



**OPERATIONAL**

**IMAGES**

**FROM THE VISUAL**

**TO THE INVISUAL**

**JUSSI PARIKKA**

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to the Invisual

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## Platform Operations

First, dear reader, a thank you for your patience: you have made it this far, and I am moving deeper into the concept of the invisual. After all, the term was promised to be central for the developing argument, and so far, I have given only brief glimpses into the term's use. Consider the postponement of this discussion to here, the second chapter of this book, as a kind of a watershed moment, for the argument of the book oscillates back and forth between visual and invisual culture. There is additional potential in the term "invisual," which might be more useful in the long run than keeping with the invisible. It is a peculiar neologism, as prepositional twisting often can be: the shift from the visual to its negation also includes the metaphorization of space that becomes helpful, too.<sup>19</sup> It is both a negation (prefix) *and* a spatialization (preposition) of the visual, and it includes an expansion from optics of vision to logistics of data, but entirely "in" space—literally. Not that this shift from invisible to invisual is one of linear historicization: "the invisual" becomes a heuristic term, and like "operational image," helps to reevaluate historical sources in a different light. This resonates with some media archaeological methods that read recursively in and across historical periods.

The term "invisual" developed and used by Adrian Mackenzie and Anna Munster describes "platform seeing," which offers a useful, interesting, and smart way of dealing with the dilemma of images in computational platforms. At what level can we claim that we are addressing images even when they do not cater to traditional forms of human seeing or observing? This is a question that is implied in the legacy of operational images as well: the computational is one threshold for what defines visibility, but even more specifically, digital platforms as environments of aggregation and operationalization of images become a more specific place where this focus condenses in relation to the economy and ecology of power. It is also on platforms where images turn into diagrams that can be operationalized in the technical sense and legal and other ways. If operational images always already were images defined by operations of measure, scaling, quantification, comparison, and analysis,

in which ways does the platform become one key site that continues, as well as transforms, that legacy?

Mackenzie and Munster use the term “invisual” in their discussion of assembly and operations of images in corporate platforms from Facebook to Nvidia. This view to platforms includes multiple components from software and services to hardware and image processing. It is not restricted to platforms in the business or legal sense (although there are clear implications at stake). Their approach underlines an important lesson about images in technical and logistical terms. Images always come as series, that in Sekula’s words, constitute a traffic in images since the emergence of photography: quantity and value in circulation.<sup>20</sup>

Mackenzie and Munster are focused on the formatting and preparation of images as part of the operational status of the platforms, not on what happens or does not happen to the photographic image. This pragmatic, even methodological stance asks: What is being done to the image, and how does this logistical operation define its usefulness and function? The image as an aggregated series is a central starting point to what the image is and how it is being captured and observed: “Their operativity cannot be seen by an observing ‘subject’ but rather is enacted via observation events distributed throughout and across devices, hardware, human agents and artificial networked architectures such as deep learning networks.”<sup>21</sup> Observation and sensing become the central tropes for this operation that shifts the stakes further from *visual* culture while also addressing the mass-image as defined by Cubitt. Observation is sensing in the broadest sense (a smart city of sensors and other data capture points, for example) and includes mathematical functions as (partial) observations of data.<sup>22</sup>

Besides the accumulating quantity of images captured and mobilized in platforms, the invisual mass-image is an example of administrative data media that is found in relational databases with operations of locating, identifying, recognizing, and measuring among the attributes of interest:

Relational databases like these are more interested in metadata—geolocation, personal identifiers, device identifiers, date stamps, facial recognition, distances and dimensions recorded by auto-

focus functions, upload addresses and the kinds of measurement prized by astronomical and meteorological databases. Commercially operated databases combine such data with data from searches and likes, swipes, shares, tags and other interactions, to construe from the relations between images a mass image of the world in constantly evolving organisational diagrams that only machines can read.<sup>23</sup>

