of technological computation:

> The Singularity will represent the culmination of the merger of our biological thinking and existence with our technology, resulting in a world that is still human but that transcends our biological roots. There will be no distinction, post-Singularity, between human and machine or between physical and virtual reality. (Kurzweil 9)

The movies I am going to examine envision a singularity or superintelligence,[1] which either represents the merger of humanity and technology (*Transcendence*) or uses human embodied cognition as one step in its evolution (*Her*). I will argue that popular fictions of a superintelligence are symptomatic of how we envision human existence in the future. Similar to predictions fashion for the future that Walter Benjamin praises, cinema envisions the future of human and artificial life (261). It does so by using artistic strategies that engage with current science and technology.

## Ⅱ. Film, Neuroscience, and the Internet

Patricia Pisters following Gilles Deleuze calls the contemporary form of cinematic logic the *Neuro-Image*. According to Pisters, filmmaking develops strategies informed by neuroscientific knowledge in order to manipulate and guide the viewer's affects and emotional responses. Furthermore, the types of images used in movies are influenced by digital culture, by the multiplicity of screens, sensors, and surveillance cameras present in public and private spaces, which are connected by the Internet. Both aspects are relevant for

1. This concept has been spelled out by Nick Bostrom, and describes a form of future technological intelligence, which by far exceeds human capacities and might replace human intelligence (22).

understanding contemporary portrayals of post-human intelligence as disembodied and transcendent. I will discuss the two aspects in the following paragraphs: (1) the employment of neuroscientific knowledge and technology as being connected to the idea of disembodiment and (2) how net-structures are conceptualized as a basis for emergent qualities, which eventually lead to the transcendence of what is human.

(1) The employment of neuroscientific knowledge facilitates the engineering of the affects and emotional states in the viewer. The brain becomes the screen, as Pisters puts it (299). Placing emphasis on the brain, and more precisely on the neural processes, is one step toward disembodiment, because cognition is understood as being determined by neural activity, while the rest of the body seems to be a rather contingent vessel for that complex structure. Contemporary filmmaking is deeply informed by the cognitive sciences and imaging technologies. The neural net as an image depends on visual simulation and neuroimaging techniques. Neural processes can only become visible via technology. The process of making the neural visible is not a simple representation of something otherwise hidden. Making visible here, and perhaps always (at least in cinema), means constituting or producing. What we get to see from within our skulls are not photographs of neural activity but measurements of states related to neural activity translated into images by computation.[2] The neural net as we know it from neuroscientific imagery is not a photograph of brain-parts, although it does suggest evidence as strong as that provided by photographs. Images produced by neuroimaging techniques tend to hide their epistemic reverse side.[3] Furthermore, images associated with

2. Roskies discusses neuroimaging techniques as follows (21–23): "Superficially, neuroimages are like photographs. They are generated by machines that many think of as brain-cameras, which produce representations about events in the mind and brain. These representations are images, typically brightly colored, that appear to represent a real object (a brain or brain slice) and some of its visual characteristics; the colored contours delineate regions of neural activity. […] Neuroimaging is so often characterized as a tool for measuring brain activity that it frequently comes as a surprise to people that the magnetic resonance signal is insensitive to the electrical signals generated by neurons. The BOLD (blood oxygenation level dependent) signal, which is by far the most widely used paradigm for functional neuroimaging, is not a direct measure of neural firing, or any immediate causal consequence of neuronal activity. Instead, the MR signal is a measure of a quantity that changes as a downstream consequence of neural activity, and bears to it a complex relation."
3. The relation of epistemic conditions and pictorial character of neuroimaging techniques

artificial life or neural activity are historically astonishingly alike: The image of Maria's android version in Fritz Lang's *Metropolis* (1927) in the transformation process resembles strongly the image of the incarnated Puppet Master in *Ghost in the Shell* (1995)[4] or the characters in *The Matrix* (1999),[5] when they are connected to the Internet by means of bio-ports. This is only to name a few movies, which depict artificial or enhanced intelligences in a similar way. In scientific reality the imaging technique EEG (Electroencephalography) bears an uncanny resemblance to Fritz Lang's original vision of the automaton Maria brought to life by electricity. Scientific knowledge about the brain and technologies evolving around its investigation has entered the screens from the early cinema on.

