# DISCERNING THE GRAIN OF THE DIGITAL

ON RENDER GHOSTS AND GOOGLE STREET VIEW

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According to James Bridle, inventor of the much discussed 'New Aesthetic', pixels are invading the analogue realm. In Bridle's view, the prevalence of 'machine vision' in our physical surroundings is rapidly increasing. Breazu critically assesses Bridle's ideas through a discussion of artistic practices that take up ruptures in the seams of the Google Street View map.
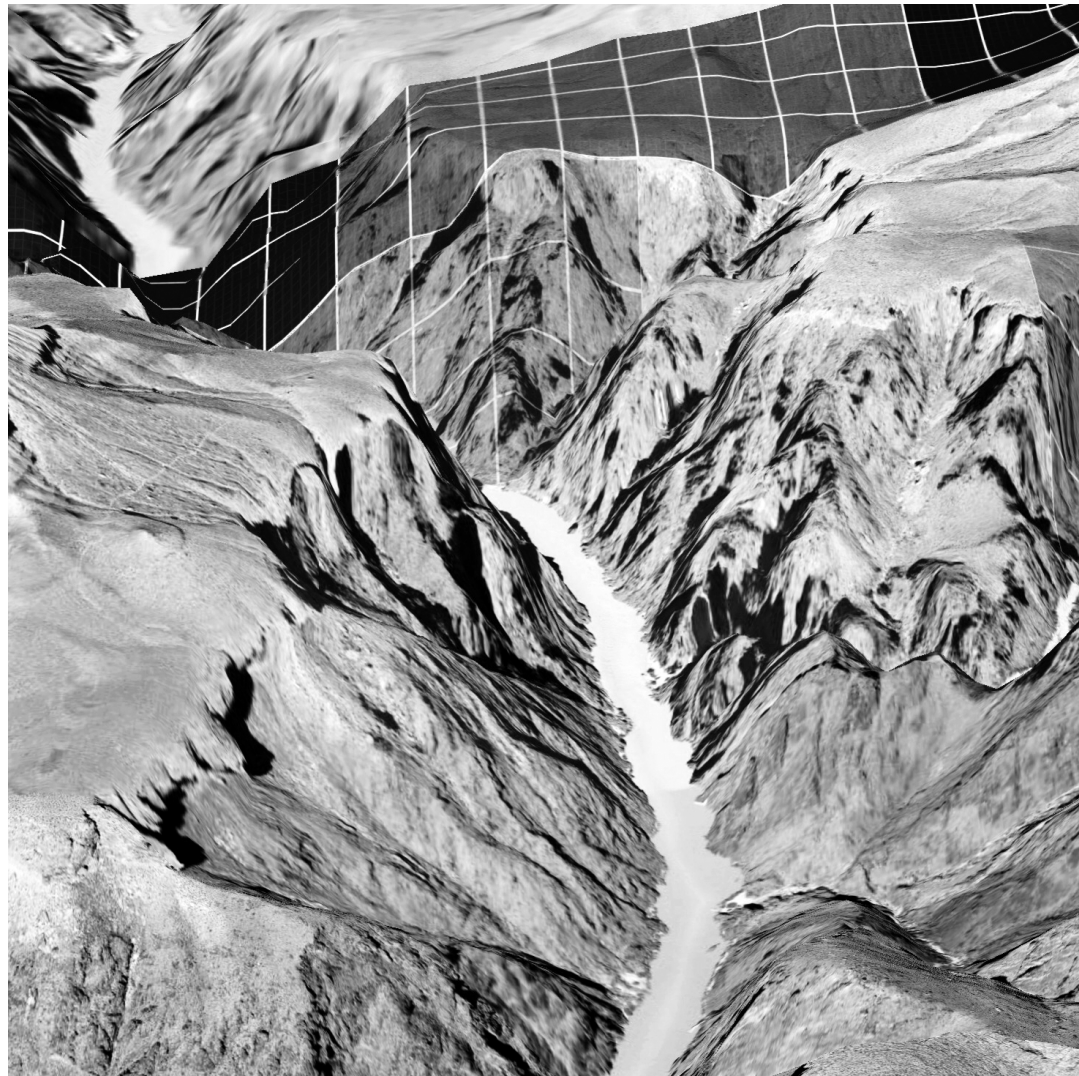
[T]he world itself has taken on a 'photographic face'; it can be photographed because it strives to be completely reducible to the spatial continuum that yields to snapshots.
– Siegfried Kracauer[1]

