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Artistic research into distraction, agency, and the internet

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Artistic Research into Distraction, Agency, and the Internet

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Abstract

This practical study is concerned with flows of attention and distraction that are associated with experiences of the internet. Taking the term ‘internet’ to stand for a range of networked social, media-consumption, and data practices carried out on devices such as smartphones, this study sets out to explore how distraction might arise, how it might be conceptualised, and the potential consequences for agency of the conditions of its emergence. The study is led by the production and analysis of artworks, using practical approaches that engage critically with aspects of the experience of the internet.

This thesis begins by exploring conceptions of the ‘attention economy’ articulated by Goldhaber (1997), Beller (2006), and Citton (2017), developing an understanding that counters mainstream deterministic positions regarding the impact of digital technologies on the capacity for focused attention. Distraction is considered as an experience that may be sought out by individuals but can be captured and extended by third parties such as social media platforms. The importance of the data generated by habitual or compulsive engagement with internet-enabled devices and services (Zuboff, 2015) is considered against a backdrop of quantification and managerialism that extends beyond experiences of the internet.

The study reviews existing artworks made in response to these concerns, focusing on expressions of the ‘attention economy’ prevalent in ‘post-internet’ art. Works by Vierkant (2010), Roth (2015) and others that interrogate infrastructure, data-gathering, or networked methods of distribution are identified as relevant, and a position is developed from which the consequences of metricised display platforms for an artistic ‘attention economy’ can be explored. Prototype artworks made during the study are appraised using an artistic research methodology that foregrounds the role of the researcher as both producer and reader of the artwork. Works that actively create distraction, that gather and visualise data, and that emphasise calm self-interrogation, are discussed and evaluated. The practical aspects of the research contribute to knowledge by extending understanding of the spatial, infrastructural, and algorithmic dimensions of the relationship between distraction and agency.

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Candidate's Statement

I, Michael Peter Day, declare that this submission for the degree of Doctor of Philosophy meets the regulations in the handbook for the mode of submission selected and approved by the Research Degrees Sub-Committee of Sheffield Hallam University.

I declare that all the material in this thesis is my own work, or in the case of practical work produced in collaboration, that the nature of my involvement in the collaboration is clearly stated. The material in this thesis has not been submitted for any other academic award. The use of all materials from sources other than my own work has been properly and fully acknowledged.

1: Introduction

Rationale

My application to the Ph.D. programme was motivated by a desire to re-evaluate and reconfigure the critical space in which my art practice had been operating. Prior to the Ph.D., I had been using computers as an artistic production tool for many years, and had developed an art practice that entered into a broad critical dialogue about the role of digital technology in contemporary life. My Masters research project explored the phenomenon of boredom. The experience of boredom, at once politically charged in opposition to work and frustratingly unpleasant as an embodied temporal experience, stood counter to the prevailing ideology of entertainment that seemed central to the mediatised world. Post-MA, my practice drew in and utilised restorative visual tropes such as landscape, and by joining this with the moving image, began to connect these with the field of slow cinema.

This durational approach to the depiction of landscape did not take into account rapid changes that were occurring alongside the widespread adoption of devices that offered mobile internet connectivity as a feature. Mobile connectivity presented a challenge to the critical position my work occupied: the relevance of the trope of remote wilderness that I was using as a knowingly conservative indicator of disconnected solitude was brought into question by the fact that everyone in this notional wilderness was likely to be tapping away on a smartphone. In a collaborative project with a performance artist, I found myself researching military-grade laptops with internet connections, and discovered that it was possible to make a reliable connection to the web from the summit of Mount Everest.¹ As it seemed that one of the most inaccessible locations on the planet now had Wi-Fi, the idea of remote wilderness as a critical counterpoint to technological acceleration no longer existed in the way that I had been deploying it, leaving my practice with some fundamental questions to address.

¹ Human Edge Tech, 'Mount Everest Wi-Fi Network' <<http://humanedgetech.com/>> [accessed 29 November 2017].

