The Aesthetics of Digital Intimacy: Resisting Airbnb's Datafication of the Interior

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Abstract

This article presents a practice-based research enquiry to investigate and develop the concept of digital intimacy. Contextualised by the Airbnb peer-to-peer accommodation sharing platform, this enquiry proposes the interior-as-image as located within the mediation of the 'Instagram-able', providing a distinct aesthetic category. Airbnb delivers an infrastructural condition, a global circulation system that penetrates the domesticity of the home, with value emerging to attach itself to qualities of individuality and authenticity of the interiors and their hosts. The mediation of the interior-as-image is co-constitutive of digital intimacy as the confluence of structures of power and inequality, troubling established conventions of public and private across a complexity of scales, from the home to urban and the global. The research explores the regimes of machine sensing inherent to the circulation of the interior-as-image and the potential strategies for technology platforms and surveillance capitalism in extracting surplus value through the datafication of the interior. The practice-based enquiry gives particular focus to the digitisation practice of photogrammetry, and the reconstruction of 3D environments from 2D images, as a methodology to explore and decrypt the apparatus of machine vision in the context of the Airbnb interior. The research indicates how digital intimacy in an active condition in the contemporary experience of the home and speculates potential tactics to evade the datafication of the interior.

Keywords

interior-as-image; digital intimacy; photogrammetry; infrastructure; machine vision; surveillance capitalism; Airbnb; Instagram; Facebook

Introduction

The proposed theme of "____room" for this special issue of Interiors: Design/Architecture/Culture provokes the notion of taxonomy and the potential categorisation of the room within a codified infrastructure. Within the conventions of the architectural construction industry, 'rooms' have always existed within datasets, spreadsheets and other schedules, an essential and pragmatic move, but one that might condition the relegation of aesthetics in prioritisation to rational classification. While the principle of and impulse towards categorisation is by no means a new phenomenon, the contemporary postdigital world has accelerated to a state of overload the circumstances under which everything imaginable (and unimaginable) can be logged, classified and subjected to analysis by a plurality of systems. In the age of the mass image, the room and the interior – as an image – becomes subsumed in ever expanding regimes of technological administration, where the image itself is no longer an object to be viewed, but one that is always already analysed; a transformation from an aesthetic to a technical or "operational image" (Dvořák and Parikka 2021, Hoel 2018, Keenan 2014). The 'interior-as-image' is a mediated artefact, entangled in a network of technological platforms and imaging processes, from which value in excess of any initial provision can be extracted and commodified.

This article will investigate the condition(ing) of the interior as it has become a distinct facet of the contemporary image-based postdigital experience. Distributed as a digital product, the '____room' as an 'operational interior' is captured in networks of capitalist production, and it becomes essential to address how these technological modes of capitalism and labour impact the condition of the interior itself. The focus of this investigation will be the domestic interior and its image-based articulation by the Airbnb accommodation sharing platform, with its proposition of what this research designates as 'digital intimacy'. This practice-based research will be immersed in the strategies of machine learning engaged by the technological platforms themselves, and will critically deploy tools of machine vision, specifically photogrammetry, to reveal and reflect on potential tactics of reflection and resistance.

The Interior-as-image

The contemporary postdigital visual environment is dominated by the circulation of images through a dense and dynamic landscape of virtual platforms and social media, where the likes of Instagram and Pinterest give specific focus to the collection and production of images. This is an ecology of attention, where shared images compete to be lingered upon, or even more valuable, to be circulated and propagated further. Inhabiting the conditions of Web 2.0, we are both producers and consumers, contributing not only our own content, but producing through replication, to propel ever denser conglomerations of images, and their aesthetics of desire. Media theorist Lev Manovich goes so far as to claim it is social media raconteurs who are the owners of today's means of cultural production (Manovich 2017, 117).

In the context of interior design, and broader spatial and architectural interests, the circulation of 2-dimensional images has a distinct and increasingly embedded relation. Online platforms such as Archdaily and Dezeen provide rich visual content with seductive imagery of current and emerging trends. In addition, the accessibility of image-enabled social media platforms, especially Instagram, has spurred the en masse production of pictures of designed spaces of all styles, typologies and conditions. Co-constituted is a spectrum of image consumers extending beyond the strictly design-informed to those that have had as aesthetic sensibility activated by the wider impulse of participating in image consumption. In the broad ecology of images with an interior focus, both captured and emergent are distinctive aesthetic styles and motifs, from 'millennial pink' and Neo-PoMo arches to "palm prints, rose gold accents, and marble surfaces" (Fiocco and Pistone 2019), with distinctiveness bleeding together to become a ubiquitous vision. This tendency towards homogeneity is a condition of the digital articulation and infrastructural capacity of the image-enabled platforms themselves, and the mechanisms of participation through reproduction, attention and 'liking' of the images: "On Instagram, user habits are regulated by the platform, and 'likes' feed an algorithm that defines what is trending" (Klanten and Stuhler 2020, 6). The algorithmic circumstances of image distribution projects an aesthetic zeitgeist, a digital visuality that stimulates actualisation in the real world by design practitioners of all aptitudes, with 2-dimensional images reproduced and re-constituted as 3-dimensional experiences.

In the wider context of the urban environment, the interrelation of physical 3-dimensional artefact and virtual 2-dimensional image is further agitated with the tendency towards photogenic spatial assemblies designed to be consumed as digital imagery circulated via social media. Categorised as 'Instagram-able', or "social media architecture" (Fiocco and Pistone 2019), these are environments designed to be co-experienced via the digital screen, persuading occupants to 'selfie' or otherwise visually circulate their participation in a specific location, where being located becomes part of the brand identity. This practice expands beyond interests of commercial brands where "[t]hrough destination marketing and urban placemaking activities, cities are following the lead of major brands in using Instagram to promote engagement with their 'product'" (Barns 2019, 163). A schematic emerges with the texture of what urban digital strategist Sarah Barns designates as 'platform urbanism' – through which "social media engagement is increasingly habituated as an interface of everyday urban encounter" (ibid., 160) – and addressed with specific questions to the scope and influence of the algorithmic entanglement of image and urban situation.