In October 2011, James Bridle, a known figure of the London design scene, gave the closing speech at Web Directions South and launched a series of provocative ideas, coined under the denominator 'The New Aesthetic'.[2] Bridle, who presents himself as a writer, artist, publisher, and technologist, among other things, stepped up to describe what he called 'machine vision', which manifests itself in software and devices such as 'computer vision and automated cameras and robot-mounted cameras and internet-enabled network cameras', surveillance drones, face/gesture/pattern recognition algorithms, CCTV cameras, satellite mapping, book scanning and digitization, etc.. Bridle demonstrated its staggering progress in recent years, its limitations, and also some of its most interesting and revealing glitches. Most importantly, Bridle opened up a discussion about the way machine vision influences and impacts contemporary design. The appearance of things around us is changing as a direct consequence of these new technologies, in order to facilitate their development or to improve their current functioning.

Bridle's 'machine vision' discourse is imbued with anthropomorphism: these machines that can perform one visual-type task are discussed as if they were learning machines, able to jump to the next phase any day now. Human vision is introduced into this discourse as an example of the instability of optical phenomena, calling attention to the ease with which sight can be manipulated and also re-trained. Given that we have learned to use optical illusions to demonstrate the general limitations of human vision, Bridle suggests that the trend now is to pixelize everything as if to make it readable for machine vision. He goes as far as to posit a change in our sense/notion of beauty: a transition of sorts towards high-tech artefacts, and their pixelated ways.

The talk abounded with examples, some improperly used and contested later, but most of them convincing and productive. Bridle entertained with random connections and jumped from one thing to another, using the same principles of selection, presentation and montage as one does on Tumblr, the micro-blogging platform that hosts, among other things, Bridle's New Aesthetic research project, a collection of images and updates that 'point to new ways of seeing the world'.[3]

One of the rather puzzling examples, the very first one mentioned in the talk, was in reference to the so-called 'render ghosts', human figures that populate photo-realistic architectural renderings. Bridle mentioned this generic group of people as a good starting point for anyone who wants to observe the so-called 'grain of the digital'. Downloaded from special databases or cut out from free stock photos, these two-dimensional humans serve a specific function in architectural renderings: they are placed there, among vehicles, trees, furniture, etc., to give a sense of scale, to bring in a dimension of reality, and to impart an overall impression of how the built environment will function, in addition to framing the building in this pre-material stage.

The render ghosts seem to only exist unto themselves, and are easily confused with photographic representations rather than indexical conventions.[4] But as expected, at close inspection these figures betray their artificiality, and reveal themselves to be not only fraudulent in their happiness or in their concentrated gaze, but not even really there in the first place.

According to Bridle this is the critical moment when the close observer starts to discern 'the grain' of these 'imaginary places', 'the outline of them, which is pixelated, which is digital'.[5] One could say that this is the result of poor Photoshopping skills, but there is more to it. The significance of this observation should be understood in the context of materialist theories of the digital object: 'in order to be able to be manifestly understood and be given meaning, digital code always has to possess a specific embodiment'.[6] In the absence of a 'complex mechanical apparatus, consisting of hardware, operating system, and software', the code is unintelligible, and therefore meaningless. Against this backdrop it becomes clear that Bridle's mention of 'render ghosts' is not random, nor misused: he is trying to make the point that we identify pixels as a metaphor, and sometimes even as proof, of the material existence of digital code. We look for disruptions in the fabric of pixels, we search for irregularities in contour, and for inconsistencies in colour shades, hoping against hope that the code can be cracked, that the glitch can be found, and that once again we will be able to tell the difference between virtual and real.