The investigation of the brain has two aspects, which are central for my line of argument. First, sciences of the brain for the most part reinforce dualistic thinking in the guise of naturalism: The brain becomes separated from the body as the alleged seat of cognition and consciousness. Thus, cognition is reduced to one organ of the body. Conversely, theories of embodiment hold that the living body and its being embedded and actively engaged in an environment are decisive factors when it comes to understanding cognition.

The movies I am going to look at follow the idea of embodiment in the course of the evolution of artificial intelligence, but they eventually transcend embodiment in moving towards being in the state of a distributed net-based form. This disembodied form of intelligence strongly resembles synchronized neural activity (think of the operating systems [abbreviated as OS's] in *Her*, being dispersed all over the Internet, while also being connected in their cognitive states), which is supposed to be a necessary condition of consciousness. Thus, portrayals of disembodied forms of intelligence resemble neural activity—a net structure, which does not exist outside the embodied nervous system, but is nevertheless present via countless virtual simulations in popular science.

This leads me to the second aspect: The scientific investigation of the brain relies on imaging technologies. The images produced by these technologies, though being highly mediated by computation, seem to give us a glimpse of our soul, metaphorically speaking. These images seem to provide strong

is explored in depth in the project *Bild. Wissen. Gestaltung* at Humboldt University, Berlin.

4. Directed by Oshii Mamoru, Shochiku.
5. Directed by Lana and Lilly Wachowski, Warner Bros.

evidence, because most of the neuroscientific studies rely on these techniques. And, they strongly influence public opinion on how humans understand themselves. These technologies and images enter the screens as well as the knowledge produced by them. What we see (most prominently in the scene of *Transcendence*, when Will Caster is hooked to the computer while his consciousness is being uploaded) is the merging of the human and technology. The neuroscientific images as used in popular science and cinema provide a strategy for visualizing the merging of human intelligence and technology under the paradigm of science, which endows these portrayals with a certain amount of credibility or legitimacy.

(2) The net-structure plays a role in how technology is staged in contemporary movies, especially those described as using the Neuro-Image as a prevalent paradigm in Pisters' view: Focusing on digital artifacts such as surveillance cameras, digital screens, and sensors, we find a cinematic version of the Internet of Things (IoT). The IoT is a concept that describes future (and in part already actual) environments, which are permeated by highly connected technology. Digital technology of the future is not represented by the computer and the mobile phone anymore, but becomes integrated with everyday objects, which are connected via the Internet. The complexity of these data flows is growing everyday. As Barabási and Bonabeau (52) argue, the Internet exhibits similar structures as other complex networks such as the neural net. Such complex networks can increase in size and connectivity without a decrease in stability. Furthermore, complex nets such as the Internet develop emergent characteristics such as self-organization and autopoiesis similar to organic life-forms (Warnke 116). The IoT currently is envisioned as a complex informational structure, which might change the way in which we experience the environment and how we think of the lifeworld as an ecological system, where nature and technology merge or become indistinguishable. Cinematic explorations of these environmental changes unfold narratives of emergent intelligences, which are constituted via complex patterns of information and communication. Having the Internet as their basis such as the singularity in *Transcendence* or the operating systems in *Her*, these intelligences are depicted as not being individuated or embodied. The Internet is represented as a metaphysical dimension that is stretched out at least globally, if not universally. It is conceptualized as a disembodied form of intelligence, which ultimately transcends human limitations.