Focusing on the imaging of interior spaces, it is essential for this line of enquiry to highlight another stratum of interiors on Instagram. Exemplifying this layer is the recent publication *Dreamscapes & Artificial Architecture* (Klanten and Stuhler 2020), filled with numerous seductive images with the aesthetic familiarity outlined above. The significance of these images of spaces lies in their purely digital character, a compilation of photo-realistic digitally rendered designs by a range of contemporary artists that will never be built. While some are fantastical and dream-like in appearance, many are extremely convincing in their proposed yet imaginary reality. The focus of these practitioners appears not an interior in a real and physical sense but the interior-as-image, and the construction of a world of simulacrums to engage and inspire. Nonetheless, against the purely speculative condition of such images, their reproducible and sharable condition allows this species to interbreed with its more tangible cousins, collaborators in an algorithmic condition and ecology of digital images projecting the possibility of a homogenous regime of designed interiors.

This last category of imagined images compounds the overwhelming scale of the task at hand. In this age of the mass image, the sheer volume of images in circulation, funnelled through social media

platforms and subjected to popular approval (or not), grows exponentially with each moment, with almost 1000 photos uploaded to Instagram every second (Aslam 2020). The unimaginable quantity of digital images proposes an impossibility for any one human, or indeed group of humans, to experience a holistic or comprehensive totalising view of any particular typology of image. But speculative architect and theorist Benjamin Bratton, author of *The Stack: On Software and Sovereignty* (2015), notes the amassed images are not for human viewing, but for nonhuman machine viewing: "Today many images are made for no-one, but this does not mean that they are functionless" (Bratton 2016, 19). It is this identification of the "operational image" (Dvořák and Parikka 2021, Hoel 2018, Keenan 2014) that is the subject of increasing focus for media theory as it relates to the scale and quantity of images in contemporary visual culture. Under this context "the mass image is no longer interested in the image *as* image" (Cubitt 2021, 28); the image is a technical artefact into which is incorporated "infrastructures, operations, apparatuses, and the aesthetic questions of measures and scale" (Dvořák and Parikka 2021, 10). In the age of the mass image, image is data, and necessarily subject to machinic apparatus and algorithmic processes to be administered in any functional way. The interior-as-image, subjected to procedures from which specific vectors of 'interior' may be extracted, sustains more significant technological activities which in turn delivers distinct and material capacities to the image artefact anterior to its initial specification. A sociotechnical pattern is circumscribed where images of interiors, both imagined and real, are mediated for trends to render the most 'likable' as object that is most visible, with the potential to have the greatest impact. Moreover, as a model founded on an algorithmic entwining with desire, likability and the intimacy of screen-based relations, the capacity for behaviour prediction must be given appropriate significance. The program of location-based image production through Instagram-able places marks a certain behavioural characteristic, but the broader (concealed) systems of data-collection and analysis embedded in the algorithmic participation can (and have) moved from extractive to predictive modes; "automated machine processes not only know our behaviour but also shape our behaviour at scale" (Zuboff 2019, 8).

The social circulation of images is only one facet of the wider postdigital condition in which technologies of surveillance are a ubiquitous experience. Cameras and their supporting machine systems are increasingly embedded in our physical and cultural environment, but surveillance is also applicable to the observation and analysis of our activities that are traced across the digital sphere. The application of machine learning protocols to the densities of harvested data, image-based and otherwise, articulates an extractivism that is unresolved for the aesthetics of the interior which this research article proposes to contextualise under the interior-as-image. The social psychologist Shoshona Zuboff designates as 'surveillance capitalism' the economic system based on the extraction and commodification of personal data in its digital forms, instigating a distinct model of capitalist production in which the interior-as-image might be located. The configurations of interconnectedness between virtual and real worlds as cited above compel a complex designation for intimacy that includes the categories of data extracted, the embodied relation to an interior environment and the screen-based mediation of both these conditions. The entanglement of image with data and the performance of the 'operational' artefactualisation of space promotes the datafication of the interior. Aligned under the strategies of surveillance capitalism, the datafication of the interior agitates a shaping of the spatial environment impelled by the algorithmic oversight of intimate relations, where "personality, moods, and emotions, your lies and vulnerabilities [can be] flattened into a tidal flow of data points for the factory conveyor belts that proceed toward manufactured certainty" (Zuboff 2019, 199). Under this structure of digital mediation, it is essential to give attention to the status of machine learning and machine sensing and its potential contribution to the aesthetics of the interior. The infrastructural condition(ing) of the circulation of

the interior-as-image in mediating the emergence of aesthetic conditions, contextualised by this complex designation of intimacy, obliges further resolution.

Airbnb and the Datafication of the Home

Since its inception, the digital platform Airbnb has emerged as a significant entity to challenge and disrupt the established tourist accommodation sector. A key proponent in the 'sharing economy', Airbnb "facilitates the exchange of peer-to-peer accommodation and hospitality" (Roelofsen 2018, 1) with over 7 million homes worldwide and assisting over 750 million guest arrivals since 2008 (Airbnb 2020a). Complicit with the "Uberisation of everything" (Barns 2019, Shapiro 2016), Airbnb allows "hospitality entrepreneurs to monetise their space" (Airbnb 2020a), unlocking the value of their property and reconfiguring the home as a commodity. In ambivalence to the ubiquity and expense of conventional tourist accommodation, Airbnb offers "unique, authentic places to stay and things to do", allowing travellers to "go where the locals go" (Airbnb 2020a).

The ethos and unique selling point of Airbnb allows consumers to participate in modes of sociality and hospitality in an antithetic position to the corporate facelessness or generic responses of conventional tourist accommodation: "Belonging is the idea that defines Airbnb […] the desire to feel welcomed, respected and appreciated for who you are" (Chesky 2014). The promise of the intimacies of home can provide the traveller with "a place [to] be emotionally unrestrained" and enjoy a "(literally) embodied freedom" (Roelofsen 2018). Under the category of 'home' is an "exhibition of Self in its most intimate spatialities" (Minca and Roelofsen 2019, 8) performed through interplay of public and private practices. The dynamics of the public-private threshold can be most revealed when the Airbnb stay is in a home (part) occupied by the host, and negotiated between him/herself and the invited stranger, demonstrating a range of dialogic boundaries (Molz 2018, Roelofsen 2018). These practices of inclusion and exclusion mark "notions of intimacy as a concept that creates boundaries around certain relationships and ethics of care" (Dobson et al. 2018, 4). While these norms denote the domesticity of home as a retreat from and defence against the public world, a Marxist feminist categorisation of home expresses a gendered space in which labour is regenerated and where "unwaged caring and affective labour" is carried out (Roelofsen 2018, 3). The intimacy of home is structured by relations of power that are both internal and external to its spatial presence – social, economic and political – in a state of perpetual production by the occupant and those with whom they are negotiating.