PIXELS

At the same time it becomes clear that the New Aesthetic cannot be reduced to screenic images,

for pixels have broken into the real world: images are pixelated on purpose, the grid formations are emphasized and employed as a pattern for what appears to be a new stylistic impulse. Bridle's claim is that this tendency can be explained as a desire to make everything readable for machine vision, even if this means artificially changing the resolution of our world. He explains, 'it makes things look like they belong in the digital world' or again, 'we've prepared something in the physical world for its entry into the virtual'.[7] It is as though we are creating objects that no longer require digitization since they are already readable, or visible to the machines – an argument obviously flawed, but one that might start to explain the hype around pixelated designs or even pixelated architectural facades, as well as the tendency to anthropomorphize machines. The New Aesthetic Tumblr does not distinguish between these different categories of pixels, such as pixels of a digital image, decorative pixels printed on various materials, perceptual error pixels and so on. The Tumblr simply collects with no apparent filter of selection.

Therefore it is important not to get side-tracked by the false or unimportant pixel issues and focus on the more substantial objections that have to be raised against Bridle, in particular his 'bogus lyricism', as Bruce Sterling has called it.[8] Sterling has strongly criticized the habit of anthropomorphizing machines, of describing them as having 'thought' or 'memory', ascribing them with the sense of 'sight' and 'hearing'. We are in the habit of 'projecting our own qualities onto phenomena that we built,' and sciences built on these kinds of assumptions, such as cybernetics and artificial intelligence, have crumbled precisely because they were relying only on fake metaphors. Yet Sterling is confident that there is more to this than just a 'glitch hunt', which is why Bridle's New Aesthetic should be 'a valiant, comprehensive effort to truly and sincerely engage with machine-generated imagery – not as a freak-show, a metaphor or a stimulus to the imagination – but *as it exists*'.[9]

Inevitably caught in the computational regime, the New Aesthetic acknowledges, nonetheless, 'the tension that exists between representation and mediation in software'.[10]

The pixels are the symptom, that superficial, easily identifiable feature that helps single out the artefacts and images of interest – all instances of the 'glitch ontology', pointing to how little we understand the logic of computational society and the anxieties it introduces.[11]

One of the most potent observations about the New Aesthetic came from Kyle Chayka, in response to Sterling: 'The New Aesthetic, as it exists in drone technology and Google maps imagery and data surveillance, represents a ground-level change in our existence. Instead of shocking society, New Aesthetic art must respond to a shocked society and turn the changes we're confronting into critical artistic creation.'[12] In other words, Chayka is arguing that the digital has become as real as the physical, and by focusing on the tools and the apparatus that have caused this shift, we will move into the direction of 'a new aesthetic reality', a united whole rather than a hybrid.

MAPS
The physical/digital amalgamation is nowhere more explicit than in digital cartography, where representation is extremely conventionalized and worldviews are constructed as subjectively as ever, but with arguably the most objective technology possible. We will leave aside specialized digital cartography, and look at an enterprise that relies upon approximate spatial representations rather than precise accuracy: Google Maps is widely-accessible, widely used, and it has generated several artistic projects.

Google Maps is engulfed in a discourse about surveillance, imperialistic power plays, marketability, corporate mapping, and so on. In the New Aesthetic context, Google Maps is a cultural artefact that uses high-end mapping technology, modifying our expectations of what a map can do, as well as our behaviours as map users by implementing functions such as the search button, directions (calculating the fastest route between two points), or Street View. Several photographic projects use Google Street View imagery, playing with the tradition of street photography or documenting the ever-changing Google map, constantly updated and retouched; in their turn, these projects influence other types

of photography and contribute to the new aesthetic pool of imagery.