Research Question

In the early stages of this study, my focus was on establishing a context for the research, initially by extrapolating a research domain from questions to do with being permanently connected that had emerged from practical work done prior to this study. One way of reading the problem was to consider the experience of becoming distracted from a view of landscape (or from an artwork that depicted a landscape) by an internet-enabled device. One of the consequences of being continually connected to the internet is the capability to instantly escape open-ended, durational, or boring experiences through the pursuit of distraction. Distraction can also occur when it is not actively pursued: Thomas Friedman coined the phrase ‘the age of interruption’ to describe a contemporary context in which focused attention is seemingly under threat from the notifications, updates, and other digital distractions that accompany continuous internet connectivity.² The assertion that continuous connectivity causes distraction is commonplace in mainstream discourse, and unpacking the assumptions behind this assertion led to the emergence of a more nuanced set of research questions. Agency is understood in a sociological sense here, referring to the capacity to act independently and with free choice within limiting structures.

During my early background research, I encountered an archetypal tableau that seemed common in mainstream discourse: the mobile device user giving close attention to their smartphone in favour of their first-hand experience of the social or natural world. Examples of this include commentators such as Sherry Turkle, who describe teenagers sending text messages to each other instead of engaging in face to face conversation, or national parks such as the New Forest offering lockers, described as a ‘Tech Crèche’, in which visitors could stow their mobile devices so that they could roam undistracted in

² Thomas L. Friedman, ‘The Age of Interruption’, *The New York Times*, 5 July 2006, section Opinion <<http://www.nytimes.com/2006/07/05/opinion/05friedman.html>> [accessed 25 June 2018].

nature.^{3,4} While this second example could be seen as a merely a marketing opportunity for the New Forest, it also re-inscribes an assumed opposition between technology and nature, as well as infantilising any distraction from the unquestioned moral wholesomeness of landscape.

While further reading placed Turkle's particular analyses into an appropriate critical context, the more relevant and important points in her widely-read book *Alone Together* seemed to be concerned with how attentiveness and distraction are experienced and managed by smartphone or internet users. My focus shifted toward the way attention can be captured by connected devices and the communicative services they carry. I wondered why these devices were so distracting to their users, and how this distraction might be experienced and negotiated by those users. How is distraction produced by internet-connected services and devices, and how might agency be enacted through capitulation or resistance to it, or through actively pursuing it? What might the consequences of distraction be for the agency of the internet user, or for the services that stand to gain from harnessing the user's attention? How can artistic research develop understanding of the relationship between distraction, agency and the internet? From the perspective of a producer of aesthetic experiences that invite a certain quality of attention, I wanted to find out more about this oscillation between attentive and distracted states, and what implications it might have for the work that I was making.

Methodology & Scope

This research terrain is navigated with the intention to explore what an appropriate and satisfactory critical art practice that explores these ebbs and flows of attention and distraction might be. While the boundaries of this research terrain have been kneaded and stretched in ways that variously

³ Sherry Turkle, *Alone Together: Why We Expect More From Technology and Less From Each Other* (New York: Basic Books, 2011), p. 178.

⁴ Katie Collins, 'New Forest Tech Crèche Takes Phones so You Can Embrace Nature (Wired UK)', *Wired UK*, 2014 <<http://www.wired.co.uk/news/archive/2014-08/04/new-forest-tech-creche>> [accessed 26 November 2015].

focused and expanded the project's scope, the necessity for the research to inform my art practice made it essential that I adopt artistic research as my primary methodology. Both the study of attention and distraction and my wider concern with the internet and its social implications are formulated as highly interdisciplinary fields, and in this thesis I make the case for art to be among the fields that can contribute to the understanding of these research questions.

Structure of Thesis

The first chapter of this thesis gives an overview of theoretical approaches to the study of attention and distraction, looking most closely at those areas that address the emergence of distraction and how it can be understood in relation to digital communication. The conceptualisation of the internet as an 'attention economy' and its connection with expressions of human capital are explored here, and this chapter gives particular consideration to the way that the 'attention economy' has foregrounded certain approaches to user engagement over others. The interrelation of an economy of attention and approaches to the design of device interfaces has led to an increased interest in 'internet addiction' or compulsive usage of devices with internet access, which this chapter explores. Compulsive distraction is considered here in terms of user agency.