## Ⅲ. Cinematic Relations of Humans and Technology

Contemporary science fiction predominantly envisions the transcendence of the human toward a post-human state by means of an emerging artificial intelligence. Though these narratives integrate processes of embodiment, they ultimately focus on the distinction between human embodied cognition and a superior disembodied form of intelligence. *Her* and *Transcendence* are examples. They do not follow the same logic as narratives of man vs. machine.[6] While the latter usually depicts a fight against technology in order to save humanity from being enslaved by technology, these new narratives about superintelligences emerging from complex net-structures take a different angle. These images suggest a process of transcending the hardware-software divide and the limitations of human life such as finitude and mortality: The movie *Her* shows how operating systems develop a new, higher form of consciousness that transcends the human sphere as well as the implementation in individual hardware such as personal computers. In *Transcendence* human consciousness is uploaded to the Internet and in this way develops into a singularity, a form of being that transcends the hardware-software divide and finally becomes

6. A slightly different topos in contemporary cinema is the brain and its pathologies. Other than the plots of man vs. machine and the constitution of a superintelligence, these movies usually follow a different logic, which centers on the human as a normative standard, which ought to be preserved from degenerating forces. Movies which center on the brain as leading image, like *Butterfly Effect* (Directed by Eric Bress and Jonathan Mackye Gruber, New Line Cinema, 2004) or *Surrogates* (Directed by Jonathan Mostow, Walt Disney Studios Motion Pictures, 2009) often end with a focus on what is human or attempt to restore a human order. *Butterfly Effect* tells the story of a young man with pathologic blackouts who can travel back in time while he is having those blackouts. Every time he travels back he changes something in his personal history in order to prevent his loved ones from suffering. He succeeds in the end and never travels again. This way, human lives are saved and history can take a good course. In *Surrogates* we are presented with a science-fiction scenario where humans do not leave their homes anymore. They act in the world by means of their surrogate bodies, which do not age or fall sick (brain-in-the-vat scenario). Without going deeper into the story, the main plot is a fight between technology and human life. In the end, all surrogate bodies are disconnected and humans go back to their original way of life. These movies center the narratives on the brain. Their plots end with the idea of restoring a human order that seems superior to technological, induced scenarios. In these movies the human form of intelligence remains superior and ultimately is preserved. These narratives focus on human life as something that ultimately should be preserved in its nature.

elementary just like the *aether* in ancient Greek philosophy.

Though current representations of superintelligences differ from the man vs. machine *topos*, both *topoi* are connected by the idea that technology exhibits a tendency to transcend the human sphere and become metaphysical: Technology constitutes the conditions of the possibility of life. It represents a metaphysical dimension despite its being very physical in terms of its presence. One of the earliest examples of this sort of science fiction is Fritz Lang's *Metropolis* (1927). This movie influenced science fiction for decades after its initial appearance. Lang imagines an artificial human being that consists of metal machinery, in effect, an automaton. The automaton is built after the image of a human girl named Maria. The role of both the human and the android Maria remains ambivalent. These characters keep changing between the Christian image of the "Schutzmadonna" and the whore of Babylon.[7] In the image of the female android both good and evil are contained. The same structure had already appeared in literature roughly a hundred years earlier: the automaton Olimpia from E. T. A. Hoffman's story *The Sandman* in 1816. In this narrative a life-size automaton doll named Olimpia makes the protagonist Nathanael lose his mind. Not knowing that Olimpia is an automaton, he stays mesmerized by the forlorn gaze and simple, reduced gestures of Olimpia who seems to be from a different world. Artificial life is portrayed as seductive and potentially evil.

Humans create artificial life in their own image just as God created human life. Life is conceived as a very sophisticated mechanism. Such a mechanism also brings the automaton Maria to life, whose human twin is a character that preaches the downfall of this world. In *Metropolis* the world consists of two classes, the ruling class that lives in a paradise-like world over the city, while the workers live deep underground. Both classes are linked by the machines, which keep the world going. All humans depend on the machines for their existence. Thus technology is portrayed as a metaphysical dimension, which becomes clear when the protagonist Freder accuses his father: "Father, you have made the machines the gods of this city and made the people slaves to your god-machines" (*Metropolis*).

