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Images Like Me: Material Engagement, Operative Images, Imagin-Actions

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Abstract

The intention of this article is to analyse some of the different ways in which the interactivity of inanimate objects has been discussed, with particular reference to images. In this context, it will be also proposed to consider a type of images, here called imagin-actions, which have specific characteristics different from those already considered in the debate. There is an extensive literary tradition according to which agency has since time immemorial been attributed to inanimate objects. Indeed, thanks to the imagination, human beings naturally relate to objects, and this would in fact constitute one of the fundamental elements for the development of the human mind. Now, with the advent of digital technologies, the actions of objects and images have acquired an operational quality, since they are capable of acting directly and concretely on the living world, and also of determining specific imaginative processes that entail the responsivity of things. However, in addition to having their own agency and operativity, imagin-actions do something more: they keep users in constant motion. By responding

to a series of requests, they ask for something in return, intensifying the level of interactive exchange between people and things and inevitably reconfiguring human creative processes.

Keywords Interactivity Imagination Agency Operativity Imagin-action

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What an Imagin-action Looks Like

K., the protagonist of the film *Blade Runner 2049* (D. Villeneuve, 2017), is in a relationship with Joi, a responsive hologram with human features. Joi is charming, beautiful, caring: the perfect woman. She is the ideal secretary and wife, fulfilling her partner's wishes even before he expresses them. But what are her deep desires? Perhaps out of overzealousness, taking to extremes the servile (and submissive) role ascribed to her in her coding, Joi wants to be a real woman in order to provide K. with the most satisfying companionship possible. As in the story of Pinocchio, Joi is a mere thing who wants more, to feel what human beings feel, to follow their path of growth. Even death, as she explicitly says, proves to be more desirable than her simulacral state, because that eventuality would be the natural result of a full and true life lived. As a measure of his deep affection for her, K. decides to give her an emanator, a device that will also allow her to appear and follow him wherever he goes.

Obviously, Joi's is a case of pure science fiction, we might be tempted to say. The contemporary Western world in particular has difficulty accepting that this tendency to relate to objects exists in reality: only the credulous "others," the ancients or the "savages," could really worship images, personify things, confound nature and culture.[1] Yet there are numerous examples of digital images that have now carved out their own space, more or less everywhere in the real world. One thinks of "biopictures," to use W.J. Mitchell's ingenious term, i.e. images that move and seem to come alive through the use of technology,[2] such as the "ghosts" of ABBA, Whitney Huston,

1 See B. Latour, We Have Never Been Modern (1991) (Cambridge, MA: Harvard University Press, 1993).
2 W.J. Mitchell, *Cloning Terror: The War of Images, 9/11 to the Present* (Chicago-London: Chicago University Press, 2011): 69-111.

Tupac and Hatsune Miku, which are currently touring the world.[3] The case of Hatsune Miku is particularly interesting, as this virtual idol represents no living being which has ever existed, and in addition is married to a human being.[4]

Recently, even the President of Ukraine, Volodymyr Zelensky, has had his video-portrait captured by the US company Evercoast by means of photogrammetry, enabling him to to address audiences all around the world.[5] Without having to download any application, one can simply use a mobile phone to scan a QR code, available on the website of Evercoast, and the holographic image appears: once access is granted to the device's location and camera, the image can be positioned in any place simply by

