From Softimage to Postimage

Ingrid Hoelzl, Rémi Marie

Leonardo, Volume 50, Number 1, 2017, pp. 72-73 (Article)

Published by The MIT Press

FROM SOFTIMAGE TO POSTIMAGE

Ingrid Hoelzl, School of Creative Media, City University of Hong Kong. Email: <ingrid.hoelzl@cityu.edu.hk>.

Rémi Marie (independent writer), Digne-les-Bains, France. Email: <remi@apisteme.com>.

See <www.mitpressjournals.org/toc/leon/50/1> for supplemental files associated with this issue.

Submitted: 5 December 2015

Abstract

With the digital revolution, the photographic paradigm of the image has become supplemented with an algorithmic paradigm. The result is a new kind of image capable to gather, compute, merge and display heterogeneous data in real time; no longer a solid representation of a solid world but a softimage—a program-mable database view. In today's neurosciences and machine vision, the very concept of "image" as a stable visual entity becomes questionable. As a result, the authors propose that the need exists to radically expand the definition of image and abandon its humanist and subjective frame: The posthuman image—which the authors propose to call the *postimage*—is a collaborative image created through the process of distributed vision involving humans, animals and machines.

1. Machines, vision, images

In his "Provisional Instructions to Kino-Eye Groups" (1926), Dziga Vertov writes that the apparatus called *cinecamera* can "penetrate more deeply into the visible world,"exploring and recording visual phenomena [1]. In short: a machine of vision! But if it sees, it does so for humans and with humans. The title of his experimental film *Man with a Movie Camera* (1929) testifies to this close alliance between man and machine in cinematic vision. Today, almost one hundred years later, the development of computer vision will soon reach a stage where machines of vision no longer need human operators to guide their vision, nor human spectators to see their images. That is, we will move from the "kino eye" as a *supplement* to human vision to the robotic eye as a *substitute* to human vision: from the eye that sees to show, to the eye that sees for itself (or for other nonhumans). This is the horizon that we trace here: the obsolescence of human vision and its consequences on the status of the image.

2. On the relation between vision and image

In our book *Softimage* (2015), we have argued that the 15th-century architect, geometer and art theorist Leon Battista Alberti and his peers, through the use of the geometric tools of triangulation, built not only a new image (the perspective image), but also a new vision of the world [2]. We call this convention of seeing the *photographic paradigm of the image*: a paradigm that is based on the principle of the commensurability of perception and representation and which has determined, through a succession of technologies and over the course of almost six centuries, their forced convergence, from Filippo Brunelleschi's 1420 experiment up to today's Augmented Reality technologies.

The digital revolution brings new functionalities to this convergence of vision and representation. If, on the visual level, the photographic paradigm of the image remains operative, on the computational level the image reposes on a new, algorithmic paradigm. And these two paradigms function in perfect synergy: Powerful algorithms underlie today's image processing such as the ones used to stitch together billions of photo panoramas in Google Street View or to enable our smooth navigation in these panoramas. These algorithms—like Brunelleschi's experiment—aim at the best possible alignment of vision and representation. Centuries of training allow us "digital humans" to deambulate, with almost the same sense of presentness and spatial continuity, through the Google World and the city space, in a correlation of what we see on-site and on-screen.

3. From machine of vision to the softimage

Put differently: Linear perspective has been implemented in/by the human brain after centuries of adaptation—a sort of implant in charge of the computation of visual data—so that our system of perception (eyes/brain) has been augmented with a mathematical apparatus, the perspective system, which renders it capable of image framing and stabilization. The camera, as an image-producing tool, is a poor avatar of this complex apparatus of human vision or imaging, and, at the same time, its technical accomplishment, that is, its externalization. So the development of the modern machine of vision is based on two paradoxical moves: integration (in the human brain) and externalization (beyond the human body). The result of this double process is what we used to call the image.