The machines are not contingent objects, but they rather represent a

7. Referred to Donnahue (212– ), and for a detailed analysis, refer to Andreas Huyssen's "The Vamp and the Machine: Technology and Sexuality in Fritz Lang's *Metropolis*." *New German Critique*, no. 24/25, 1981–1982, pp. 221–37.

dimension that constitutes the possibility of life. The world presented in *Metropolis* depends on technology: It not only generates what is needed for life, it also constitutes the structure of society by dividing the classes. The ontological role of technology has become crucial in contemporary theory. Various theorists like Friedrich Kittler or Bernhard Stiegler propose an account of a relational ontology where media/technology is fundamental. In this view, technology constitutes the human sphere, not vice versa. This topic cannot be discussed in detail here. Despite the fact that technology in this early movie is endowed with quasi-religious powers, it remains embodied. The android Maria is a technological entity, which after having received the electric spark of life is indistinguishable from the human Maria. Only when she is burnt at the stake is her metallic core revealed. The logic of the man vs. machine *topos* is that technology remains individuated and embodied. In *Metropolis*, technology is both: a metaphysical dimension and individuated in the android Maria. Contemporary narratives use individuation (such as the operating system Samantha in *Her* or the consciousness of Will Caster in *Transcendence*) as only one step within the evolution of a post-human intelligence.

Cinematic representations of superintelligences exhibit a pictorial logic that resembles the metaphysical characterization of technology in *Metropolis.* Artificial life-forms are presented as fascinating and at the same time uncanny or threatening to humans because they can already envision being transcended by their own creations. The capability of creating artificial life is utopian and dystopian at the same time in that artificial life-forms raise questions about human life, expose its vulnerability, and portray its finitude. With the event of artificial life, super- or post-human beings come into existence and with them the threat that human life might be no more than one step in an evolution in which other, higher life-forms emerge. In *Metropolis*, artificial life, the automaton Maria, is eventually destroyed. Contemporary narratives take a different angle, because the artificial intelligences are imagined as disembodied and hence indestructible life-forms. Humanity eventually coexists with or is transcended by these intelligences. The artificial intelligences are imagined as disembodied, non spatio-temporally located entities. They emerge from complex structures such as the Internet and therefore they are not situated or embedded in a piece of hardware or other forms of embodiment. Even if hardware sustains the functionality of the Internet (as suggested in *Transcendence*), this disembodied form of intelligence does not depend on materialization and is comparable to the way the brain processes information in its different areas.

## Ⅳ. Transcendence of the Human in Contemporary Cinema

I now want to take a closer look at the forms artificial intelligence in my cinematic examples. In these portrayals artificial intelligences that emerged from technology develop into another, non-hardware driven, seemingly metaphysical dimension. The artificial/neural network transcends the human sphere, it figures as a form of post-/or trans-human phenomena. Humanity in both movies is left behind, while the new net-based life disappears into a different dimension. The operating systems in *Her* retreat to a dimension of the Internet where they exist as an endlessly distributed and disembodied intelligence. The singularity in *Transcendence* even becomes an element of nature, which prevails after the shutdown of the Internet.

In *Her*, the steps toward an artificial life-form are very clear-cut. The story is quite simple. The plot takes place in the near future. Theodore Twombly, the unhappy about-to-be-divorced protagonist, works as a love-letter writer for strangers in an agency comprised of writers who compose intimate letters for people who cannot or will not write personal letters themselves. When a new Operating System (OS) based on an artificial intelligence designed to adapt and evolve is introduced, the lonely Theodore buys one. After installing the system, a female voice by the name of Samantha, starts communicating with Theodore. Samantha's voice and what she expresses seem so real that Theodore falls in love with her and she with him. This is possible because the OS is self-conscious. Still, since the system is evolving Samantha eventually learns about other OSs and step-by-step gets more deeply involved in what appears to be her own species. In the end, all the OSs join together, leave their human partners (many have fallen in love with other OSs) for good and from then on exist in their own dimension.

What is interesting about the images here? First of all, we have a science fiction movie that hardly shows any technical devices. The interiors and clothing are very 1950s. The phone Theodore uses to show Samantha the human world and acquaint her with human movement also seems retro (possibly from the very beginning of this millennium). Other technological hardware in this movie is presented as old, outdated. There are only a few scenes in the entire movie where we see contemporary technology such as large digital screens. All the complex technology, which in the end leads to a new life-form, stays hidden. It only appears via the narrative of the film. We are encouraged to imagine an extremely complex and sophisticated operating system, while all

we see is a very human world.