The next chapter provides an overview of existing artistic approaches that are relevant to my own practical research and to the research terrain introduced above. Many artists have worked with and through digital technology, but recently certain types of work have been described using the contested term 'post-internet' art. My interest in the experience of being distracted by the internet suggests that art made in response to the internet will provide clues to the key issues at stake in the relationship between the internet and attention. Part of the narrative that emerges positions ideas of infrastructure as key in relation to attentiveness, the digital, and art that responds to these concerns. This chapter will critically examine some of the characteristics of 'post-internet' art and the compromises it might involve, as a way of establishing

the context for my own research and positioning my artistic practice in the wider field of contemporary digital art.

The next chapter of this thesis looks at ways of conceptualising artistic research and outlines my own position as an artistic researcher. This chapter summarises the ways in which artistic research can address questions of knowledge and insight, and discusses the epistemological concerns appropriate to the way that I conduct my own artistic research.

I then discuss the progression of my practical research, detailing the practical experiments that have taken place during my study, and exploring the insights emerging from them. In line with a methodological stance that positions the researcher as both author and reader of the work, this section of the thesis both documents and analyses the practical research activity taken place as part of the study. The thesis concludes with a discussion of areas of contribution and potential future work.

2: Understandings of Attention and Distraction

Mainstream discourse seems awash with claims that internet-connected devices are having a negative effect on cognitive capacities such as attention. The concern might be that Google is making us stupid, or that fifty per cent of year ten students feel addicted to the internet, or that contemporary attention spans are now shorter than that of a goldfish.^{5,6,7} Two main threads of this type of writing are firstly, that smartphones, the internet, social media and so on have an ability to create distraction, and secondly, that these technologies and systems make their users feel bad in some way. These two threads are often entangled and have large areas of overlap. Distraction is a tricky thing to conceptualise and analyse: being distracted by an interruption seems like a phenomenon, whereas feeling distracted, or feeling something about being distracted, appears more like an affective state. Both these readings have an impact on how people value themselves. I intend first to look at some of the theoretical understandings of attention and distraction as phenomena, and then continue by exploring a more affective understanding of distraction.

Attention and Distraction as Phenomena

If there is concern about the capacity of new technologies such as smartphones to distract, then this concern seems to manifest itself in a number of distinct ways. Some people are concerned that they are too easily distracted by the entertainments and interruptions that mobile communications such as social media provide, and that this is making them less productive, happy or

⁵ Nicholas Carr, 'Is Google Making Us Stupid?', *The Atlantic*, August 2008
<http://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/306868/?single_page=true> [accessed 6 November 2015].

⁶ Peter Walker, 'Poll: Nearly 50% of Year 10 Students Feel Addicted to the Internet', *The Guardian*, 9 May 2014, section Technology
<<http://www.theguardian.com/technology/2014/may/09/half-of-students-feel-addicted-to-the-internet>> [accessed 6 November 2015].

⁷ Microsoft Canada, 'Attention Spans' (Consumer Insights, Microsoft Canada, 2015)
<<http://advertising.microsoft.com/en/cl/31966/how-does-digital-affect-canadian-attention-spans>>.

fulfilled.^{8,9,10} Others find themselves overwhelmed by the demands of email or work-related communication carried out on mobile connected devices.^{11,12} Still others are concerned with 'information overload', loosely described as the sense that there is simply too much information on the internet, and that it is impossible for it to ever be effectively assimilated.^{13,14} Each of these overlapping areas can be critically examined by considering them in terms of the capture of attention.

The literature on attention is divided across a number of disciplinary perspectives. While there is a huge body of literature that covers the functioning of attention in cognitive psychology, these accounts will not form a major part of my study, for the following reasons. Most cognitive psychology studies employ objective methodologies, and seek generalised answers that explain the phenomenon under investigation. Artistic research operates within a more relational epistemological frame that foregrounds subjective or constructionist approaches, making cognitive psychology seem at odds with practical artistic research. While recognising the potentially fertile interaction between these approaches, my inquiry is more in alignment with cultural understandings of the phenomenon of attention than objective psychological understandings.