The complexities of any specific Airbnb encounter are mediated in the first instance by the platform's highly visual website, where the key means of interfacing with a property is via the photographs of the listing's interior. Image quality is broad and varied, but Airbnb offers potential hosts with guides to assist in documenting the accommodation, from preparing the interior and composing photographs, to 'curating the story' of the space (Airbnb 2020b). Further hints and tips assist with choreographing the experience, gently suggesting the host to "make a room feel more inviting[,] provide a homey touch [and] give guests a sense of your personality" (Airbnb 2020c). These subtleties are expressed in a stratum of photographs that give focus to ornamentation and decorative elements, plants, unique artworks, books for reading, city guides for the traveller, and other elements that enhance the properties distinctiveness, individuality and 'homeliness'.

Airbnb's assemblage of interiors express a distinct visual vocabulary and, while (currently) less inclined towards pink arches and other dreamlike characteristics described previously, have nonetheless emerged to become a specific and globalised aesthetic (Chayka 2016, Heathcote 2020,

Wainwright 2018). Authenticity dissolves into ubiquity, where “we surf through weirdly familiar apartments, unable to decide because they all look so similar” (Heathcote 2020). Difference and individuality embrace collective values, materialising as a definable interior experience; “a sprinkling of specific cultural symbols of a place mixed with comprehensible devices, furniture, and decoration” (Chayka 2016). It is as if “a tasteful veil of white walls and grey sofas, house plants and mid-century-style furniture has descended and flattened them all into uniformity” (Heathcote 2020).

To isolate the practices of digital image production circumscribed previously, while in the main the design advice for Airbnb hosts is levelled at opening up space, storage solutions, lighter colour schemes and durable finishes, of significance are those placing an emphasis to ‘make the property Instagram-able’ (Heathcote 2020, Stouhi 2018, Wang 2018). The material articulation of individuality is choreographed to become an image worthy of circulation: “These are for Instagramming. They are Moments” (Heathcote 2020). These interiors are ‘oven-ready’ to be projected onto the image-sphere, further impelled by an emerging trend to characterise an Airbnb property via its own Instagram account. As noted previously, it is unsurprising the structures of digital circulation and reproduction give way to homogenisation; “the same images on Pinterest get pinned and re-pinned, time and time again, and they come to cement certain features that are the same as we find in most Instagram architecture” (Fiocco and Pistone 2020).

The impulse towards homogenisation is most directly addressed under wider concerns of globalisation. While some might assert that “globalisation can in no way be equated with homogenisation” where reputed global products “penetrate different national markets in different ways” (Massey 2001, 160), if national demands become more homogeneous, then arguably national markets disappear in favour of global markets. Broader debates around homogenisation of urban design under globalism assert the growing tendency for all cities to look identical, with the same styles of architecture, urban landscaping and public art, losing any sense of cultural distinctiveness. “Globalisation (in the economy, or in culture, or in anything else) does not simply entail homogenisation. On the contrary, the globalisation of social relations is yet another source of (the reproduction of) geographical uneven development, and thus the uniqueness of place” (Massey 1991, 29). When “uniqueness of place” becomes a commodity itself to be reproduced, patterns of global (digital) exchange and sharing tend towards the successful and the similar.

Under these concerns, the broader urban circumstance of Airbnb should not be underestimated where the machinations of the digital platform are increasingly pervasive. On the commercial level, these focus on the capacity of Airbnb to disrupt established provisions for tourist markets in city planning. But (ironically) at a residential level, where local neighbourhoods have become tourist destinations, conflict emerges between visitors and residents, in “displacing permanent accommodations in high-demand cities and exacerbating affordability pressures for low-income groups” (Gurran and Phibbs 2017, 80). Contributing to what can be designated as “tourist gentrification” (Cocola-Gant 2018), the logic of peer-to-peer accommodation sharing impacts the social-economic texture of a given neighbourhood, skewing its urban development away from the indigenous inhabitants. Excluding the common complaints concerning “noise, nuisance, traffic, parking, and waste management” issued from local residents, more profound and negative concerns include “rising rents, diminishing housing stock, gentrification and the influx of unwelcome tourists who disrupt the calm veneer of everyday life” (Molz 2018, 14).[i] The impact of Airbnb and other such platforms at an urban scale reveals the dynamics of intimacy and relations of power at a local and neighbourhood level, between local resident and tourist stranger, which having been commodified and performed, and lead to the production of institutional apparatus of regulation.

Airbnb's digital ecology produces a complex landscape dispersed across a range of scales including house, neighbourhood, city, nation and 'anywhere' (Molz 2018) in which bodies and spaces become digital commodities, subjected to dynamics of power and exchange. Notwithstanding the classified nuances designating the "'platformalisation' of infrastructure and 'infrastructuralisation' of platforms" (Plantin et al. 2016), Airbnb delivers an infrastructural condition to the home, reconfiguring it as a codified artefact; the datafied interior expands beyond its specificity of home as a discreet occupiable space, to engage in much wider urban and global conditionings. In surplus to the aesthetic similitude of Airbnb as a global(ised) experience, its artefactualisation under the conditioning by and of digital intimacy reifies a structuring of power organised across all scales, from object to globe: "MDF, Chinese chipboard, Vietnamese self-assemble, Asian fake furniture, all shopped from around the world while local makers are forced out of industrial buildings and workshops as they're turned into industrial-chic lofts for tourists so that Budapest can look a little more like Brooklyn" (Heathcote 2020). Inasmuch as "the platform is both enabled by and productive of certain imaginaries and spatialities of home" (Roelofsen 2018, 1-2), Airbnb distributes a certain form of digited intimacy stratified with various categories of exclusion, displacement and inequality.