In comparison to architectural renderings where the virtual space is sharp and bright, Google Street View is selectively blurred and inconsistent at each shift of the viewing angle or frame. In the present technological age, representations of the virtual are realized in accordance with the qualities of the physical, while representations of the physical world are constantly problematized and called into question. Therefore, the apparatus producing them has to remain visible to a certain extent. The authors of the volume *New Aesthetic, New Anxieties* (2012) refer to this as an ironic development: 'just as digital technologies and software mediate our experience and engagement with the world, often invisibly, so the "digital" and "software" is itself mediated and made visible through the representational forms of pixilation and glitch'. They further speculate that if more computational forms (such as 8-bit) were to be adopted and adapted into the new aesthetic reality, we would be confronted with mass cognitive dissonance.[13]

Returning to Google Street View, it makes sense, then, that a photographic mapping of the world looks like an eerie materialization of Siegfried Kracauer's prediction from 1927 that we would one day witness the 'complete reproduction of the world accessible to the photographic apparatus' in an archive of photographs, seamlessly tied together, where the navigation is not animated, but sequential, jolting from one photo frame to another while buildings maintain their impenetrability.[14] Google Street View is a photographic imprint of the territory, not a reconstruction with virtual bricks.[15]

The 'Google experience' is guaranteed by following a one-size-fits-all policy, whether it is digitizing books or photographing streets, the same procedure is followed through in all cases.[16] Only in the case of protests or infringements of copyright or local laws does it allow for exceptions and regulation of content.[17] Therefore, a product like Google Street View has to be standardized: the same types of cars, with nine-eyed cameras mounted on top, travel the country and map the territory, capturing everything in their way

(not only photographically, but also with other technological means, capturing even information such as passwords and login data from Wi-Fi networks – Google Street View cars are essentially data bulldozers). After standardization, uniformity usually follows. Google Street View surveys everyone equally and indiscriminately, from a height of 2.5 meters, regardless of government or geography, as though it were snapping the same picture over and over again in order to obtain the most comprehensive and consistent photo album in history. This consistency is attractive in the eyes of photographers working with Google Street View imagery because it grants them the opportunity to work with all the source material, without excluding anything on account of differences in quality or shooting angle.

Jon Rafman, for instance, has been collecting specific Street View scenes since 2009, particularly those in which inexplicable, provocative, or strange things seem to be happening.[18] His photographs evoke a certain ambiguity, which is possible only because Street View photography is 'artless and indifferent, without human intention', thus the images produced are 'bereft of context, history or meaning', glued together only by geospatial contiguity.[19] Consequently, Rafman looks for subjects that 'resist becoming purely objects of the robotic gaze of an automated camera' – those who do not blend into the landscape willingly. However, it should be noted that finding these out-of-the-ordinary instances is not entirely dependent on spending countless hours navigating the map; one can search through Flickr pools and Tumblr accounts where amateurs have amassed entire archives, posting their finds from Google Street View, and indicating the exact coordinates. These print screens are displaced, appropriated, magnified, re-photographed; they become 'poor images' as Hito Steyerl calls them, copies in motion characterized by 'substandard resolution', and it is precisely their low resolution that integrates them in 'an information capitalism thriving on compressed attention spans, on impression rather than immersion, on intensity rather than contemplation, on previews rather than screenings'.[20]

1:1

One way of understanding Street View would be by using the distinction made by Deleuze and Guattari between tracing and map, also mentioned in James Corner's contribution to the publication *Mappings* (1999): 'The map has to do with *performance*, whereas the tracing always involves an "alleged competence".'[21] Corner talks about the agency of mapping, in the sense that mapping is instrumental 'in the construing and constructing of lived space,' and in particular, it is 'most effective when its capacity for description also sets the conditions for new eidetic and physical worlds to emerge'.[22] Google's amateurism in digital cartography becomes irrelevant in light of this, instead of tracing the already known territory, its maps capture much more than physical attributes of the terrain, and Street View can be said to be the closest thing to a 1:1 map.[23]