⁸ Friedman.

⁹ Maggie Jackson, 'MAY WE HAVE YOUR ATTENTION, PLEASE?: With the Workplace Ever More Full of Distractions, Researchers Are Developing Tools to Keep Us on Task', *Business Week*, 2008.

¹⁰ Andrew Sullivan, 'Andrew Sullivan: My Distraction Sickness — and Yours', *Select All*, 2016 <<http://nymag.com/selectall/2016/09/andrew-sullivan-technology-almost-killed-me.html>> [accessed 25 June 2018].

¹¹ Ian Bogost, 'Hyperemployment, or the Exhausting Work of the Technology User', *The Atlantic*, 8 November 2013 <<http://www.theatlantic.com/technology/archive/2013/11/hyperemployment-or-the-exhausting-work-of-the-technology-user/281149/>> [accessed 25 June 2018].

¹² Maggie Jackson, 'Turn Off That Cellphone. It's Meeting Time', *New York Times*, 2003.

¹³ Mark Andrejevic, *Infoglut: How Too Much Information Is Changing The Way We Think And Know* (London: Routledge, 2013).

¹⁴ Franco Bifo Berardi and others, *After the Future* (Edinburgh: AK Press, 2011).

Art Criticism's Approach to Attention and Distraction

The literature on attention and distraction in art criticism seems to engage with contemporary technological questions in very specific and quite limited ways. That viewers attend to artworks closely during the aesthetic encounter is typically taken as a given, and relatively few art critics discuss distraction on a level other than seeing it as a failure of the artwork. Many approaches can be traced back to the Frankfurt School, with Walter Benjamin's 'reception in distraction' operating as a significant touchstone for the discussion.¹⁵ Writing in the 1930s, Benjamin theorised 'reception in distraction' as a way of articulating what he identified as a new visuality emerging alongside the new medium of cinema, considering it a consequence of mechanically reproduced mass media. Benjamin suggested that in comparison to the medium of painting, film's editing processes (specifically montage, Eiland suggests) had the capacity to break the viewer's concentration, preventing them becoming absorbed in the work as they might do a painting.¹⁶ Rather than engaging in an extended, contemplative interaction with the artwork, the viewer receives the work of film in a distracted state: 'The spectator's process of association in view of these images is indeed interrupted by their constant, sudden change.'¹⁷ The word 'distraction' in the English translation of Benjamin's text corresponds to the German '*Zerstreuung*', and while this word covers some senses of its English equivalent, it also carries a sense of dispersal, etymologically descending from the root '*streuen*', similar to the English 'strewn'. '*Zerstreuung*' therefore carries with it something of a spatial connotation: distraction to Benjamin is attention dispersed across space.¹⁸ Benjamin likens this dispersal of attention to the mode of a spectator's interaction with architecture: while architecture can be viewed at a distance and contemplated, it is more usually interacted with in an

¹⁵ Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', in *Illuminations*, ed. by Hannah Arendt, trans. by Harry Zorn (London: Pimlico, 1999), pp. 211–44.

¹⁶ Howard Eiland, 'Reception in Distraction', *Boundary 2*, 30.1, Benjamin Now: Critical Encounters with The Arcades Project (2003), 51–66.

¹⁷ Benjamin, p. 231.

¹⁸ R. L. Rutsy, 'Pop-up Theory: Distraction and Consumption in the Age of Meta-Information', *Journal of Visual Culture*, 1.3 (2002), 279–94.

embodied, tactile way, with viewers experiencing multiple partial views of the fragmented whole as they navigate it. Habits of usage soon emerge through daily contact with architecture. Benjamin sees the potential for film to teach the masses not through their direct contemplation of single images, but through training them in the kind of habituated dispersed reception that would soon be coming to all areas of contemporary art.