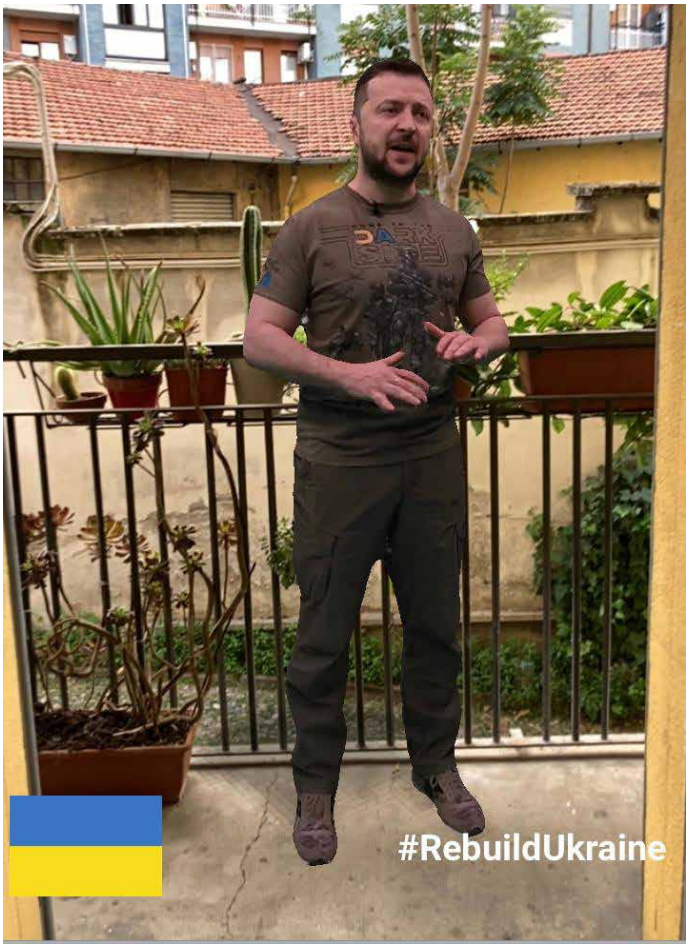

Fig. 1 – Ukrainian President Volodymyr Zelensky portrayed in augmented reality by EVERCOAST, photograph by the author.

3 A. Cross, "Upcoming Our Lady Peace Tour Plans to Take In-concert Holograms to the Next Level," *Global News,* (May 8, 2022), https://globalnews.ca/news/8812347/our-lady-peace-hologram-concert/, accessed September 25, 2024.
4 B. Dooley, H. Ueno, "This Man Married a Fictional Character. He'd Like You to Hear Him Out," *The New York Times* (April 24, 2022), https://www.nytimes.com/2022/04/24/business/akihiko-kondo-fictional-character-relationships.html, accessed September 25, 2024.
5 President Zelensky Hologram, *Evercoast* official page, https://ff.evercoast.com/, accessed September 25, 2024.

tapping on the screen. It is also possible to rotate, enlarge or reduce the image.

Images such as this are digital entities that are superimposed on the real-world environment thanks to augmented reality technology (AR), e.g. on mobile devices or smart glasses, which show them as integrated into a physical space. Whether they appear on a screen or as three-dimensional objects in space, AR images are responsive and often manipulable entities with which users can interact while sometimes even intervening in reality and communicating with other users. In this way, the user is no longer an observer, but rather an experiencer.[6]

Thus, AR images claim presence in real space: they appear clearly before our eyes, inviting us to approach them, to explore them in the round. They are not physical bodies, because when we bring our fingertips close to the screen we feel only the coldness of the surface, and when we try to grasp them where we see them thanks to the visor, we do not squeeze anything between our fingers. They do not really produce the sounds that accompany them. However, it is not enough to see them as "just" images. I suggest calling them imagin-actions because, whether they have human likenesses or not, they are animated, alive, moving around us.

But is this the first case of images that are so interactive that they seem to be animated? And if not, what distinguishes imagin-actions from the actions of other images?

Natural Born Interactive

As W.J.T. Mitchell wrote, "We are stuck with our magical, premodern attitudes toward objects, especially

6 See A. Pinotti, "Self-Negating Images: Towards An-Iconology," *Proceedings* 1, no. 856 (2017): 1-9, https://doi.org/10.3390/proceedings1090856.

pictures, and our task is not to overcome these attitudes but to understand them, to work through their symptomatology."[7] In a famous passage from 2005, he proposed a thought experiment: to assume the subjectivity and independence of images in order to ask "What Do Pictures Want?". For it does not seem that they are made only to be looked at: it is rather common to feel that they return our gaze, sometimes sharply and pointedly, to the point of suggesting that they are the ones asking us for something. Why else would we carry the photograph of our loved one in our wallet? As Susan Sontag wrote, pictures are often used as talismans that magically allow us to enter into another reality.[8]

In fact, digital technologies have brought into sharper focus forms of animism that have always existed in various human cultures (think of the case of automatons, dolls or statues).[9] Images and things tempt us into an interactive and reciprocal exchange, even when they do not have a physiognomy similar to our own. In 1998, the anthropologist Alfred Gell was about to complete his last work, *Art and Agency* (which remained unfinished), with conclusions significantly entitled *The Extended Mind*, in which he drew together the threads of a discourse devoted to the relationship between human beings and artefacts in general (images and objects, artistic or otherwise), considered as true social agents. He asserted the existence of an "isomorphy" between external and internal mental resources, all the parts of a person distributed among their various relationships with other people and things.[10] In this sense, human perception and cognition would be the result of a