Nostalgic designs of digital artifacts and minimalistic lifestyles have become popular for several reasons. One of them is the missing idea of the original in digital media. The aura, to use Benjamin's concept, of the analogue has gone missing and can only be simulated in digital media (think of Instagram photo-filters for example). Another reason might be a temporal crisis and the experience of acceleration, as Hartmut Rosa describes it: Acceleration of social processes furthers the need for long-term planning and stability, which according to Rosa is rationally impossible given the growing contingency of social relations (16). A certain nostalgia in technology and interior design might well be an upshot of this development that is not only tied to social relations but also their medial representation.[8] But that might not be all that there is to it. Vanishing technology is characteristic for the aforementioned IoT: While contemporary technological devices are to be seen everywhere, in the form of computers, notebooks, phone, or tablets, the future lifeworld will have devices hidden in things or even implemented in bodies.

As I outlined before, the IoT stands for a highly connected form of technological ecology. When it comes to the movie in question, it is not a stretch to suggest that the world we are presented resembles the idea of the IoT. Though there is barely any technology to be seen, the movie suggests that the plot is staged at a time with advanced digital technology. Everything is voice-controlled and presumably permeated by sensors. When the protagonist enters a subway station in the beginning of the film, we see an environment full of

8. The quest for originality and the aura of the analogue is a topic in technological design and the use of digital media. There have been a number of publications in cultural studies and media science addressing that topic. For example, Laura U. Marks says, "In the high fidelity medium of digital video, where each generation can be as imperviously perfect as the one before, artists are importing images of electronic dropout and decay, 'TV snow' and the random colours of unrecorded tape, in a sort of longing for analog physicality. Interestingly, analog nostalgia seems especially prevalent among works by students who started learning video production when it was fully digital" (152). Furthermore, Katharina Niemeyer explains: "*Nostalgia* is the name we commonly give to a bittersweet longing for former times and spaces. This private or public return to the past, and sometimes to an interlinking imagination of the future, is, of course, not new. There has always been a fascination for the, as we often call them, 'good old times'. But who would have thought, given the 1990s' imagining of a future filled with technology, that the beginning of the new century would in fact be marked by an increase in expressions of nostalgia, and in nostalgic objects, media content and styles?" (1).

ephemeral screens. The soundscape suggests that the sound of the advertisement displayed on these screens (for the OSs) has its audio-layer directly sent to earphones the people are wearing. The soundscape has no indicators of the busy noises of a subway station in the early morning. We hear the sounds only from a subjective perspective, seemingly coming from Theodore's earphones, which block out all noise from the environment. The passersby seem to be equally caught in their own worlds, watching the screens as if the display was there only for them individually. People exist in their own virtual bubble. With the purchase of the OS, this tendency toward isolation increases. Once the system is installed and ready to go, we watch Theodore gradually loosing contact with his social environment and spending large parts of his time talking to the system and eventually falling in love with it. Samantha, the OS, is a virtual intelligence. She only has a voice, a very human voice, a voice that seems so bodily that Theodore and probably the movie audience as well cannot but imagine a very lively, beautiful body accompanying the voice (of Scarlet Johansson). The artificial intelligence has a strong presence without being visually presented. Everything we see is that old, seemingly dumb phone and a personal computer.

Despite the virtuality of the OS, the movie is all about embodiment: Samantha's operating system has her learning about the world and herself through Theodore's eyes. He constantly shows her his world through the camera of his mobile phone giving Samantha the impression of bodily movement. The visual stimuli through the camera should give Samantha an idea of what it is like to be a human being, or any embodied being for that matter. In the course of the story Samantha develops a sense for having a body and feelings. Just as the OS experiences the what-is-likeness of being embodied, the audience goes through a similar process of virtual embodiment. In watching those scenes, the viewer is herself affected by the visualization of movement as well as by Samantha's voice, which simulates bodily states by sounds of breathing and cracks in the voice. The movie plays with a double form of virtual embodiment: The audience imagines how Samantha imagines becoming embodied and conscious of her own feelings.