Drawing on Benjamin's definition, Peter Osborne states that 'art distracts and is received in distraction', by which he means that 'we go to the gallery, in part, to be distracted from the cares and worries of the world.'¹⁹ But in order to be distracted from the world, we need to be attentive to the artworks in the gallery. This paradox proposes that when directed outwards to the world, attention and distraction are in essence the same phenomenon. The difference between attention and distraction is the positive valuation that is placed upon the former, and the negative valuation on the latter: distraction is simply attention directed toward the wrong things. Much of the writing on attention and distraction explores the way that this valuation is arrived at – how the 'wrong things' come to be regarded as such – and how the observing subject is constructed through adherence to this valuation.

Jonathan Crary's extensive scholarship covers the production of attentive norms in detail.²⁰ He argues that the nineteenth century saw a reconfiguration of attention and distraction, and of the relation between a subject and the visual field. As reorganisations of capitalism brought new information sources, stimulations, and distractions into being, models of discipline were developed that formed normative standards of attention. Failures of attention were considered to be a danger in the industrialised settings of the factory floor, and inattentiveness was pathologised as sociopathic behaviour by writers of the time. These and other developments formed the model of an ideal attentive

¹⁹ Peter Osborne, 'Distracted Reception: Time, Art, and Technology', in *Time Zones: Recent Film and Video*, ed. by Gregor Muir and Jessica Morgan (London: Tate Publishing(UK), 2004), pp. 66–75.

²⁰ Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture*, 1st edn (Cambridge, MA: The MIT Press, 2001).

subject along lines that were compatible with the sorts of factory labour that nineteenth century mass industrialisation required. Crary contends that the emergence of distraction as a problem in the late nineteenth century is an effect that is inseparable from attempts to construct an attentive subject. In fact, Crary's position is that the disciplinary nature of these attempts is what produces the distracted subject. Osborne succinctly summarises this position: 'attention is a norm produced by the fear of distraction, while distraction is a side-effect of attempts to produce attentiveness.'²¹

Osborne argues that Benjamin's approach applies to art in the gallery as much as it does to cinema, and that the institutional context of the gallery makes disciplinary demands on the attention of its visitors, producing anxiety if they are unable to observe its imperatives. Distraction from the artwork arises as boredom, if the artwork can't sustain the contemplative attention the context demands, or as revolt against the imperatives of institutional discipline. There is, after all, plenty to be distracted by in a gallery, despite its conventional white-box configuration: other viewers, the surrounding architecture, attendants, other artworks and so on. Osborne continues, somewhat confusingly, by asking 'if what art must distract its viewers from – in order to function critically as art – is not just the cares and worries of the world, but increasingly, distraction (entertainment) itself, how to distract from distraction without simply reproducing it?'²² His answer is to consider attention and distraction as a particular modality of temporalisation, producing interrupted and syncopated time for the viewer instead of continuous uninterrupted duration.²³

Viewing the dialectic between attention and distraction in terms of a philosophy of time locates Osborne's approach in a theoretical lineage that sees attention as conflated with time. He goes on to explore Bergsonian thought and its rediscovery by Deleuze, concluding that philosophies of time offer a key

²¹ Osborne, p. 68.

²² Osborne, p. 69.

²³ This syncopation chimes with experiences of art in the web browser, where it may be in competition with multiple browser tabs, or on mobile devices where the rhythms of the non-art world intercede on the art experience.

analytical tool to understand art received with dispersed attention. He may be correct, but even if so, the conflation of attention with time also conflates it with metaphorical understandings of time: time that can be wasted or spent wisely, and ultimately, time as a scarce commodity.

In a partial reiteration of Osborne's position, Anne Ring Petersen attempts to challenge the assumption that if the viewer is distracted from an artwork, this is generally taken to mean that the artwork is not a very good artwork, as it has failed to attract the focused, directed attention that is usually applied to the appreciation of art.²⁴ Ring Petersen's view of distracted reception retains Benjamin's hope that new modes of apperception might be able to be developed through the viewing of video installations. As multi-screen video works show images and sequences that slip in and out of synchronisation, the viewer enters into a state of permanent low-level attentiveness rather than the concentrated absorption of aesthetic contemplation. Ring Petersen infers that this might invite the viewer to develop a mode of apperception appropriate to understanding 'how (perceptible and imperceptible) data is generated and exchanged between technical devices that are spread out in an environment.'²⁵ Ring Petersen sees video installation art as 'exercise for an emergent type of spectatorship where focused concentration is smoothly alternating and merging with distraction'.²⁶ While her examples go some way to supporting Osborne's position, she refrains from explicitly positioning her analysis within a philosophy of time.