7 W.J.T. Mitchell, *What Do Pictures Want? The Lives and Loves of Images* (Chicago: The University of Chicago Press, 2005): 30.
8 S. Sontag, *On Photography* (1973) (New York: Rosetta Books,2005): 12.
9 See D. Freedberg, *The Power of Images: Studies in the History and Theory of Response* (Chicago: The University of Chicago Press, 1989); H. Bredekamp, *Image Acts: A Systematic Approach to Visual Agency* (2010) (Berlin-Boston: De Gruyter, 2018).
10 A. Gell, *Art and Agency: An Anthropological Theory* (Oxford: Clarendon Press, 1998): 222.

constant confrontation between the brain, the body and the environment. In short, the human mind is inherently interactive and is itself an evolving artefact.

In the words of Lambros Malafouris, proponent of the now well-known Material Engagement Theory (MET), we do not think *about* things, we think *with*, *thanks* and *through* them. Material engagement, the relationship of body, brain and environment, is the process responsible for the emergence of the human mind.[11] Interaction with material culture is therefore not an incidental occurrence, but the mechanism underlying the evolution of our cognition.

Objects can be considered as true social agents because they are capable of initiating a series of events linked by a cause-and-effect connection, with transformative consequences on both sides. Of course, things do not act in the same way as human beings, they do not act in place of us, nor are they themselves simply acted upon. If anything, it is possible to introduce a distinction in terms of "sense of agency:" only humans would be able to attribute responsibility for their actions to themselves.[12] It is possible to recognise a degree of freedom for artefacts that are indeed external to bodily boundaries, while at the same time acknowledging that they are an internal part of cognitive processes. Thus, without denying the existence of individuals, one can continue to think of mind as an emergent and distributed process: it is "not a 'within' property; it is a 'between' property,"[13] therefore internal to the process of material engagement and not to the isolated person. In other words, thinking means acting in the environment, perceiving and interpreting it, sometimes having to deal with the friction, resistance and rigidity that characterise any truly interactive exchange between parties to a

11 See L. Malafouris, *How Things Shape the Mind: A Theory of Material Engagement* (2013) (Cambridge MA: The MIT Press, 2016).
12 L. Malafouris, *How Things Shape the Mind*: 214-215.
13 Ibid.: 85.

relationship. No area of the mind is exempt from interaction with things and the environment, if one considers that by mind one should also mean the affective and emotional dimension in the broadest sense, as is well captured in the pages Gell devotes to his mixed feelings of love and hate for his car,[14]or those in which Giorgio Agamben explores objects' rebellion and perfidy, responding to our attempts to connect with them.[15]

The necessity of the co-presence of human beings and things in creative cognitive processes returns forcefully in Pietro Montani's idea of a mutual empowerment of the two.[16] The human being is the animal that embodies the world,[17] and structures and produces itself in relation to it. The ambiguous character of our eternal balance between the outside and the inside of the individual, can be described as "atmospheric."[18] Consider the modulation of the breath that accompanies the different stages of thought, the pauses we take to breathe and think at the same time:[19] the development of the mind is radically linked to the most material aspects of the environment.

Sean Gallagher has proposed speaking in this regard of "affordance-based imagining," an imaginative action embedded and anchored in the environment, necessarily linked to the use of objects, a form of experimentation that he calls "active engagement with possibilities."[20] Holding that perception is a performance consisting of the active exploration and manipulation of the affordances of the environment since "we see things in terms of what *we*

14 A. Gell, *Art and Agency*: 28-29.
15 G. Agamben, *Stanze: La parola e il fantasma nella cultura occidentale* (1977) (Turin: Einaudi, 2011): 55.
16 P. Montani, *Tre forme di creatività: Tecnica, arte, politica* (Napoli: Cronopio, 2017): 46-48.
17 V. Gallese, "A Bodily Take on Aesthetics: Performativity and Embodied Simulation," in A. Pennisi, A. Falzone eds., *The Extended Theory of Cognitive Creativity* (Cham: Springer, 2020): 135-149, 145.
18 T. Ingold, *Imagining for Real: Essays on Creation, Attention and Correspondence* (London, New York: Routledge, 2022): 252.
19 Ibid.: 241.
20 S. Gallagher, *Enactivist Interventions: Rethinking the Mind* (Oxford: Oxford University Press, 2017): 194.

can do with them," Gallagher believes that "we should think that there is an aspect of imagination in perception itself."[21]

Indeed, according to a long-established philosophical tradition, the responsibility for this intimately relational way of thinking lies with the imagination,[22] whose material character has recently been highlighted by Maria Danae Koukouti and Lambros Malafouris, whose stated aim is to "challenge a disembodied, purely representational way of thinking about"[23] it. From this perspective, imagination is not something that happens in the head: it is a material mental process, not only internal, nor only private, one which emerges from the relationship with things, during an action, bodily and precisely located.