The idea of a 1:1 map is a conundrum with literary significance, as addressed by for instance Jorge Luis Borges and Lewis Carroll, articulating the impracticality of a representation without abstraction, synthesis and/or conventions. At the beginning of *Simulacra and Simulation* (1981), Baudrillard invokes Borges' fable only to later discard it as an allegory of simulation which no longer holds true because today 'it is nevertheless the map that precedes the territory – *precession of simulacra* – that engenders the territory'.[24]

In the essay 'On The Impossibility of Drawing a Map of the Empire on the Scale of 1 to 1', Umberto Eco plays out the paradoxes and the contradictions of such a map. However, there are many aspects mentioned in the description of this impossible feat that correspond with Google Street View, such as 'the map [should] be faithful, depicting not only the natural reliefs of the empire but also its artefacts, as well as the totality of the empire's subjects' or 'the map may be produced on separate sheets, but only on condition that they be sutured in such a way as to construct the overall map of the entire territory of the empire'.[25] On the other hand, certain ineluctable problems pointed out in the essay can be easily surpassed in the era of digital cartography, the most obvious of them being the unmanageable size of such a map, or the impossibility of changing anything in the territory afterwards for fear of rendering the map inaccurate.

Nonetheless, what is of utmost interest when it comes to 1:1 maps, or to Google Street View for that matter, is that it enables the viewer to go from surveying the site to observing the *milieu*.

In his series *A New American Picture (2012)*, Doug Rickard made use of exactly this feature: zooming in to uncover the living conditions in city fringes, as observed from street level.[26] He claims to have taken more than 10,000 photographs in front of his computer, exploring the streets of cities such as New Orleans, Atlanta, Jersey City, Houston, in derelict neighbourhood with high crime rates and poor quality of life, thus documenting contemporary neglected communities. It could be argued that all Street View imagery is of sociologic and historical

2 – Clement Valla, *Postcards from Google Earth (apalachia 21)*, 2010 (ongoing), courtesy of the artist. Valla writes about the project: 'These jarring moments expose how Google Earth works, focusing our attention on the software. They reveal a new model of representation: not through indexical photographs but through automated data collection from a myriad of different sources constantly updated and endlessly combined to create a seamless illusion; Google Earth is a database disguised as a photographic representation.' www.postcards-from-google-earth.com.

3 – Paolo Cirio, *Street Ghosts (12 Cheshire Str. London)*, 2012, inkjet prints on coated paper, courtesy of the artist.

importance, but only a very small fraction of it is immediately relevant and can be read as documentary evidence. The rest might become so in the future, serving a different societal agenda.

Rickard's photographs are mediated by the Street View software, and it is precisely this indirectness that enhances the viewer's impression of being removed from the scene (the unnatural height at which the shot is made also contributes to this sense). The indifferent process through which Google captures these images parallels the indifference with which these failed communities are treated. Rickard's series suggests that mapping as a means of appropriation is no longer (entirely) accurate, and that 'we might begin to see it as a means of emancipation and enablement'.[27] This way, mapping could continue to fulfil its 'original entrepreneurial and exploratory character', despite the fact that the planet has long been exhaustively mapped.