The confluence of dynamics of power aestheticized and materialised via the Airbnb interior institutes ways of being intimate, ways of being digital, ways of being under globalisation, and not to neglect, ways of Instagramming. The structuring of spatial intimacy mediated by the interior-as-image must be considered with a sensibility of relations between host and stranger, local and tourist, producer and consumer, as co-constituted by the digital infrastructure of the peer-to-peer platform. The discreet event of home becomes a site for the uneven distribution of power, organised through the datafication of home where "[i]ntimate life is played out, recorded, commodified, and made political on digital media" (Carah n.d.). Where those socio-economic structures are performed across the real-world scales outlined above, the co-constitutive condition must acknowledge the algorithmic circumstances of the digital platform itself, "a system that numerically captures the qualitative 'distinctions' of home and hospitality and extracts 'value' from these same distinctions" (Minca and Roelofsen 2019, 7). Real and actual people and places are subjected to demonstrable and visible ramifications in their everyday experience, but to a large extent these are symptomatic, whereas the more nuanced and virtual mechanisms which impel these disruptive conditions are hidden and obscured. When residents are ejected from neighbourhoods through escalating rents, the algorithmic circumstances of the imaging of intimacy may seem elastic and incidental, yet as part of an expanded apparatus must be allocated with distinct authority. The qualities to which the algorithm is deterministic, emergent from user engagement with an aesthetic experience, might on the surface imply an objectivity responding to the desires of the user. Yet any single event must be considered in the wider regime of digital reproduction from many instances to reinforce the emergence of a particular inclination. Equally, the nuances and aims of the algorithmic condition are subject to specific demands of those that wield it. While distinct socio-economic dynamics that are in a sense peripheral to the direct digital engagement of the peer-to-peer platform have been outlined above, there are exclusive structural processes internal to the digital platform that order hierarchies across the content and its users; "algorithms are far from being neutral since they do assess homes and individuals according to specific parameters and 'values' set by Airbnb" (Minca and Roelofen 2019, 13).[ii] As the interfacing between guest and host, traveller and destination, the private and the public, considerable personal data is generated that oils the Airbnb machine.

The collection and processing of an expanded array of private behavioural data by Airbnb can most immediately be contextualised by the growing contemporary circumstances broadly located under

surveillance capitalism as noted earlier. It is of increasingly of concern to many, from citizen to state, the extent to which digital mega-platforms harvest private and personal information regarding the activities, interests and habits from millions and billions of users, and the market forces that compel these industries to "acquire ever-more-predictive sources of behavioural surplus: our voices, personalities and emotions" (Zuboff 2019, 8). Under these machinations of techno-capitalism, consumers are tracked and bombarded with targeted advertising tailored to profiles that have been extracted from their personal data footprint. But the impact of these strategies falls wider than any one market. Newly developing strategies of political advertising, where the acquisition and analysis of personal data is employed to persuade and dictate the behaviours of millions of people, circumscribe practices that have the capacity to impact the way in nations are governed; "the reorientation of knowledge to power, it is no longer enough to automate information flows about us; the goal now is to automate us" (Zuboff 2019, 8).[iii]

Notwithstanding these wider and serious conditions bound to extractive and instrumental dispositions of digital technology platforms, there remains a lack of resolution for the aesthetic milieu outlined in the opening section of this article. The specifics of designed and decorated interiors in the Airbnb context mediate experiential qualities which stimulate the "dispersed network of the endless interior" (Heathcote 2020). As such, the wider ecology of mediated images has a distinct relation to the visual interiority of Airbnb, complicit with the datafication of the interior as a totality. While the dream-like and imaginary interiors from digital artists such as Alexis Christodoulou and Andres Reisinger might stand apart from the real-world environments distributed by Airbnb, as a mediated body of images entangled in the reproductive conditions of digital platforms, they have the capacity to "*remediate experiential worlds*" (Barns 2019, 158, original emphasis), captured through our attention to a system of data flow and reward. The algorithmic condition of interior-as-image, both real and imagined, contributes to a paradigm to be defined more comprehensive, especially under the apparatus of surveillance capitalism outlined above.

Photogrammetry as Extractivism

In April 2016, at Trafalgar Square in London opposite the main entrance of the National Gallery, a replica of the Roman-era Arch of Triumph from the ruined ancient city of Palmyra, Syria, was erected. With the original destroyed the previous year by terrorist group ISIL during its occupation of the city, the 1/3 scale reproduction fabricated using 3D printing technologies was commissioned by the Oxford-based Institute of Digital Archaeology (IDA), and exhibited in several cities around the globe (IDA 2020). The workflow of the 3D printing process requires a 3D digitisation of the artefact, and in the discipline of heritage studies the practice of digitally capturing and recording monuments and other historical artefacts has emerged as a distinct field. In this particular instance photogrammetry was used, a technique that requires large data-sets of 'operational images' of the subject, with photographs taken from multiple positions and angles, and digitally processed through a number of definable stages to generate 3D geometry and textural information.[iv] Perhaps unique at that moment the data-set for Palmyra's arch was crowd-sourced, with the IDA issuing a global call for photography taken of the arch prior to its destruction. From this collection of privately-owned photographs, a digital 3D model of the site was reconstructed and 3D printed.

The program set out in the Arch of Triumph reconstruction outlines a distinct practice which could be embraced under the datafication of the interior as outlined above. A strategy can be envisaged where multiple (interior-as-)images of a particular room could be gathered as an operational data-set and subjected to the process of photogrammetry. Notwithstanding the specifics of 3D printing,

photogrammetry as a technical process presents a distinct condition for the ever-increasing mass of images in circulation, and the activation of machine sensing with which photogrammetry is complicit. A certain (poetic) logical evolution might be drawn out for the totality of images that swirl about the digital landscape, for these to cohere in some way, and congregate and allow some type emergence from the virtual into real-world spaces. But as described above, it is the strategies sublimated through surveillance capitalism, where images are sensed by the machine, extractively scrutinised and fed into models of behavioural prediction. The datafication of the interior compels an infrastructural condition propelling interior aesthetics along a path of homogenisation and reproduction, where photogrammetry can be deployed as a technical process to address the aesthetics of interior-as-image in a direct manner. The procedures employed can be unpacked and decrypted to interrogate how photogrammetry engages machine sensing, and gain insight into the way the computational apparatus looks at the world, or more precisely, looks at the interior-as-image in order to re-make it. In understanding how the algorithm sees and what it pays attention to, it can be possible to recognise the aesthetic conditions with greatest potential to be captured under the machinations of surveillance capitalism.