Our engagement with objects is thus in many cases not automatic and unconscious (as is the case with neural processes). There is a relationship of co-constitution between people and things, which involves not only the relocation of a number of cognitive processes outside the individual's physical body, but rather a real reorganisation of the mental structure, which is modified according to the artefacts we ourselves create.[24] The relationship between body, brain and environment is not a sign of human thought, it is itself thought;[25] if one of these parts is missing, cognition is also missing. For this reason, the material imagination is immanent to the creative act and does not precede it: if we take the example of working with clay, the initial idea of the final result never corresponds to the object actually made, which is rather the consequence generated by the craftsman's relationship with the clay in that specific event. The material responds to every human impulse, in

21 Ibid.: 197.
22 See E. Garroni, *Estetica ed epistemologia: Riflessioni sulla "Critica del Giudizio"* (Rome: Bulzoni, 1976); M. Ferraris, *L'immaginazione* (Bologna: il Mulino, 1996).
23 M.D. Koukouti, L. Malafouris, "Material Imagination: An Anthropological Perspective," in A. Abraham, ed., *The Cambridge Handbook of the Imagination* (Cambridge: Cambridge University Press, 2020): 30-46, 30.
24 L. Malafouris, *How Things Shape the Mind*: 76-77.
25 Ibid.: 38.

turn creating impulses and opening up at least partly unforeseen directions of work. Imagination is the glue that holds the various parts of the environment together, mediating and modulating their cooperation: none of them, taken separately, is sufficient for imaginative action. If more intuitively we would be inclined to deny imagination to things (in this case, clay) without their human counterpart, Koukouti and Malafouris make it clear that the same is true of the brain or the body as a whole: "Outside this context of creative material engagement there is very little that the potter's brain and body can imagine. […] It is the actual engagement with clay that offers an opportunity to imagine."[26]

As Martin Heidegger has brilliantly pointed out, Immanuel Kant had already wrestled with the problem of the ambiguous nature of the imagination, a hybrid *par excellence*, neither fish nor fowl, neither sensitivity nor intellect, and yet at the origin of both.[27] If we can indeed consider human beings as imaginative animals, born to be interactive, it is not surprising that they in turn present an ambivalent nature, imaginatively inclined to be complementary in various ways with the rest of the environment, animate and inanimate. And yet, there is often resistance to accepting this structural imaginative exchange with matter.

Operativity Beyond Agency

The tendency to exploit, suffer, evaluate, invoke and fear the agential potentials of artefacts, including images, is thus decidedly older than the latest technologies, and imagin-actions in particular. In this sense, perhaps no image has ever been "just" an image. In the scholarly literature on the subject, however, it has often been suggested

26 M.D. Koukouti, L. Malafouris, "Material Imagination:" 42-43.
27 See M. Heidegger, *Kant and the Problem of Metaphysics, Enlarged* (1929) (Bloomington: Indiana University Press, 1997).

that contemporary images are even less so, that they have somehow accessed the human world in a different, unprecedented, more radical and disturbing way. In the contemporary mediascape, the autonomy and vitality of the image has taken on a distinctly operative flavour.[28] A certain agency of the image has always been present, but the specificity of many of the images produced in the last three decades lies in their ability to operate directly on the physical world, producing concrete consequences.

The first to speak explicitly of operative images in this sense was the filmmaker Harun Farocki, in a series of writings and artworks produced in the early 2000s, beginning with the *Eye/Machine* series (2000-2003). The prime focus of Farocki's reflection is war, especially The Gulf War, which was extensively documented in videos and photographs. As Farocki noted, the vast amount of such visual material, the form and content of which could be carefully constructed, led to a paradoxical mystification of the nature of the conflict, which was received in the same way as a film or a children's video game. What was hidden in plain sight was the provenance of the images (in which human beings are rarely present), coming directly from the battlefield, mostly taken from the very instruments of destruction, such as bombs.[29] While they may also be used so as to represent the conflicts, they are in fact the interfaces that allow the military to identify (and consequently destroy) sensitive targets. The main novelty introduced by operative images is therefore the reversibility of their agentive scope: not only do they provide information through visualisation, but they also translate the procedures carried out by the user on the machine that implements them into concrete actions