'Intention is the key to what the map conveys', Amanda Finkelberg claims in her research on digital cartography.[28] As pointed out earlier, it can be said that the imagery collected for Street View lacks intentionality because it is captured by a machine that has no judgment, and no selection criteria, and therefore shows neithe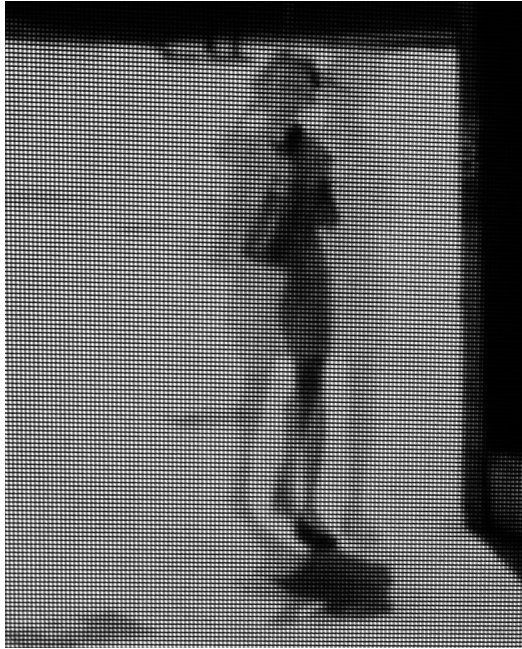r hesitation nor premeditation. But surely one can ask the question: what is the intention behind the lack of intention in collecting the data for a new map? For Street View, the answer would probably be along the lines of total exposure, total accessibility for the purpose of mapping the networks of service providers. However, among the most frequent uses of Street View is a form of contemporary psychogeography: users take walks in urban spaces they might have never visited.[29] As practiced by the Situationists, psychogeography entailed walking across established routes and into semi-abandoned urban areas to politically oppose authority. By comparison, virtual walking in Street View is not much of a gesture against authority, although it does retain a sense of resistance or reservation in regard to the real-life experience. Furthermore, it also makes implicit a concession of sorts to Google's open-ended privacy policy.

SECOND COMING

Michael Wolf realized a Street View photography series called *Paris Street View* (2009), when he moved from Hong Kong to the French capital.[30] Stemming from a dislike of Paris the photographer had reluctantly decided to explore the city via Street View when he started to notice peculiar scenes, strange shadows, sliced human figures

4 – Michael Wolf, *Paris Street View No. 7*, C-Print Lambda Process, 122 x 152,5 cm, courtesy of the artist. See also the contribution 'Stadsgezichten' on pp. 126-128 of this publication.

and so on. Aiming his camera at the screen, he took to photographing blow-up details of these instances. Wolf intentionally included digital elements of Street View in his photographs, such as the Google watermark, the mouse pointer, or the directional arrows, as well as glitches resulting from the intersection of different frames, creating the illusion, or merely suggesting, that the physical and the digital are colliding. Using an opposing strategy, but making the same case, are artists Aram Bartholl and Paolo Cirio, who transpose elements from Street View on to the physical reality. Bartholl creates sculptures in the public space installing giant Google place markers at that spot in the city that Google has marked as the 'center'. Cirio's human-sized posters of people captured in Street View, pasted back on the streets, on public walls, subvert Google's infringement on privacy and ownership/copyright.[31]

An approximation of a 1:1 map, Street View is often navigated explored rather than used for exploration, as if it were indeed covering the earth, as if, perhaps, to speak with Baudrillard,

'something has disappeared: the sovereign difference, between one and the other, that constituted the charm of abstraction'.[32] This blurred interaction is perhaps why we now search for glitches and pixelation errors, in order to restore that sovereign difference between the map and the territory, between the digital and the real. Yet a counter-effect manifests, one similar to seeing spots after staring at the sun we start seeing pixels, cheap pixels, fake pixels, an entire trend of glitches in object design and even architectural design, that corrupts the metaphor of pixels as the grain of the digital.[33] If media theory dealt with the digital becoming visible, the New Aesthetic refers to a second-order problematic of how the digital can become physical, and elucidates cases such as that of the poor image which incorporates 'its own real conditions of existence: [...] swarm circulation, digital dispersion, fractured and flexible temporalities'.[34] As such, Boris Groys' analogy of digital technology and fundamentalist religion could be extended to include the New Aesthetic, but will the analogy be a crisis of faith, or the Second Coming?[35] ●

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NOTES

1 ● Siegfried Kracauer, 'Die Photographie' (1927), trans. by Thomas Y. Levin as 'Photography', in: *Critical Inquiry* 12 (1993) 3, pp. 421-436, 432. The text was first published as 'Die Photographie' in the *Frankfurter Zeitung*, 28 October 1927.