When anything can be made into an image—a series of patterns for analysis or an organized set of pixel relations presented on a digital screen—the constitution of the image as “soft” has been argued to be a central aspect of this transformation that also includes operational images. The claim that we are dealing with algorithmic processing (to paraphrase Hoelzl and Marie)<sup>24</sup>—and not geometric projection—as the image’s primary quality is radically developed further to include the preparation of material that can be processed as if an image but for various ends other than human perception. Images can have other autonomous functions regulating, ordering, controlling, and relaying. Instances of data visualization since the eighteenth century could also be considered as part of this lineage of “proto data media”:<sup>25</sup> the emergence of charts, graphs, tables, and diagrams as central features of modern statistics (consider William Playfair’s *Commercial and Political Atlas and Statistical Breviary* of 1786). Mackenzie and Munster write that invisual perception goes further than recapping machine vision. What is meant by observation and sensing is more than a substitution of human agency with machines or data:

Such a mode suggests that while visual techniques and practices continue to proliferate—from data visualization through to LIDAR technologies for capturing nonoptical images—the visual itself as a paradigm for how to see and observe is being evacuated, and that space is now occupied by a different kind of perception. This is not simply “machine vision,” we argue, but a making operative of the visual by platforms themselves.<sup>26</sup>

This *making operative of the visual* is where the relation to the main theme of this book emerges: it is not the image but the platform

where (distributed) agency lies in this shifting regime of (in)visuality. What is recognized as an image is also an operation of data, commerce, law, and so on, defined by the complex ecology of platforms. There's no individual observer or one individual image as the process of pattern recognition is automated through different techniques such as convolutional neural networks that are central for image analysis en masse.<sup>27</sup> The fantasy space of pattern recognition resides in a particular assumption about the epistemic world of data: there's always more; to work beyond the intelligible is the multiscalar promise that, instead of vast, invisible worlds of a micro- or macroscopic optical regime, is about the endless permutations inherent in data, training datasets for machine learning, relational databases, and their operations across platforms that reformat their surroundings.<sup>28</sup>

Image ensembles feed forward to the creation of (statistical, mathematical) models for various bespoke tasks. The example used by Mackenzie and Munster of the DeepMind company's AI model for the game of Go shows the operationalization of and through the invisual domain: a world that is approached as patterns, diagrams, series, and data. The AlphaGo program was widely discussed in popular discourse between 2015 and 2017 as it beat several leading Go players, demonstrating how effective the neural network had become in playing the infamously complex board game. Using the Monte Carlo tree search in mapping and identifying the effective decision patterns functioning at the back of the neural network also implies interesting points about the centrality of cognition as perception, as observation. In provocative terms, Vladan Joler and Matteo Pasquinelli describe "the history of AI as the automation of perception," where the automation of perception is understood as "a visual montage of pixels along a computational assembly line."<sup>29</sup> Here too, the (so-called) machine intelligence that goes into playing Go has a special version of pattern recognition as a new kind of cultural technique<sup>30</sup> that sorts invisual observations (from images to remote sensing data) into operational actions.

Go game squares are also a visual pixel grid. Such grids can be operationalized in a logistics of images that can be adjusted into multilayered neural networks and thus inserted into training sets: game boards like Go can thus become a  $19 \times 19$  observational ma-



trix. Here, cognition is observation and is further processed as images integrated as heterogeneous forms of data into platform operations. This does not imply an image in the traditional sense but the logistics of platforms that create, organize, and mobilize data and datasets. Furthermore, from a  $19 \times 19$  pixel space, the scaling up to millions of pixels across millions of images becomes the space where these problems are computationally challenging and wonderfully emblematic of an operative ontology of multiscalar data. As Mackenzie and Munster write:

We draw attention here especially to the primacy of image ensembles; the model trained via the DeepMind platform “learns” by observing many images. AlphaGo acts in the world to the extent that local spatial correlations can be associated with actions and rewards for those actions. The development of these systems centres on many cycles of observation followed by action. This cycling through observation and action constitutes the “training” of the model; a training that seemingly requires very little “prior knowledge” on the part of the model since it only receives pixels and game scores as input.<sup>31</sup>

Pixels in, models out. So-called images in, so-called statistical models out. The transformation enabled by such invisual platforms seems to produce one form of operationalization that describes not only a technical but also a political reformatting of the world that is one version of what Benjamin Bratton coins as platform sovereignty operating “within territories that are composed of intersecting lines, some physical and some virtual.”<sup>32</sup> This new political geography of data rearranges planetary visibility according to a different logic than traditional cartographic projection.