28 B. Grespi, L. Malavasi, *Dalla parte delle immagini: Temi di cultura visuale* (Milan: McGraw Hill, 2022): 22-23.
29 H. Farocki, "Phantom Images," *Public*, no. 29 (2004), https://public.journals.yorku.ca/index.php/public/article/view/30354, accessed September 25 2024.

in the world: “These are images that do not represent an object, but rather are part of an operation.”[30]

Farocki has in mind the reflections of Vilém Flusser, who only a few years earlier had written about technical images, an expression he used in the mid-1980s to refer primarily to photographs and television images. For Flusser, these are the main vehicles of information and culture in the current era, replacing linear texts. Unlike the images that preceded them, they are “mosaics assembled from particles,”[31] not “observations of objects,” but “computations of concepts,”[32] put together by a unifying ability (significantly, Flusser uses the term *Einbildungskraft*, which stands for “imagination” in Kant). Technical images parcel out reality, translate it into bits of information, and then offer the human eye a synthetic, or rather a reasoned, reconstruction of these elements.

While Flusser remains ambiguous about the degree of independence that can be accorded to technical images, he points out that the interaction of technological and human elements is necessary for their operation.[33] Technical images do not think on their own, but need someone who knows how to carry out the activity of synthesis they presuppose and who guides the operation of the device, albeit within the possibilities it offers. In this respect, Flusser speaks of an “envisioner.” Envisioners enable the constitution and interpretability of technical images, and ultimately of the world that is fragmented and literally re-synthesised within them. As Flusser himself acknowledges, envisioners always work at the interfaces of the technological tools at their disposal. Some technicians are given the opportunity to think more deeply about codes, but it is true that such

30 Ibid.: 17.
31 V. Flusser, *Into the Universe of Technical Images* (1985) (Minneapolis-London: University of Minnesota Press, 2011): 6.
32 Ibid.: 10.
33 Ibid.: 22.

knowledge is not necessary for the envisioner's activity, and that most of the process remains in a realm invisible to the human eye.

Following Flusser's and Farocki's reflections, Trevor Paglen has noted that, in recent years, operative images are in fact images made by machines for other machines and that they are, strictly speaking, completely invisible. The machine does not need an interface: if at least the operative images Farocki spoke of were made for the benefit of the human being, most of the operative images necessary for the realisation of a given process are nowadays not seen by anyone,[34] because they have now taken the form of "instructions for action."[35]

Faced with such a dramatic position, A.S. Aurora Hoel has emphasised the importance of maintaining the role of the human agent. While technology can work autonomously, even communicating with other technologies, all the intentions, purposes and procedures are human, as is the responsibility that goes with them: "Operative images are utility images, and as such they belong to a wider family of instruments and tools, which are constructed by humans to serve practical human purposes."[36]

Studies on this issue have expanded to include the most diverse meanings of operativity. The meaning that can be ascribed to this term therefore takes on different shades depending on the modes of operativity that are emphasised on each occasion. Jens Eder and Charlotte Klonk, for example, have provided a complex reading, according to which image operations occur in direct and indirect ways,

34 T. Paglen, "Operational Images," *e-flux*, no. 59, (2014), http://e-flux.com/journal/59/61130/operational-images/, accessed September 25 2024.
35 T. Elsaesser, A. Alberro, "Farocki: A Frame for the No Longer Visible. Thomas Elsaesser in Conversation with Alexander Alberro," *e-flux*, no. 59, (2014), http://e-flux.com/journal/59/61111/farocki-a-frame-forthe-no-longer-visible-thomas-elsaesser-in-conversation-with-alexanderalberro/, accessed September 25 2024.
36 A.S.A. Hoel, "Operative Images. Inroads to a New Paradigm of Media Theory," in L. Feiersinger, K. Friedrich, M. Queisner, eds., *Image – Action – Space: Situating the Screen in Visual Practice* (Berlin, Boston: De Gruyter, 2018): 11-27, 15.