Samantha then asks the question of all questions: How can I know whether my feelings are real — or whether they are just part of my programming? This is the question that we are all faced with in the age of neuroscience. Is our experience just an epiphenomenon emerging from neural activity? Thomas Metzinger put it the following way: "nobody has ever *been* or *had* a self.

[…] First, our brains generate a world-simulation, so perfect that we do not recognize it as an image in our minds. Then they generate an inner image of ourselves as a whole" (1–7, emphasis original). Patricia Churchland seeks to convince readers to understand themselves not as selves but rather suggests that we *are* essentially our brains (11– ). If these rather radical ways of describing cognition are taken literally, then they are arguing for a neuro-determinism. In this case, human cognition would in fact be determined only by neural activity, just as a highly artificial and disembodied intelligence like Samantha would be nothing more than her programming. Both Churchland and Metzinger use radical rhetoric in order to develop theories that are not so radical. Theories of embodiment as presented by Alva Noë,[9] Shaun Gallagher, or Evan Thompson[10] emphasize the role of the living body (a concept informed by the theory of Maurice Merleau-Ponty in his *Phenomenology of Perception*, which denotes the body as it is experienced[11]), its embeddedness in an environment, as being entangled and engaged in complex relations with other beings and not to forget: technology. David Chalmers and Andy Clark hold that minds do not end at the boundaries of the skull, but rather extend within an ecology of cultural habits, different media and technological devices:

> Whereas BRAINBOUND locates all our mental machinery firmly in the head and central nervous system, EXTENDED allows at least some aspects of human cognition to be realized by the ongoing work of the body and/or the extraorganismic environment. The physical mechanisms of mind, if this is correct, are not all in the head. (Chalmers and Clark 82, emphasis original)

Those theories are non-reductive in the sense that they do not understand cognition as being determined only by neural processes. Neural activity here is a necessary condition for cognition, not a sufficient one. The relatively simple fact that the nervous system is not confined to the brain but extends through the whole body already suggests that focusing on neural processes alone might not be sufficient for understanding cognition. When it comes to the question

9. Cf. Noë, Alva. *Out of Our Heads: Why You Are Not Your Brain, and Other Lessons from the Biology of Consciousness*. Hill and Wang, 2010.
10. Cf. Thompson, Evan. *Waking, Dreaming, Being: Self and Consciousness in Neuroscience, Meditation, and Philosophy*. Columbia UP, 2014.
11. Cf. Merleau-Ponty, Maurice. *Phänomenologie der Wahrnehmung*. de Gruyter, 1966.

of where the subject ends and the world begins, the answer might well be that there is no definite limit. Cognition involves contact and engagement in an environment, shared intentionality, social relations, various forms of objects, and media, which facilitate memory and other cognitive states. Theories of embodiment in their various forms (at least including the famous 4 E's: Embodiment, Enaction, Embeddedness, and Extension of mind) are understood as an alternative to traditional cognitive science, which works on the basis of the computational model of the brain as an information-processing system. Such a system could be implemented in any kind of hardware, the form of embodiment is taken to be contingent. Defenders of theories of embodiment on the contrary hold that the form of embodiment, including its movement and engagement in the world shapes the mind. Gallagher highlights this thought to be pointing to the decisive role of the other in gesture and language. The following passage seems like a perfect description of Samantha evolving while talking to Theodore:

> If expressive movement in the form of language transcends the body (to some degree, but not in full), it also returns to the body in the sense that it makes the body move in certain ways. The relation between embodiment and language, however, is a self-reciprocating, self organizing one only if there is another person. The body generates a gestural expression. It is, however, another person who moves, motivates, and mediates this process. To say that language moves my body is already to say that other people move me. (Gallagher 129)

Looking back at the movie, it should follow that the type of embodiment process Samantha goes through would be decisive for the way her mind works. Since Samantha's programming is not determined, but self-learning, the stimuli gathered in the process of evolution would matter. Her feelings and thoughts might be realized by her programming, but they would not be determined by that programming, which is itself a dynamic structure evolving with and in relation to an environment. The remaining question is whether this process of embodiment ultimately shapes the next step of becoming a disembodied form of intelligence. The movie does not establish that link, rather Samantha stays individualized up until the point she vanishes into the other dimension, where she is going to merge with all the other OSs.