Go could be claimed to be just another abstract and formal example that the history of (symbolic) AI has mobilized so many times, but in fact, platform invisuality adjusts to multiple kinds of live situations too. Many examples of research projects with cloud robotics, machine learning, and other experiments with making the real world into an observed “image” testify to this: consider, for example, the work on Dex-Net cloud robotics and point cloud data of 3D object models. Moreover, the perceptual capacity of machine vision,

learning, and platform invisibility is not restricted to “ready-made” pixel arrangements: platforms are involved in different dynamics, from urban life to environmental earth observation to agricultural innovation—even “platform ruralism.”<sup>33</sup> Such powers of operationalization define its particular grip on different material sites of reality: the smartphone, the image sensor inside the smartphone, urban and nonurban sensors from access cards to facial recognition systems to thermostats to driverless cars (see chapter 5), a long list of systems that are often covered under “surveillance” but include much more specific cultural techniques that are nested with other cultural techniques (such as pattern recognition). Platforms thus both distribute (image-events of observation and capture across various dynamic situations of people and things) and integrate (synchronizing, synthesizing these events into series, into mass-images in datasets). It’s a push and pull of images and data, of sensor capture and projective modeling that drives these operative ontologies of the visual/invisual.<sup>34</sup>

In other words, invisual images demonstrate one updated version of the pairing of the visible/invisible as a shift to the observation of data relations and patterns. The operational image is integrated into platforms as well as machine learning procedures that take images as training sets and models. The refashioning of surfaces that can be read as images can be seen to work as one form of abstraction, but it is in all forms and ways real. These abstractions and invisual events effectively establish interfaces to those material worlds. This platform-based way of observing and modeling is also about integrating material worlds into data operations and producing handles that can change those worlds: “Unlike other geographic projections, the interface is not only a visual representation of an aspirational totality; it is an image of a totality that when acted on also instrumentally affects the world.”<sup>35</sup> In addition, operations of statistical modeling are actively involved in real-world situations, thus becoming one form of a technique of intervention. Abstractions are not unreal, and they are not separated from material surfaces.

As you can see, this meshwork of terms maps how a transformed notion of the image relates to questions of abstraction regarding platform operations. But in our case, the main focus is still on the coupling of operations and images; what sort of an understanding of

images and operations is adequate in discussions of data and digital culture. As acknowledged throughout my discussion, the questions are not entirely new, and there are many answers already that relate to software, interfaces, and interactive screens. The argument about images as part of the broader programmable, executable culture was recognized earlier in software studies with different emphases by Alex Galloway, Wendy Hui Kyong Chun, and others. For Galloway, like in games, computational images are primarily geared toward execution and action.<sup>36</sup> Chun opens up the question of software as execution to the genealogy of what is narrated as visible and invisible in computer history from aspects of gender and programming. Furthermore, following on from discourses of computers as information machines, this relates to how transparency is being sustained as the ideological backdrop for a machine that is primarily meant to make visible.<sup>37</sup> This theme features in contemporary big data analytics and data visualization, too; how to draw patterns and make visible the otherwise unseen from datasets substantially bigger than the usual corpus of, for instance, humanities research.<sup>38</sup>

So while we could continue describing the various technical formulations of platforms and images, it is clear that the stakes of those techniques and humanities-focused discussions about data and (operational) images are not the only context. Some of it concerns methodology and how we address images in contemporary technical humanities; some concern “images in the wild,” which implies their political economy as much as their political ecology. Here, the platform as a central feature of capitalism, political geography, and digital culture<sup>39</sup> is not a mere extension of the operational image but a site where it is executed with additional force, adding to the early 2000s context of discussions about software and visibility. While we have inherited a rich set of ideas about technical images as mobilizing an ontology of the invisible and bringing it to play a key part in various institutional forms of knowledge (and coercion) over the past 150 years, the platform describes a more recent way images are formatted into platforms and how they format the world in patterns of value, knowledge, control, and more.<sup>40</sup>