generating consequences in the political sphere, even to the point of determining the life and death of people (or the environment in general). Often divulged over the Internet and sometimes exceeding the expectations and intentions of their creators, operative images act as evidence of war crimes, as instruments of surveillance and control, but also of destruction, information and protest.[37] Recently, Chiara Cappelletto has focused on the specific case of brain imaging, pointing out how it reveals traces of the structure or performance of mental activity, but does not provide true pictures of the brain: in fact, we see what does not exist in a visible form.[38] Some researchers have focused on codes and algorithms, which have always been necessary for the production of *ante litteram* operative images, such as maps or architectural drawings.[39]

Since their nature is indeed mathematical, one might ask, as Hoel does at the end of her article, why it is still necessary to speak of operative images *as* images. However, the choice of an iconic interface (even if often accompanied by sound elements) is by no means secondary. In fact, the image here assumes a shielding function, responding to the etymological meaning of the word "screen", understood as that which both protects and conceals.[40] Precisely because the purposes behind the operation of the devices are entirely human, the interface is never completely lost. The decision to use images can be practical in many ways: a code too can be read and interpreted, but an image can be understood even by those who are not familiar with the language. In this sense, an

37 See J. Eder, C. Klonk, eds., *Image Operations: Visual Media and Political Conflict* (Manchester: Manchester University Press, 2016).
38 C. Cappelletto, "Brain Image Making and Cyborg Visuality," *Reti, saperi, linguaggi* 11, no. 21 (2022): 87-104, 10.12832/104542.
39 L. Manovich, *The Language of New Media* (Cambridge: MIT press, 2001): 153; see J. Parikka, *Operational Images: From the Visual to the Invisual* (Minneapolis: University of Minnesota Press, 2023).
40 M. Carbone, *Philosophy-Screens: From Cinema to the Digital Revolution* (Albany, NY: SUNY Press, 2016): 67.

architect working with digital tools learns how to manoeuvre the interface without having to acquire programming skills. It is an envisioner that, as Flusser wrote, remains on the surface. Through images it is also possible, as Farocki already noted, to simplify a problem to the point where synthesis can turn into falsification. The representational nature of the image thus fits into a game of appearances and disappearances: if the image by definition shows reality, then what it does not include simply does not exist. While it is true that understanding images at an elementary level is relatively easy, knowing how to infer all the implications and levels of their meaning is a task for specialists, requiring careful and specific training. For example, a soldier who sees black and white images, such as those Farocki has written about, will know that they are the interface of a deadly weapon, often used perfunctorily and with results that are not entirely predictable; a civilian unaccustomed to thinking about the matter might instead read them as the most surgical way of approaching warfare, allowing bloodshed to be kept to a minimum. Similarly, many of us have experienced utter disbelief when faced with a doctor explaining in detail what she sees on an ultrasound scan that is meaningless to us. In this respect, James Elkins has spoken of "informational images," which, moreover, constitute the majority of the contemporary iconosphere, far outnumbering artistic images.[41]

What Do Pictures Want (Today)?

Returning to Mitchell's question, in light of the debate about the responsiveness of contemporary images one might ask: What do pictures (today) want? For some of today's operative images, it seems possible to hark back to the answer that Joi would give: to be like us. Indeed, there

41 J. Elkins, *The Domain of Images* (1995) (Ithaca-London: Cornell University Press, 1999): 6.

is often such a continuity between image and reality that "the essential otherness of images is lost."[42] In his recent research, Andrea Pinotti has used the term "an-icon" to refer to this phenomenon. According to Pinotti, some images, of which there are various pre-contemporary examples (such as illusionistic painting), tend to present themselves as environments or elements within environments, paradoxically denying their own representational nature:[43] from an ontological point of view, these are icons which, however, try to masquerade, at least phenomenologically, as parts of the real world.

With the advent of operational digital technologies, the visible interface has by no means disappeared. On the contrary, it is as integrated as possible into the living world. According to Rinie Van Est, it is therefore possible to speak of an "intimate technological revolution"[44] with consequences for our bodies, our behaviour and our identity, since the technological devices we use, which often communicate with us through visual interfaces, are on us, in us, among us, and sometimes even imitate our behaviour.[45] In short, the so-called "new digital media" are so pervasive and autonomous that they are not solely agentive and operational. They can be considered "almost alive."[46]

This is certainly the case with the imagin-actions mentioned above. As it has turned out, they are also available to be conjured up even in our homes, to keep track of interaction and to change accordingly, in more or less complex ways: from the photogrammetry of Zelensky, which appears only where and when we want it and rotates