It is under these parameters this enquiry engages photogrammetry as an experimental research practice, conducted within the framework of digital intimacy contextualised by Airbnb and its aesthetic conditions. The research explicated to this point has mapped a critical situation where images of real and imagined interiors have the capacity to be requisitioned by digital platforms for information extraction and behavioural prediction in the pursuit of surplus value under surveillance capitalism. The category of images of specific focus are domestic interiors that express the aesthetics of digital intimacy, articulated as embodying dynamics of power and inequality at the threshold of the public and private practices, and in direct relation to the regime of digital mediation where the image is located. Images within this category will be subjected to photogrammetric procedures, where data-sets are assembled from a number of domestic interior spaces that are complicit to the scope of a peer-to-peer accommodation typology. Through the interrogation and analysis of the demands of this methodology under this specific context, and the qualitative evaluation of the outcomes of this methodology in the framework of 3D printing technologies, the practice of photogrammetry will be asked what it can reveal about the interiors it surveys and the process of photogrammetry itself as contextualised by surveillance capitalism.

It is essential to note photogrammetry is not unfamiliar to the strategies of large platform-based technology companies.[v] More recently in 2018 at the annual F8 Developers Conference, Rachel Franklin, Head of Social VR at Facebook, showcased a project that could utilise personal photos and videos uploaded by a user to recreate in digital form the rooms and physical environment where the recordings were located. Ostensibly an exercise in photogrammetry, the demonstration was presented as enhanced experience for its users; “with the magic of [Artificial Intelligence] reconstructing a moment that’s important to you” (Franklin 2018). The demonstration video from the conference presentation appears crude when compared to high-resolution outputs acquired within the heritage preservation context, the virtual environments appearing primarily as point-cloud data, without mesh and textural information that would allow the digital spaces to appear more solid.[vi] Nonetheless, the potential for photogrammetry is clearly being considered by some platform-based technology companies whom would benefit from their massive image repositories and maximise the surplus capital of user data.[vii]

Facebook’s plan to instrumentalise user photographs and reconstruct private intimate spaces raises obvious concerns about privacy, consent and image copyright, matters that have increasingly

dogged the company. Certainly an intrusive manifestation of photogrammetry, and while this feature has not yet been released on the Facebook platform, it does not prevent the company from processing user images as data-sets to train the machine learning protocols for the purposes conceived. To a large extent, users have already provided Facebook with the necessary permissions to use the images for any purpose where, subject to the user's account setting, Facebook is granted "a non-exclusive, transferable, sub-licensable, royalty-free and worldwide licence to host, use, distribute, modify, run, copy, publicly perform or display, translate and create derivative works of your content" (Facebook 2020). With the photogrammetric output conceived as a 'derivative work', Facebook can be clearly designated with ownership. Returning to the replica Arch of Triumph from Palmyra, these questions of ownership and copyright have also been pursued, and notwithstanding the terrible human cost of the conflict in Syria, there is a bleaker side. Working in partnership with the IDA, Arc/k Project were the digital platform responsible for the technical accomplishments for the project, from the requisition and processing of the data-sets of photographs to overseeing the manufacture of the 3D-milled stone replica (Arc/k Project 2020). The crowd-sourced photographs harvested for the project were submitted under Creative Commons license which, similar to Facebook's terms, gave Arc/k Project permission to 'redistribute, remix and transform the material', a necessary step for the data to be used for the photogrammetric-led task in any case. But, unsurprisingly, it is the output from the process and its ownership which has attracted reproach. Most critically, the replica has been cited as an expression of 'digital colonialism' (Khunti 2018, Kwet 2019), with the IDA accused of withholding the digital patent for the reconstructed Arch of Triumph from the people of Syria despite the democratised means by which the data-set was secured. These events make clear the increasing digitisation of environments, whether public monuments or private interior spaces, is skewed towards the creators of digital artefacts as having authority over their access, and the immersive conditions by which they can be experienced.

Probing Airbnb's terms and conditions, a broadly identical condition is revealed where derivative work is prohibited, the images and other content provided by users protected as assets of Airbnb. Therefore, this research inquiry would be prohibited from developing data-sets with images harvested directly from the Airbnb website, without express permission from the legal owners. As noted previously, Airbnb publicly acknowledges submitting its content to machine learning, and while these might be for innocuous purposes of room categorisation, the uniqueness of the collected images prescribes a distinct motivation, potentially in advance of Facebook's own interest, to extract surplus value in the context of interior spaces. The specificity of Airbnb's interior-as-images can provide a comprehensive data-set from which machine learning procedures with a focus on interior environments would greatly benefit. In speculating on the consequence of photogrammetry for Airbnb's image content, a further layer of intimacy and private-public threshold is agitated, and a rich vein of surplus value identified. The datafication of the interior foreshadows the replication of one's home annexed under platform capitalism, commodified by those technology companies with a vested interest in developing features and experiences fundamentally contextualised by interior environments.

Photogrammetry as Method

To preclude a direct harvesting of Airbnb's listings to accumulate photogrammetric data-sets, it is essential to repeat that the framework of digital intimacy is not bound to the images of interiors themselves, but their practiced and mediated aesthetics as described earlier. Of principal concern is the behavioural indices for the aesthetics of digital intimacy; practices of image capture and

circulation, attentiveness aimed towards the visuality of individuality and uniqueness, and the indulgence of agitating conventions of public and private under a global mediated experience. These qualities are not limited to images requisitioned by Airbnb, and to a large extent are replicable, without having to be submitted to the platform to be endorsed as such. Moreover, clear directions for the making of such images as has already been identified, with guidelines by Airbnb and other parties to choreograph and document interior spaces suitable for peer-to-peer sharing. Under this direction, domestic interiors have been imaged to conform with these directives for the purposes of this research enquiry, to propose a number of operational data-sets also calibrated in the broader landscape of both real and imagined interiors, which satisfy a further investigation of digital intimacy through photogrammetry. The photographs articulate a property under the peer-to-peer accommodation typology, forming individual data-sets averaging 30-40 images across a range of domestic interior spaces including lounge, kitchen, bedroom, etc., giving a sense of the overall spaces as well as discreet objects and encounters, as typifies an Airbnb listing.

For the photogrammetric study, the data-sets were submitted to a number of different tools, including Alicevision Meshroom, Autodesk Recap Pro and 3D Flow Zephyr, all easily accessible commercial and educational packages.[viii] The success of any photogrammetry project leans more towards the quality of the data-set itself, rather than the software used, with large quantities of overlapping images generated from multiple angles yielding the best results. Working with the limitations of the Airbnb-type data-sets, where up to 40 images might capture a whole property and, depending on the spatial arrangement and staging of photographs, between 10-20 images documenting one particular interior, the fragmentary quality of the data-sets were always anticipated a challenge to the photogrammetric process, but nonetheless of primary concern to this research enquiry. Nonetheless, it should be underscored the intention of deploying photogrammetry is not to necessarily achieve uncompromised 3D interior environments, but to test and explore the various regimes of machine vision and pursue their significance in relation to digital intimacy.