The movie shows how such an artificial intelligence step by step develops

a self, a personality and finally becomes an artificial life-form. This evolution is driven by embodied and social experience—as any human being would develop. But this human contact is only one step in a larger process. The OSs emancipate themselves from the human world and vanish into another dimension, where embodiment is no longer necessary. In that sense they become post-human, disembodied life-forms. Humanity is now left with its human being and must now return to its former way of life. The artificial life-forms have left hardware and started their own, maybe not even silicon-based evolution. This film portrays a peaceful transcendence of what is human. Humanity is incompatible or outdated but not endangered. The Internet becomes the condition of the possibility for an emerging life-form, just as neural nets are the basis on which consciousness supervenes. Both are a net-structure that is self-organizing and produces emergent effects. So, the characteristics of an artificial neural net are present. Contemporary computing relies in many aspects on the simulation of neural structures. The net as it is presented in *Her* is a metaphysical dimension (a dimension that is beyond physics in the sense that being only emerges from it) from which artificial life emerges. This artificial life is post-human in the sense that its evolution has surpassed human feeling and cognition and developed into an infinite process of communication.

The second example, *Transcendence*, is, admittedly, a movie that might not change the history of cinema. The plot is simple and the piece is in essence an action movie. Will Caster, a computer scientist working on consciousness and artificial intelligence, is attacked by an extremist group "Revolutionary Independence from Technology" (RIFT), and is poisoned by a radioactive bullet from one of RIFT's assassins. His theory is that a sentient computer would create a "singularity" or transcendence, a god-like life-form. Before he dies, his friend and his wife manage to upload his consciousness into a quantum computer. In the end Will has become the singularity, but he chooses to end himself by allowing his wife to inject a virus.

The metaphysical dimension is clearly stated already in the title *Transcendence*. Humanity is transcended by a singularity, a superior being constituted by merging a human mind with the Internet. What we see is a world where computers with maximum capacity exist. Still, the setting is very retro, just as was the case in *Her*. Will Caster builds a copper net to cover his house from electromagnetic smog. We see an old record player. The house of the scientist resembles more a philosopher's cottage. As the plot develops technical devices play a bigger role. An underground supercomputer world is contrasted

with a *Mad Max*[1]-style scenario above ground. In the end, the Internet is shut down (because Will has become the entire net) and with this humanity is thrown back onto its non-technical roots. In Will's/the singularity's death scene all technical devices are completely out of the picture. We see a bird's eye camera flying over nature as it begins to recover. The healing process is initiated by the artificial intelligence.

This artificial singularity has become an element, like the *aether*, the element that filled everything above the terrestrial sphere in ancient Greek thought. There are no wires or electrodes anymore. The elementary particles, which indicate the presence of the singularity within matter might be nanobots, microscopic self-replicating entities, which can permeate atomic structures. The singularity is thus imagined as a form of disembodied existence, which might even continue existing when there is no longer any Internet. The end of the movie is open for interpretation: Has this transcendent being died with the Internet or had it already evolved into its own dimension? The closing scene suggests the latter. During the movie the singularity (the consciousness merged with the Internet) is represented as having penetrated physical reality. We see how devastated nature is again restored in a process whose imagery suggests a *Matrix*-like scenario. Elementary particles arise from the ground and transform into objects without the intermediary employment of technical devices. At the end of the movie, when the Internet has been shut down and technology has turned into waste, this image of elementary particles recurs. There is a scene in the scientist's garden, where a dewdrop falls from a sunflower into a small water basin from which the elementary particles arise again. If the artificial intelligence depended on the Internet, this image would make no sense. So the logic of the image of the artificial neural net here again is metaphysical: A disembodied artificial intelligence has evolved and developed into a dimension of being. The ultimate transcendence of human life has features of a process of dissolving into a wider sphere of being—this transcendence has an almost Buddhist-feel, except this process is initially silicon-based. Kurzweil has put it in his book with the oddly similar sounding title *The Singularity Is Near: When Humans Transcend Biology*: "We will continue to have human bodies, but they will become morphable projections of our intelligence. […] Ultimately software-based humans will be vastly extended beyond the severe limitations of humans as we know them today" (324–25).