42 K. Purgar, "What Is Not an Image (Anymore)? *Iconic Difference, Immersion and Iconic Simultaneity* in the Age of Screens," *Phainomena* XXIV (2015): 145-170, 146, https://doi.org/10.14361/9783839441350-004.
43 See A. Pinotti, "Self-Negating Images."
44 R. Van Est, *Intimate Technology: The Battle for Our Body and Behaviour* (The Hague: Rathenau Instituut, 2014).
45 L. Royakkers et al., "Societal and Ethical Issues of Digitization," *Ethics and Information Technology* 20 (2018): 127-142, https://doi.org/10.1007/s10676-018-9452-x. 2018: 127.
46 See F. Cimatti, A. Maiello, *Quasi viventi: Il mondo digitale dalla A alla Z* (Turin: Codice, 2024).

as we wish, to the interfaces used in medicine, which are visualised via smart glasses and allow for more substantial transformations. The US company GigXR, for example, has developed the HoloPatient app, which displays standardised holographic patients along with their vital signs. Designed primarily for trainees, HoloPatient aims to provide scenarios that are as realistic as possible so that students can be trained to assess a patient's condition, starting with their appearance, behaviour and reactions, and make the most appropriate decisions in order to provide the right treatment.[47] The same can be done with three-dimensional,

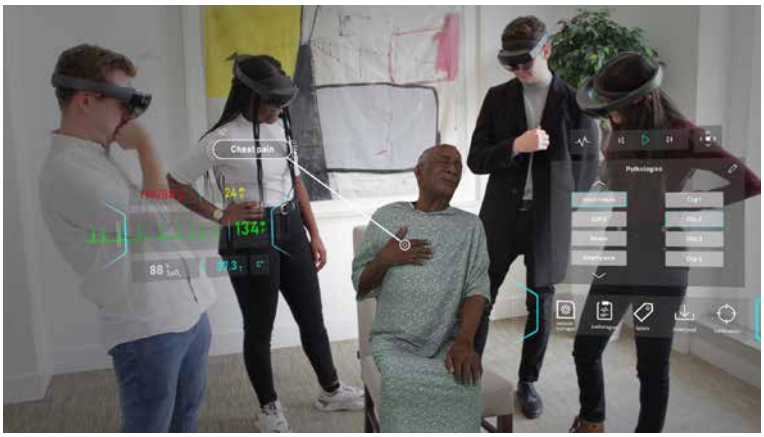

Fig. 2 – GigXR applicaton "HoloPatient," full environment view.

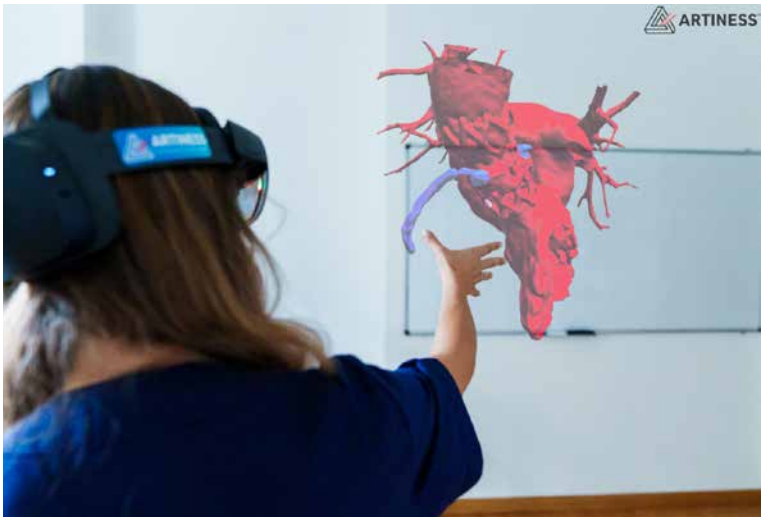

Fig. 3 – Cardiac surgeon navigating three-dimensional CT images of the patient superimposed on the holographic chest model. Artiness application "Articor."

responsive representations of individual parts of the body, as in the case of the Articor software developed by the Italian company Artiness to plan the progress of cardiovascular

47 HoloPatient, *GigXR* official page, https://www.gigxr.com/holopatient/, accessed September 25, 2024.

surgery, to assess the state of the patient or to assist the surgeon in the operating theatre.[48] Images of this kind are characterised by a tension between presence and representation: they reproduce a part of the world to the point of acting like it.[49] AR confronts us with living images that ask for instructions, but also invite us to act. Unlike a static mannequin, a HoloPatient moves, complains, can go into cardiac arrest, show the evolution of their conditions. More than just being agentive and operational, imagin-actions have broken through and crossed the threshold of the world of images, providing additional layers of possibility within the environment.