From the documentation of the outputs produced from the suite of photogrammetry tools (Figure 1), the variation in results clearly demonstrates different strains of algorithmic processing. While some results can nominally be recognised as having an origin in some interior experience, others appear as abstract geometric or blob forms. Demonstrable is a lack of consistency across the photogrammetry platforms with each expressing its own style or ‘vernacularism’ (Menkman 2010). A data-set of up to 20 images might be whittled down to only a handful of images, with many rejected due to insufficiencies. A more detailed examination might reveal a machinic sensing drawn to a particular interior feature – a chair, a lamp, a piece of wall decoration – around which the 3D reconstruction has gained greatest expression. The key condition for a high-quality productive data-set is multiple overlapping images, but the partial data-sets developed under this research enquiry offer limited points of intersection. It is essential to repeat that machine vision lacks any sense of aesthetics and does not perceive the image as image, but rather the image as data: “An algorithm programmed to discern a particular pattern or anomaly can ‘see’ it directly in the data itself” (Bratton 2016). By mapping pixels, and collections of pixels, with similar values across a range of operational images, patterns can be extracted from which structure and depth in the photograph can be determined. Photogrammetry favours image content with the greatest variety and differentiation, where plainer and monotonous data-sets provide too few targets.

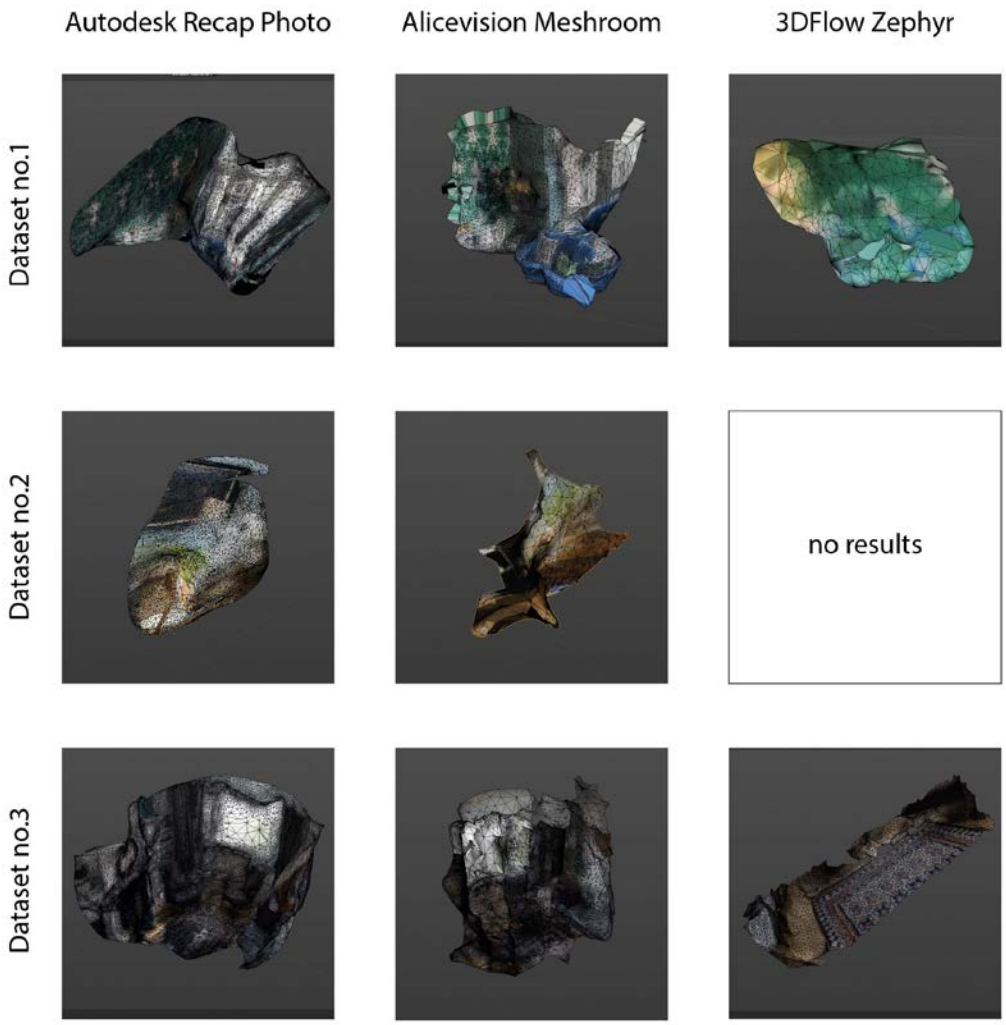

Figure 1: Documentation of photogrammetry processing using a number of data-sets.

To draw out the significance of these observations, firstly is media artist and theorist Rosa Menkman's categorisation of 'vernacular' qualities of digital images that exemplies the nominally unseen variations of digital artefacts implanted in their coded structure. This practice-based research has deployed photogrammetry as a methodology to "let otherwise invisible […] languages present themselves" (Menkman 2020), identifying the hidden discrepancies between the software platforms used. But more significantly, this serves to highlight bias embedded in such technological processes, concerns most easily relatable under the increased deployment and adverse effects of facial recognition technology (Bridle 2018; Crawford and Paglen 2019; Monea 2019). Such bias, that can be (unwittingly) present in either or both data-set and technological apparatus, has potential contextual implications for digital intimacy and its agitation of paradigms of exclusion and inequality.

Secondly, is a reflection on the essential quality of any Airbnb listing to stand out from its competitors, for any one interior-as-image to be distinguishable from another. Equally, as discussed earlier any specific interior-as-image is an expression of individuality, albeit a certain category that leans towards homogenisation across the broader typology. In a machinic analysis of the

photographs, it is conceivable that those points of individuality in the interior act as landmarks for the algorithmic processing, their recognisability being a key factor in their success as a photogrammetric target. Against an aesthetic baseline of white minimalism, the Airbnb-styled interiors with a curated array of objects, furniture and decoration that might aspire towards a restrained maximalism in their expression of individuality, provide spatial environments well-prepared for photogrammetric datafication. To push the archetype further, it is useful to reference German sculptor Tobias Rehberger and his iconic black-and-white architectural installations. Based on the principles of dazzle camouflage developed to obscure naval ships during World War 1, the geometric patterns deployed in Rehberger's installations confound the eye, producing a disorientation where it is difficult to discern wall from floor, compromising one's perception of spatial depth. The exaggerated graphical configurations provide strong reference points for photogrammetric processing, and it is possible that such a dramatically disruptive visual experience favours its own datafication (Figure 2).[ix] Dazzle camouflage was developed to confuse the human eye, but the machine eye is adept at deconstructing the interior-as-image – as data – to determine structure and depth (May 2017). This collision proposes an additional facet to augment the notion of digital intimacy, and the threshold of (wo)man and machine, human and nonhuman, a 'cyborg hybrid' (Haraway 1991; Loder 2021) "where photography and algorithm meet head-on in a fiery crash" (Anderson 2017).