2 ● Founded in Australia in 2004, Web Directions is a series of conferences dedicated to web industry professionals addressing current debates, issues and trends in web design, front-end and back-end development, data visualization, information architecture, interaction design and so on. See Jamie Bridle's full lecture 'Waving at the Machines' video, 5 December 2011, at www.webdirections. org/resources/james-bridle-waving-at-the-machines. The undertone of his entire talk is marked by naiveté, which is worrisome when it comes from a technology writer.

3 ● See: www.new-aesthetic. tumblr.com.

4 ● Perhaps the render ghosts can be seen as spectres of an imagined future, they are ideal inhabitants (happy, racially mixed, urban) of an ideal and utterly fictional before-life of the building. Photo-realistic architectural renderings, heavily manipulated and aestheticized, do not speak the same language of conventions as basic plywood scale models once did; the focus is often on these virtual entities as they seem to exist autonomously. Consider for instance Daryl Mulvihill's article 'The Mysterious Adventures of the Boy in the Yellow Cap' (2013) for *Failed Architecture*. The author indulges in the investigative exercise of collecting as many sightings possible of a young boy wearing a yellow cap and holding his mother's hand, spotted in various inspiring architectural designs, mainly 'future parks, museums and new public plazas'. See: www. failedarchitecture. com/2013/07/ the-mysterious-adventures-of-the-boy-in-the-yellow-cap.

5 ● Bridle, op. cit. (note 2).

6 ● See: Hans Dieter Huber, 'The Embodiment of Code', on the author's webpage, www. hgb-leipzig.de/artnine/huber, p.1. This text was first published in German as 'Die Verkörperung von Code', in: Rudolf Frieling, Wulf Herzogenrath (eds.), *40Jahrevideokunst.de - Teil1. Digitales Erbe: Videokunst in Deutschland von 1963 bis heute*, Ostfildern: Hatje Cantz Verlag 2006, pp. 58-63. Any digital object depends on a material support in order to become visible and legible. The mistaken impression of the disembodied, immaterial digital world is a symptom of the fact that corporations go to great lengths in order to release technologies that dissimulate the mechanical apparatus. The user is exposed to the immaculate performances of the code (or the 'embodied presentation' as Hans Dieter Huber calls it), and the rare instance when he is forced to acknowledge the material existence of digital code is in the transition from one device to another – incompatibilities occur and error messages allow the user a glimpse into the organization of the code.

7 ● Bridle, op. cit. (note 2).

8 ● In his response article to the New Aesthetic. See: Bruce Sterling, 'An Essay on the New Aesthetic', *Wired.com*, 2 April 2012, s.p..

9 ● Ibid., s.p..

10 ● David M. Berry, Michel van Dartel, Michael Dieter, Michelle Kasprzak, Nat Muller, Rachel O'Reilly, José Luis de Vicente, *New Aesthetic, New Anxieties*, Rotterdam: V2_, 2012, p. 15. Published as e-book: www. v2.nl/publishing/ new-aesthetic-new-anxieties.

11 ● Ibid., p. 41.

12 ● Kyle Chayka, 'The New Aesthetic: Going Native', on: *The Creators Project*, 6 April 2012, www.thecreatorsproject.vice. com/blog/ in-response-to-bruce-sterlings-essay-on-the-new-aesthetic#1.

13 ● Berry et. al., op. cit. (note 10), p. 43. The authors introduce the term 'digital pareidolia' to describe the tendency of seeing pixels in non-digital images – a tendency which has already started to become manifest, as Bridle proves with the example of a satellite image that shows a group of carefully delineated green squares, which are in fact irrigated fields on the border of Namibia and South Africa, but perceived instead as pixels. It is a tendency that Bridle himself exhibits when he talks about dazzle camouflage, which he attributes to the same computational regime when it in fact has everything to do with human vision (it suggests an imperfection of sight), and nothing to do with machine vision, as cautioned by Sterling.