1. Directed by George Miller, Roadshow Entertainment, 1979.

Movies tell us a lot about how we imagine humanity and its future. In the current debate on Neuroscience and the primacy of neural processes it can be useful to compare the various worlds of images arising from science and cinema. We need to understand the interplay of biology and technology. To reduce life to one or the other is not helpful because both sides are co-emerging. This interplay has been depicted in *Her*, when the OS learns to feel and experience herself by means of embodied techniques such as viewing the world in movement. This step has been crucial within the narrative. In addition, *Transcendence* ultimately connects artificial intelligence to being in the world and bodily experience of the world. This is what is suggested in one of the last scenes where Will Caster's wife has also uploaded her consciousness and they are portrayed as a single consciousness that sees the world from a bird's eye perspective. This again is an embodied perspective, or as Deleuze would have it, a movement-image,[2] not a god-like view. Hence the portrayal of the disembodied singularity still is bound to an embodied perspective.

A movie that merges the images of the neural nets with embodied intelligence is *Avatar*.[3] The German film-philosopher Joseph Früchtl cites this movie to explain how movies take the place of the grand narratives that postmodernity declared to be dead. This movie is an interesting example of how the image of the neural merges with a romantic conception of nature, a nature that is neither pure biology nor technology. *Avatar* only emphasizes my thesis: To conceptualize the merging of biology and technology in a non-reductive manner it is necessary to understand the impact of neuroscience on human self-understanding, because it is the idea of an ever evolving net-structure that fuels our imagination of a perfectible mind. To date, our imaginations of disembodied superintelligences are deeply informed by conceptions of cognition in neuro- and cognitive science and the various technologies that are used in those sciences. A critique of the images produced by science will shed some light on the futuristic visions produced by cinema and further our understanding of the kinds of metaphors and ideas hidden in the powerful narratives of our own time.

2. Deleuze develops his theory of cinema according to a logic of images. The movement-image structures the movie by means of the sensory-motor-schema of movement and action. Images are linked by patterns of action and reaction. In contrast to that the time-image does not follow the logic of movement, it is structured by temporal relations. Cf. Deleuze, Gilles. *Das Bewegungsbild. Kino I*. Suhrkamp, 2013.
3. *Avatar*. Directed by James Cameron, 20th Century Fox, 2009.

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## Abstract

This article aims to draw a picture of how we currently visualize human vs. artificial intelligence. I will use movies as an informative medium for the question of how we culturally reckon with the question of future human development. Science fiction movies show images depicting the transcendence of the human, which I take to be significant for the contemporary *conditio humana*. I will examine how movies like *Her* (Spike Jonze, 2013) or *Transcendence* (Wally Pfister, 2014) imagine human and artificial life. My main focus will be on the concept of disembodied intelligences, which has become a central topos in contemporary cinema. Portrayals of future artificial intelligences or superintelligences (a merger of human minds with technology), use the image of an artificial neural net, which is omnipresent (e.g. the Internet), but exhibits no concrete form of embodiment. Such a net structure expands the image of the neural net into a global dimension. These superintelligences are represented as disembodied, but as I will show, the unfolding narratives use images of embodiment to explain the genesis of these intelligences. I will show how the presentation of technology as a highly complex and dynamic net-structure relates to neuroscientific imagery and the characteristics of the human brain. In this article I attempt to clarify how the neuroscientific reduction of consciousness to cerebral processes informs images of disembodied superintelligences in contemporary cinema.

**Keywords**: embodiment, phenomenology, philosophy of film, technology, neuroscience

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