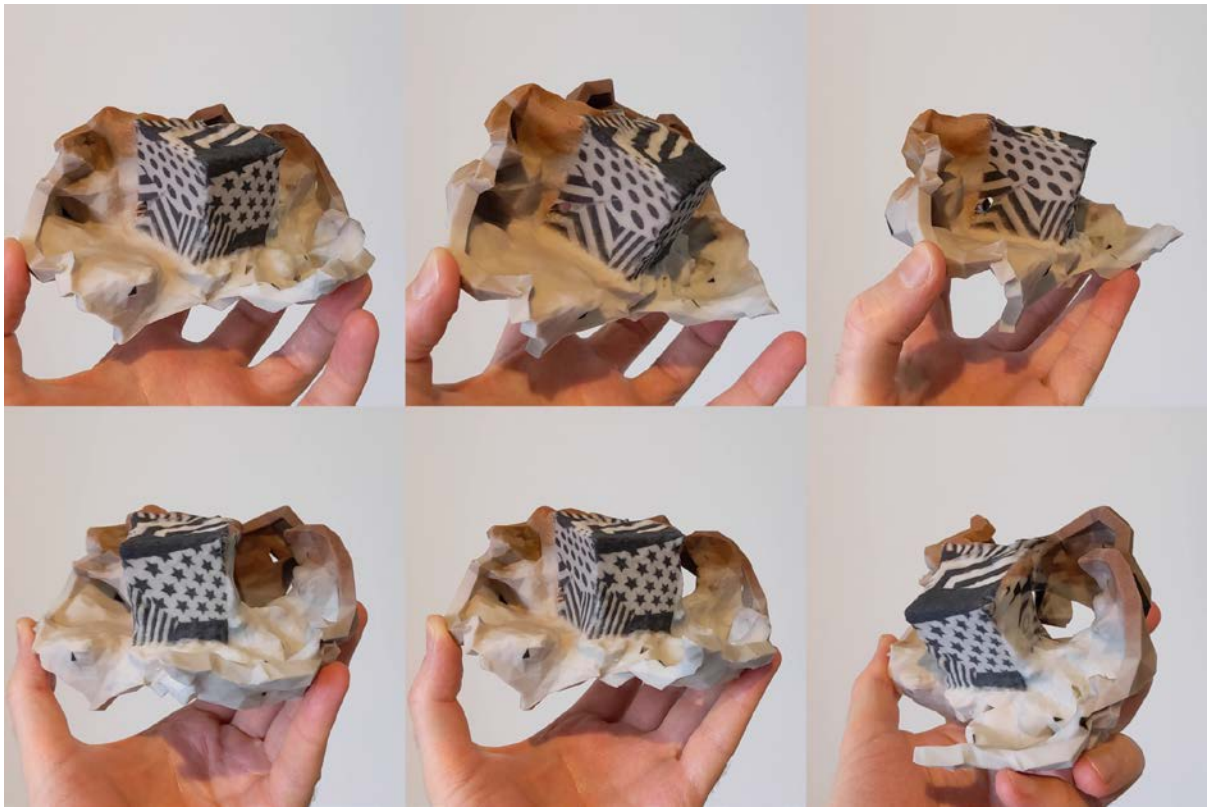

Figure 2: 3D printed model of 'dazzle cube' photogrammetry.

Turning to photogrammetry's potential to motivate a 3D printed real-world emergence, obvious concerns can be directed at the 'authenticity' of the reproduction, as was observed for Palmyra's Arch of Triumph (Bacchi 2016, Cunliffe 2016, Kriss 2016, Khunti 2018). Firstly, as a technique of reproduction, photogrammetry is not perfect. Partial and low-resolution data-sets lead to inaccuracies and simplification of form, leading to diminished quality and loss of original meaning.[x] The limitations of digitisation practices result in incompleteness, with incidents of absence crudely

scaffolded by the software, or backfilled by human labour. These indicate how digital imaging technologies do not discern individual objects, but only surfaces, without depth or notions a reverse-face. Through this façade, a surface of intimate presentation is deconstructed, organised with an orientation towards the envisioning device. Similarly, when one 'selfies' one's location, divulging their 3-dimensional ontology to become a part of the 2-dimensional interior-as-image, the arranging of the body in space by the camera that acts like "a tether to the body, orienting and circumscribing potential movement" (Korody 2019). In the scanning and digital recreation of environments and objects, machine vision smears everything into a singularly mapped experience, without joints (but perhaps gaps and holes). The resulting digital artefacts are homogenous in form, and while textured with colour, will lack haptic qualities of softness, smoothness, coldness, etc.[xi] It could be postulated such imperfections and 'glitches', the gaps in the process and hidden nooks in the model, are outside the surplus of the technological platform. But as machine learning develops with more and more data assimilated, the algorithm can begin to populate these voids with speculations mapped from predictive models. With Airbnb as a key proponent in the archiving of interior-as-images, they are potentially best placed to arrive at that point.

Figure 3: 3D printed artefact – Extract_mirror_1b (2021).