14 ● This is about to change: the new Google Street View now offers access inside certain local businesses that are marked on the map; the user can enter virtually to see panoramic images of the interior. See for Kracauer, op. cit. (note 1), p. 432. Kracauer: 'The aim of the illustrated newspapers is the complete reproduction of the world accessible to the photographic apparatus; they record the spatial outlines of people, conditions, and events from every possible perspective. [...] Never before has an age been so informed about itself, if being informed means having an image of objects that resembles them in a photographic sense. [...] The spatial continuum from the camera's perspective predominates the spatial appearance of the perceived object; the likeness that the image bears to it effaces the contours of the object's "history". Never before has a period known so little about itself.'

15 ● A parallel can be made to the informational superimposition of the territory through augmented reality apps for smartphones.

16 ● The idea of the 'Google experience' is borrowed from Siva Vaidhyanathan, *The Googlization of Everything: (and Why We Should Worry)*, Berkeley: University of California, 2011, p. 48.

17 ● Google's nine-eyed camera faced protests and public opposition in Germany, which is why the German street views have entire buildings blurred out, not only faces and car number plates. Germany's reluctance to have its territory photographed proved to be more than justified when, a few months later, it was revealed that Google Street cars captured Wi-Fi networks, MAC addresses, SSID information, and in some cases, entire e-mails, URLs and even user passwords.

18 ● See Rafman's website: www.9-eyes.com.

19 ● Jon Rafman, *Sixteen Google Street Views*, Lenexa: Harvest Graphics, 2009, p. 2.

20 ● Hito Steyerl, 'In Defense of the Poor Image', *e-flux journal* (2009) #10, s.p.: www.e-flux. com/journal/ in-defense-of-the-poor-image.

21 ● Quoted in James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', in: Denis Cosgrove (ed.), *Mappings*, London: Reaktion, 1999, pp. 213-252, 214.

22 ● Ibid.

23 ● For instance, Google Earth behaves like a database disguised as a photographic archive. According to Clement Valla, Google Earth combines satellite shots with 3D models generated through texture mapping. Among the spectacular (amateur) functions that Google Earth offers, the user can activate archives of imagery for certain sites in order to compare and contrast the evolution of that particular area; also, the user can explore in Street View mode inaccessible areas, such as Wilson Island Reef. See: Clement Valla, 'Universal Texture', *Rhizome*, 31 July 2012, www.rhizome.org/ editorial/2012/jul/31/ universal-texture.

24 ● Jean Baudrillard, *Simulacres et simulation* (1981), trans. by Sheila Faria Glaser as: *Simulacra and Simulation*, Ann Arbor: University of Michigan, 1994, p. 1.

25 ● Umberto Eco, 'On The Impossibility of Drawing a Map of the Empire on the Scale of 1 to 1', in: Umberto Eco, *How to Travel with a Salmon & Other Essays*. New York: Harcourt, Brace, 1994, p. 96.

26 ● See: www.dougrickard. com/photographs/a-new-american-picture.

27 ● Corner, op. cit. (note 21), p. 252.

28 ● Amanda Finkelberg, *Space, Place, and Database: Layers of Digital Cartography*, dissertation, Cambridge, MA: Massachusetts Institute of Technology, 2007, p. 36.

29 ● The term can be traced back to Guy Debord, who used psychogeography as a tool in order to better understand urban life, and to transform it for aesthetic or political ends. It also designates a minor literary genre. See also 'The Naked City' by Christopher Collier in this publication.

30 ● See: www. photomichaelwolf. com/#paris-street-view.

31 ● See for Bartholl: www. datenform.de/map.html; See for Cirio: www. streetghosts.net.

32 ● Baudrillard, op. cit. (note 24), p. 2.

33 ● A selection of pixelated designs: www.design-milk. com/our-favorite-pixelated-designs.

34 ● Steyerl, op. cit. (note 20), s.p..

35 ● Boris Groys, 'Religion in the Age of Digital Reproduction', *e-flux journal* (2009) #4, s.p.: www.e-flux. com/journal/ religion-in-the-age-of-digital-reproduction.