

ISEA2024 Artist talk / work in progress

Heat

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Abstract

The introduction of new imaging technologies, is giving rise to new worldviews. This is a slow process. Originating in military applications, adopted by innovative start-ups and manipulated by artists, these technologies sweep, enrich or replace 'old' knowledge. Over time, they reshape our perceptions of the world, instigating a shift in how we think about reality. A new logic is introduced, directing actions before it shapes understanding.

Keywords

Computer vision, (near) infrared, thermal, time-based, post-optic, more-than-human, perception, algorithms, nonlinearity, Everwhen.



© Dirk vd Herik, dog left 30 min ago, thermal image

Introduction

Since its invention, photography has been used to represent reality. It acts as a proof or testimony, capturing the now to look back on it in the future. This optical chronology came to an end with the introduction of algorithmic images. The *post-optic*¹, as Carolyn L. Kane calls it, is both an extension and a challenge of the logic rooted in optics. Algorithmic images have the capacity to make visible what is outside the human spectrum. With the aura of authenticity inherited from the optical age, they reveal things invisible to the naked eye.

¹ The *post-optic model*, which sees the image as the result of an output, a transcoding, a simulation

Post-optic

Digital infrared is considered the clearest demonstration of the *post-optic* or algorithmic, transcoding non-visible data into our visible field and expanding human visual territory. In military applications and facial recognition, digital infrared can also be used alone as an input for decision-making. Incognito, it participates in the invisible dialogue that shapes the human domain.

The memetic relationship of the optical world does not exist in the *post-optic*; the relationship between the real world and its image is constantly mediated by data and information algorithms. Digital infrared (and also ultraviolet) images are interpretations or translations of an unseen world.

Close to the human spectrum, the *post-optic* scares us. Just beyond what we can see with the naked eye - birds and bees can see it - the digital near-infrared reveals a (slightly) different reality. Light behaves differently, colour has to be interpreted within wavelengths perceptible to humans. In the 'just beyond', skies turn black, eyes turn into dark pools, veins become clearly visible. We want to stay away from the uncanniness of the 'just beyond' that challenges our norm and confronts us with what surrounds us.



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Slightly further away from the human spectrum, the *post-optic* questions the inherent nature of photography as a 'witness' or 'evidence.' Algorithmic images, with their capacity to portray both past and future, expand the temporal scope of optical image capture, transcending the immediate

determined by algorithms and mathematical models. Kane, 2014, pp. 211-240

present. Predictive scanning leverages historical data to "see" information in the current moment and anticipate future occurrences. Thermal cameras, for instance, can trace residual bodily heat on surfaces, long after the subjects have gone.



Photo credit: resources Altium.com

Heat

Infrared thermography (IRT) is a technology that uses infrared radiation to create images of objects based on their temperature. Being used in construction building for finding heat-leakage, in surveillance technology to make humans and other warm-blooded animals become visible at day or night. In face recognition technology. During the Covid 19 pandemic thermal cameras were broadly used in public places to detect early-stage corona infections.

Some living creatures have natural organs that have thermal imaging capability. What is commonly called a pit organ, allows some snakes to essentially "see" radiant heat at wavelengths between 5 and 30 μm , allowing them to strike prey accurately even in the absence of light.



© from the paper What Happened 3 Seconds Ago?

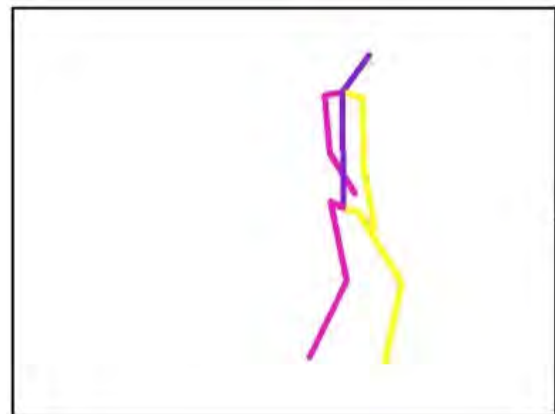
The paper *What Happened 3 Seconds Ago?*² makes clear how thermal imaging is capable of capturing the present and the past in one image. This computer vision study focusses on human indoor movements and combines thermal imagery

and PoseNet algorithms to extend the 'real time' image towards past and future. Heat images of traces and bodies are captured and combined with datasets to infer future movement. Thermal image technology turns photography into a 'time-based' or multi perspective medium, capable of catching an extended here and now.



© from the paper What Happened 3 Seconds Ago?

With the introduction of new imaging technologies, new worldviews are being created. Or are old worldviews being restored? Confirmed? Do (near-)infrared images, bridging the visible and the non-visible, have the capacity to broaden our norm? Can the *post-optic* expand our anthropocentric worldview, into wavelengths perceivable by animals and machines? Paving the way for the extrasensory and contribute to a shared and interconnected reality? Fostering interactions amongst all entities – be they machine, human, or otherwise?



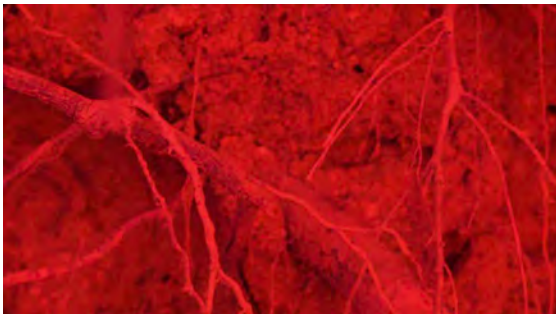
© from the paper What Happened 3 Seconds Ago?

In my artist talk I want to focus on the *post-optic* as a visual & conceptual point of departure that could restore ancient knowledge, enhance a human and nonhuman (animals & machines) coexistence and create and capture a

² <https://arxiv.org/pdf/2304.13651.pdf>

timespace that is radically relational. Catch the Everywhen.

I will talk about my work-in-progress Heat (working title) in which I am experimenting with thermal imaging and its ability to capture the simultaneity and coexistence of past, present and future. About the intimate relationship humans and other animals have with their environment and objects. On how this relationship becomes visual by making visible how heat is transferred, shared and leaked. About the visual similarity of heat traces with ghosts, shadows, doppelgangers, about non-linearity and multiperspectivism. The project will most probably have the form of a film-essay and will sequel my latest video NIR³, which will also part of the artist-talk.



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In NIR I investigate the possibilities of a shared, inclusive timespace by exploring visual realms that are invisible to the (human) naked eye, but can be seen by machines and animals. Leveraging technology's ability to re-imagine, boundaries are slowly shifting between human and nature. Norms

are challenged in the close-ups of flesh-like trees, blood-like mountain streams and cyborg-humans.

References

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What Happened 3 Seconds Ago? Inferring the Past with Thermal Imaging Zitian Tang¹ Wenjie Ye¹ Wei-Chiu Ma² Hang Zhao^{1,3} 1 IIS, Tsinghua University 2CSAIL, MIT 3Shanghai Qi Zhi Institute

Rosemary Lee, *The Limits of Algorithmic Perception: Technological Umwelt* 2012, conference paper, 2018

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³ NIR

4K video, 15", ultra-soundscape, 2024 trailer:

<https://vimeo.com/893683413?share=copy>