With digitalization, the image becomes equipped with algorithms that gather, compute, merge and display heterogeneous data in real time. The result, however, is a different kind of image: no longer a solid representation of a solid world—a "hardimage" as it were—but an unstable algorithmmic configuration of a database: a "softimage." And while the famous 3D animation software *Softimage*® was rendered obsolete in 2015 (with product support ending in 2016), the softimage lives on . . . not only as a multitude of image-software, but in the sense that the image itself has become software.

4. The deconstruction/dissolution of image

The same "soft" understanding of the image in the sense of "program" is at play in the development of the neurosciences (and neural networks), where vision is modeled as a process taking place along specialized cortical areas, with each area computing specific data, related to, for instance, motion, form or color [3]. If the cortical areas are overlapping/interacting, at no point of this computation of visual data involved in human vision are there "stable visual entities."

Emulating this human machine of vision, machine vision follows the same logic: In automated border controls, assembly robots, military drones or distributed sensing systems, video cameras are associated to other sensors. The sensors furnish various data (visuals, sound, heat, movement, biometrics, etc.) that need to be processed, correlated, fused and matched with a database before human controllers (or the control program of autonomous machines/systems) can take a decision/action.

5. Image and data

With the concept of "image" dissolving under the assault of neuroscientific modelling and advances in machine vision, there are only two possible responses by image theory: either to abandon the concept (and thus the discipline) or to radically enlarge its definition/scope. We consider the second option.

Let us start with a very narrow definition of image as visual data rendered as a visual entity fixed onto a material support (sculpture, photo) or appearing on a digital screen. From there we can enlarge the definition to include all data that is rendered in visual form; this definition encompasses visualizations of nonvisual data (thermal, ultrasonic, etc). The third step is to consider the image as an ensemble of data that represents an "object" in codified form (bit-stream) or sensory form (2D, 3D, holographic, sonic, etc.). Eventually we can define "image" altogether differently:

 doi:10.1162/LEON_a_01349

as an operation and as a process rather than a representation. From our earlier definition of the image as program (softimage) we arrive in fact at a very large definition of the image: understood as the relation of data and of algorithms that are engaged in an operation of data gathering, processing, rendering and exchange. This fourth definition takes us beyond the limits of the humanist and anthropocentric concept of the image and opens a posthumanist *point of view* on the image. It takes us to a point where human vision is only one among many possible sentient systems and where we need to reconsider what images (and imaging) mean with regard to nonvisual sentient systems.

6. The robot's eyes: sensors, software, data

Mobile robots, remotely controlled or autonomous, involve images and imaging at many levels: at the level of orientation and navigation, at the level of survey and mapping and at the level of data integration and visualization. SLAM (Simultaneous Localization and Mapping), for instance, allows generating a map of unknown territory using odometry (position estimation using motion sensors), laser scanning and sonar sensors. Hyperspectral Imaging captures a much larger visual spectrum than traditional optical instruments; it allows to build an image constituted of as many layers as frequency bands and thus, to characterize/classify the objects in the scene based on their spectral properties. Multisensor Data Fusion allows to merge data captured by different sensors or agents of a given system, and Distributed Consensus Algorithms allow to reach decisions among collaborating vehicles operating on the ground, in the air, on the water, underwater or in space.

In short: The robot's eye—coming a long way from Dziga Vertov's kino-eye—is a complex interplay of sensors, sensor data, control algorithms, actuators and vehicles, and it is where our fourth definition takes its full meaning. Until totally autonomous systems are operative, *imaging* still involves pilots, payload operators and image analysts, controllers and commanders [4]. As a consequence, we need to add to our definition of the image the relation of humans and machines that are engaged in an operation of data gathering/exchange.

7. Autonomous vision

But, given the rush toward autonomy of machines, we will be increasingly, as Rosi Braidotti put it, "confronted with a new situation, which makes human intervention rather peripheral if not completely irrelevant" [5]. The total autonomy of robots endowed with sensing/imaging capacities brings into question the fate of the image as a fundamental component of humanity. Moreover, the passage from human vision assisted by robots to fully autonomous robotic vision is part of what many fear as the imminent "robolution" or replacement of man by machines. Vision machines, as Paul Virilio calls them, will not only be endowed with vision, but also with cognition, discernment, decision and action. They will thus be intelligent and autonomous beings, similar to humans. Eventually, vision machines will function as "a kind of mechanized imaginary from which, this time, we would be totally excluded" [6].