This can be discussed in terms of a “political economy of digital data.” As defined by cinema scholars Ruggero Eugeni and Patricia Pisters, it pushes us to analyze “the logics of production, circulation,

and transformation of light (both from an optical-geometric and a physiological perspective); also, it drives us to evaluate the intertwining of these logics with that of the production, circulation, and algorithmic transformation of digital data—without forgetting the principles of sovereignty that govern these dynamics and determine their trends.”<sup>41</sup> In short, and of particular interest for visual and in-visual studies, the question of the image is what mediates this shift between the political economy of light and data.

As a more specific unit for a “political economy of digital data,” platforms are a condensation of economic transactions and, as such, set the stage for what Sekula articulated as the link between photographs and money. Now, though, it’s images beyond photography, and data, that are linked in this way. Here, the platform is not merely a replacement of the market as a meeting place of providers and customers topped up with various access-for-data arrangements but an intensive apparatus for extending logistics of data to a variety of urban and nonurban situations. In short, it is not only facial recognition as surveillance, but agricultural solutions, landscape surveys, spectral signatures, and many other things that are aggregated and, in that process, turned into a particular kind of a mass-image.

Furthermore, the platform turns the world into its own image. Like a recent collection of speculative texts probing the transformation of cities into platforms asked: What is the city as Uber, the city as Instagram, the city as Palantir, as GroundTruth, as Amazon?<sup>42</sup> Here, the question of images as money is not merely about the circulation of photographs but the platforms that enable property and labor regimes that can be characterized by their operational invisibility. In other words, in the bundle of images, things, and people, platforms are also legal arrangements that assign positions of visibility while being operationally invisible: sellers, buyers, (gig) work, images, copyright, and other regimes of intellectual property through which the world is shaped in a particular anamorphic fashion, to follow Matteo Pasquinelli’s use of terms.<sup>43</sup> But whatever we might refer to as (anamorphic) distortion, we can also refer to in terms of an expanded vocabulary concerning design in platform capitalism.

Engaging platform invisibility as *posthuman property* is an insightful way to focus on the materiality of data as an operative force

in concrete spatial contexts.<sup>44</sup> This term, mobilized by Jannice Käll, helps us to understand operational platforms in relation to broader spatial contexts of digital technologies. Autonomous vehicles and their way of (in)visualizing urban space is one example that I will follow up in chapter 5. But already, I should add that such an approach to spatial justice refers to how space is formatted by platforms, continuing the earlier points by, for example, Sarah Keenan on the law as production of space and place “from nation-states to public parks to eruvs.”<sup>45</sup> Such a merger of law and invisibility is useful in helping us understand how platforms reorganize the world.

The operationalization of images is effective in contemporary contexts of data and where *visual* studies are not the only route to such an operational reality of observations.<sup>46</sup> The operational image can be seen working in various contexts outside military targeting and vision; it is integrated into various other sites of execution where images do not anymore look like images. Or, even if they do, their primarily operational value might be as property, for example, one form of the continuation of war (a more frequently recurring reference point for operational images).<sup>47</sup>

## Data Shots

*Invisual culture* is introduced as a core thematic and conceptual mediator that grounds much of the discussion in this book. The *invisual* is not to be mistaken as synonymous with the invisible, but they do stem from a shared concern about the transformation of images in different knowledge and aesthetic practices. Mackenzie and Munster’s analysis of the platform becomes a helpful scaffolding for many of the other ways I want to engage with operational images beyond the earlier input of Farocki and others. Investigations of invisibility—such a peculiar term that holds on to the legacy of *visuality* while denouncing it—are helpful as insights into the continued question about images and operations. But the answers as to where to address this question are somewhat different: some concern platforms (and thus legal and economic forms of the operationalization of the image), and some concern diagrams (thus inserting themselves into a long history of visual practices that have