Because they require a high level of user engagement, involving complex actions and movements of different parts of the body, imagin-actions draw the user into a reciprocal play of forces. In fact, to operate these tools, you have to move in space, use your hands, turn your head or eyes, use voice commands, blink or make certain gestures. Some user surfaces, such as the skin of the wrist, are used as part of the device interface.[50] Unlike other types of an-icons, such as *trompe l'oeil*, they do not merely hide their iconic nature: AR entities are imagin-actions also because they make *us* move, act, react. In doing so, they make us objects of analysis and observation. If they want a body in physical space, they can only really enjoy the body of the user, whose desires they must constantly keep track of in order to fulfil.[51] In this sense, they

48 Articor, *Artiness* official page, https://www.artinessreality.com/#articor-link, accessed September 25, 2024.
49 A. Pinotti, "The Avatarization of the (Self)Portrait: Notes Towards a Theological Genealogy of the Virtual Self," in A. Geil, T. Jirsa, eds., *Reconfiguring the Portrait* (Edinburgh: Edinburgh University Press, 2023): 190-204.
50 For instance, this is the case with HoloLens 2, the most widespread smart glasses at the moment: HoloLens, Microsoft official page: https://www.microsoft.com/it-it/hololens/hardware#documenta-le-esperienze, accessed September 25, 2024. However, as recently announced, the HoloLens project will be shut down in 2027: https://www.theverge.com/2024/10/1/24259369/microsoft-hololens-2-discontinuation-support, accessed September 25, 2024.
51 All AR devices require tracking technology to function, although they vary in number and effectiveness.

show a propensity to control the user more than the user can control them.

Perhaps it has always been possible to act on the world through images. This is all the more the case today, thanks to AR imagin-actions, which allow operations reminiscent of paranormal abilities such as telekinesis and teleportation. In fact, this aspect does not represent a discontinuity with the imagination before its advent. Indeed, human experience is characterised by a magical feature, that dual movement which allows one to bring the world to oneself and to extend oneself beyond one's physical boundaries.[52] For a long and established philosophical tradition, to imagine is to operate at a distance, even in an occult, clairvoyant and telepathic sense.[53] Yet, the embodiment of the devices, the constant motorial and bodily participation of the user, the visualisation and exchange of information brought about by imagin-actions reconfigures the way we think about and in the world, changing modes of thought and practical action: in short, the aforementioned human affordance-based imagining. AR thus allows for an expansion of the operational potentials at hand, and it does so by using the resources that are fundamental to thinking in the environment, namely physical exploration and relationship. Then the activities to which it is applied can be transformed into a highly imaginative coefficient operation, enhancing the capacities of our senses. With Articor, for example, I can rotate the replica of a patient's heart using only my eyes and voice. I can open it and plan the actual surgical procedure, exploring how it will react, using gestures that do not involve physical touch.

In conclusion, in addition to being operational and informative, AR images are a special kind of an-icon

52 M. Merleau-Ponty, *The Visible and the Invisible* (1964) (Evanston: Northwestern University Press, 1968): 138.
53 See T. Griffero, *Immagini attive: Breve storia dell'immaginazione transitiva* (Milan: Mondadori, 2003).

that are not only responsive, but imply complex user responses, raising the level of true interactivity in the exchange between human beings and things. They give the impression that they can read and follow intentions, while in fact they read bodies through tracking systems. The relationship with inanimate objects, which defines us intimately and which, as we have seen, we need in order to think, is thus modified to the extent that it resembles the exchange between people.

However, the fact that they are highly interactive does not mean that they are independent: imagin-actions are made for human beings by other human beings. It seems, then, that we can speak of imagin-actions precisely because human imagination in particular, understood as the exploration and fine-tuning of interpretive and agentic strategies in physical space, proves to be the most attentional process of all, such that it can later be appropriately learnt and directed.

If objects are an integral part of our thought processes, innovation in their application will inevitably result in different ways of thinking. The increasing pervasiveness of AR tools in numerous areas of human activity may lead to a significant change in the way we think and imagine. The high levels of interaction generated by imagin-actions will lead to consequences that have only just begun to be contemplated, with implications in various different fields, including medicine, industry, art, advertising and warfare.

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