More than 20 years after Virilio launched his lucid but ultra-pessimistic vision, we propose another way for the future of the image: a collaborative one. We call this alternative future of the image the *postimage*, the prefix *post-* indicating not an end of the image, but an opening toward an understanding of what it "always already" is [7].

8. Postimage

Since the image (and the forced convergence of vision and representation) is at the core of the humanist ideology, the postimage can only be addressed in the framework of posthuman(ist) theory: Just as the perspectival image has been a central element in the consolidation of the humanist episteme of "Man" as the center and operator of the world, the postimage plays an important role in the posthumanist episteme where humans/technologies/nature are no longer seen as separate (or even antagonistic) but as co-evolving and co-operating. [8].

With regard to the development of autonomous robots toward collaboration, we posit that the postimage is (or will be) not an objective (photographic) or subjective (human-centered) image, but a collaborative image. If with gregarious animals, sensing is distributed yet coordinated (*con-sensus*) *within* a given swarm, pack, herd, etc. [9], posthuman vision, on the contrary, is a collaborative vision distributed *across species*, that is, between machines/robots and humans/animals and any intermediary forms (cyborgs, biomachines, etc.), and the postimage comes to be defined as the collaboration of visioning humans/animals, data/algorithms and, increasingly, autonomous machines.

With this definition, we intend to open up a new field of inquiry: that of postimage theory, at the meeting point of neuroscience, robotics, AI, posthumanism and image theory.

References and Notes

The work described in this paper was partially supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China (CityU 21615316).

1. Dziga Vertov, "Provisional Instructions to Kino-Eye Groups (1926)," in *Kino-Eye: the Writings of Dziga Vertov*, Annette Michelson, ed. (Berkeley/Los Angeles/London: University of California Press, 1984), p. 70.

2. Ingrid Hoelzl and Remi Marie, *Softimage: Towards a New Theory of the Digital Image* (Bristol/Chicago: Intellect/Chicago Univ. Press, 2015).

3. Michael Jenkin and Laurence Harris, eds., *Cortical Mechanisms of Vision* (Cambridge: Cambridge Univ. Press, 2009).

4. For an analysis of the complexity of drone imaging, see Derek Gregory 2012, "From a View to a Kill: Drones and Late Modern War," *Theory, Culture & Society* 28: 7–8 (December 2011): 188–215; and Gregoire Chamayou, *A Theory of the Drone* (The New York: The New Press, 2015).

5. Rosi Braidotti, *The Posthuman* (Cambridge: Polity, 2013), 43/44.

6. Paul Virilio, "The Vision Machine," in *the vision machine*, trans. Julie Rose (Bloomington/Indianapolis: Indiana Univ. Press, 1994), p. 66.

7. Iris van der Tuin, "The New Materialist 'Always Already': On an A-Human Humanities," *NORA—Nordic Journal of Feminist and Gender Research* 19:4 (Oct 2011): 285–290. DOI: 10.1080/08038740.2011.620575.

8. Rosi Braidotti, *The Posthuman* (Cambridge: Polity, 2013); Donna Haraway, "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin," *Environmental Humanities* 6 (March 2015): 159–165; Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2007); Brian Massumi, *What Animals Teach Us about Politics* (Durham/NC: Duke Univ. Press, 2014); Cary Wolfe, *Zoontologies. The Question of the Animal* (Minneapolis: University of Minnesota Press, 2003).

9. James Elkins and Erna Fiorentini, "Animal Vision," *Visual Worlds*, Chapter 4 (Oxford: Oxford Univ. Press, 2016 forthcoming); Jussi Parikka, *Insect Media* (Minnesota: University of Minnesota Press, 2010).