Finally, in deploying the extractivism most comprehensively, the incompleteness of the photogrammetric outputs is most pointed so that only discrete features – such as a mirror (Figure 3, Figure 4) or house plant (Figure 5) – are of any practical exploitation. Of immediate articulation in these artefacts is their capacity to perform a spatial choreography upon the viewer. Their partial and deformed condition motivates the observer move and rearrange their line-of-sight, an attempt to

locate the best position to recreate an authentic viewing of the subject. This performance (re)activates the embodied sensibility present in the co-constitutive practise of social media architecture explicated at the start of this article and the aligning with the intimate relations of documenting (body-in-)space. In addition, and drawing attention to the inauthentic dimensions of the Palmyra two-thirds scale reproduction, the intangibility of scale that emerges from the photogrammetry process serves to augment the fabrication of artefacts across a range arbitrary of scales, modelling differential experiences from a single digital feature. This provides a further spatial facet that troubles the threshold of the physical and the virtual, in which artefacts are reproduced at any scale and appropriated and commodified with new functions, and where the authentic is dynamic and slippery, impelling the viewer to reassess their own perspective in observing the artefact. These spatial conditions motivated by the 3D printed artefacts serve to emphasis the co-constitutive conditions that underpin the concept of digital intimacy developed in this research article. The experience of artefacts emergent from the operational capacity of the interior-as-image deterritorialise the viewer, a procedure of digitisation that captures him/her in the machinations of techno-capitalism, and be subjected to the exclusion and displacement structured by it.

Figure 4: 3D printed artefact – Extract_mirror_3c (2021).

Figure 5: 3D printed artefact – Extract_flower_top_2c (2021).

Conclusions: An Aesthetics of Resistance

The Airbnb interior is exemplary of an environment devised to be consumed as an image on a screen (Heathcote 2020), a particular strand of a growing predisposition towards interior-as-images that defies any exclusive typology or sector. Any single event participating in activities of digital image consumption contributes towards datafication, the image capable of being subjected to any manner of machine learning processes. The image is categorised and classified, allocated a value and placed within an algorithmic ecology in which further surplus value can be extracted. Equally, the mediation of the interior-as-image presents a confluence of digital intimacy, a dynamic and complex threshold of public and private that has diverged and expanded from established domestic norms to encompass globalised regimes of exclusion and inequality. In reifying the aesthetics of the interior-as-image as part of a wider structuring of power, this inquiry urges against a denial or masking of digital intimacy, instead "encourages us to perceive contemporary reality as an 'augmented space' filled both with human agents and computational artefacts […] that interact and influence each other" (Contreras-Koterbay and Mirocha 2016, 27). In an augmented space, we recognise those Instagram-able Moments as computational artefacts, and expressions of a networked regime of power.

Under the datafication of the interior the domestic is commodified as a globalised experience, proposing new behaviours by which intimacy is performed digitally, and is by no means confined to participation in an Airbnb experience. During the Covid-19 pandemic in 2020, webcam-based social and working practices demanded new modes of engagement that troubled the thresholds of public and private, with 'Working from Home' blurring into 'Living in Work', restructuring the spatial intimacy of the home and alienating one from the domestic. While the mosaiced presentation of interior-as-images has become familiar, these now essential infrastructures of connection are

subject to the authority of large technological conglomerations, expressions of digital extractivism that penetrate the domestic condition. Strategies of resistance to the datafication of the interior under surveillance capital and digital extractivism become more urgent as technologies of machine vision become increasingly embedded in our everyday experience: "One must create deliberate inefficiencies and spheres of life removed from the market and political predications – 'safe houses' in the invisible digital world" (Paglen 2016). Some of such inefficiencies may lie in design strategies responding to the limitations of machine vision as witnessed through photogrammetry, interfering with the capacity of the digital eye to determine structure and depth. But perhaps more significantly, is how imaginary and fictional interior-as-images as developed by Alexis Christodoulou and others can be designated 'counter-operational' tactics and allocated with a disruptive capacity. Inserted into regimes of circulation, these impossible interiors could confound the ability of machine learning to speculate or fill in the gaps, to trouble the development the predictive models that can determine our everyday interior behaviours.

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Biography

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[i] Responding to these stresses that have emerged on the urban fabric, some cities have sought to regulate the shared accommodation sector, with measures that include the registration of properties for sharing, limitations on number of days the house may be shared, and requirement for property owner to be 'in residence' a minimum number of days per year. Other than these relatively crude regulations, city authorities are perhaps still trying to adapt at an urban framework resolution with strategies that could include the revision of zoning and residential development controls (Gurran and Phibbs 2017).

[ii] For Airbnb, "machine learning is imbued within the product, it's been there for quite a long time" (Hoh 2019), with individual programming teams developing their own machine learning infrastructure to suit their own needs that include search ranking, smart ranking and fraud detection.

[iii] The panorama on which platforms leverage their business, empowering connections between individuals to invisibly wield the data from those encounters to enhance not only their own services, but further regimes of personalisation with the distribution of patterns of behaviour to other parties, manifests a stratum of behavioural modification that can impact a wide range of social and economic factors and concerns, from the consumption of products to a challenging of democratic freedom.

[iv] Not limited to heritage visualisation, photogrammetry is used most recognisably in geographic mapping systems such as Google Earth where 3D models of buildings, vegetation and other features are extracted from a range of 2D photographic material.

[v] Since its inception in 2001 the Google Earth geo-mapping platform has endeavoured to turn its flat maps into 3D environments. A strategy initially developed through crowd-sourced user-generated 3d modelled content which had partial success, Google shifted wholesale to photogrammetry in 2012 where the process could be automated, literally on a global scale using satellite imagery and aerial photography.

[vi] Such a primitive experience maybe shows the limitations of the data-set used and a still-in-progress machine learning procedure, but nevertheless expressed as a novel "pointillism effect" allowing the viewer to "feel like you are in a dream" (Zuckerberg 2018).

[vii] Facebook has as its disposal countless billions of images, from its core social media platform, but also Instagram which it acquired in 2012, and its recent focus on Virtual Reality aimed towards the domestic market, outlines a distinct direction with the capacity to increasingly impact on the domain on digital intimacy.

[viii] While the photogrammetric workflow is broadly identical across all packages, with identifiable common processes such as Structure from Motion, Depth-mapping, and Texture-Mapping, each platform will have developed its own particular algorithmic programming to result in the outcomes being dissimilar to varying degrees.

[ix] Indeed, when using photogrammetry for challenging small artefacts uniform in shape and texture, it is recommended to introduce additional graphical textures – newsprint cited as an exemplary example – on challenging surfaces or as a base, to provide additional reference points in the scanning.

[x] Arguably other processes such as laser-based LIDAR can measure much more accurate models, but this process is not without a second issue with the impossibility to see every surface possible, where the fixed-point capturing creates distinctive digital shadows.

[xi] The manifestation of such experiences exemplifies what has been described as the 'New Aesthetic' (Bridle 2012; Sterling 2012) with attention given to qualities that reveal the "grain of computation in digital visual media" (Contreras-Koterbay and Mirocha 2016, 22).