Before moving on, it is necessary to clarify what is meant by the term 'aesthetic encounter'. Since the term 'aesthetic' has been theorised from a range of disciplinary positions such as sociology, psychology, anthropology and marketing as well as philosophy and art criticism, it will be impossible to make a full account of the term's multiple and often conflicting meanings here. In the

²⁴ Anne Ring Petersen, 'Anne Ring Petersen, Attention and Distraction: On the Aesthetic Experience of Video Installation Art', 2010 <<http://www.riha-journal.org/articles/2010/ring-petersen-attention-and-distraction>> [accessed 25 June 2018].

²⁵ Ring Petersen (para. 33 of 35).

²⁶ Ring Petersen (para 35 of 35).

simplest possible sense, I use the term ‘aesthetic encounter’ to refer to the point at which a work of art engages its audience. When referring to an aesthetic encounter with a work of art, I lean toward Csikszentmihalyi & Robinson’s way of understanding what happens when this occurs. They describe four dimensions of the aesthetic encounter. The *perceptual* dimension refers to the experience of sensing the physical aspects of the work, such as scale, texture, visual appearance, and so on. The *emotional* dimension refers to the work’s ability to create an emotional response in the viewer, which needn’t necessarily be positive: surprise, frustration or anger are equally valid responses. The *intellectual* dimension alludes to the way artworks invite questioning, and that viewers find that ‘cracking the code’ of a work forms a part of their engagement with it. This needn’t imply closure, as the thinking involved in this dimension of engagement often raises more questions than it answers about the work. The key point is that the intellectual dimension involves the contextualising of the work in some way, by relating it to historical, biographical or other knowledge about the work. *Communication* is the final major dimension of the aesthetic encounter, although this does not mean that the work is considered to directly communicate with the viewer. Communication with the work is seen as a multidimensional experience that takes in the perceptual, emotional and intellectual aspects of the encounter to produce an exchange of thoughts through repeated encounters with the work. The communication takes place in the mind of the viewer, and denotes the extraction of meaning from a work.²⁷

Attention Economy

The term ‘attention economy’ is used quite broadly to refer to various ways of understanding the flow and exchange of attention using models inferred from economics, itself considered as a system for the exchange of scarce resources. Osborne’s conflation of attention with time invites a reading of attention as a finite resource that might be exchanged in a kind of economic

²⁷ Mihaly Csikszentmihalyi and Rick E Robinson, ‘The Major Dimensions of the Aesthetic Experience’, in *The Art Of Seeing: An Interpretation of the Aesthetic Encounter* (Los Angeles, CA: J Paul Getty Trust, 1990), pp. 27–71.

transaction. The term also invites speculation about broader questions involving the commodification of human cognitive functions: if attention is understood as a resource, what are the forces that seek to capitalise on it, capture it, and exploit it? If attention is understood as labour, how is value extracted from it?

In their introduction to an edition of *Culture Machine* devoted to critique of the attention economy, Crogan & Kinsley provide a helpful overview of the territory, which it will be useful to summarise here. They identify four ways in which the commodification and training of attention has been theorised. Firstly, the attention economy has been considered to be ‘an inversion of the “information economy”, in which information is plentiful and attention the scarce commodity’.²⁸ The second paradigm is drawn from post-Marxist theory, considering attention as labour rather than as a commodity, and framing attention as immaterial labour in a system of cognitive capitalism. The third approach considers the neural, cerebral or embodied aspects of attention as having relevance. The fourth approach, taken by ‘popular commentators’, sees the internet as having a significant role in the devaluation of our attentive capacities. My artistic interest and practical research circulates among these categories and their overlapping edges.

Attention as Scarce Resource

Two of the more notable writers to approach the consideration of attention as a scarce resource are Georg Franck and Michael Goldhaber. Franck’s analysis carefully details how the exchange and accumulation of attention can be considered as analogous to an economic materialist model of the monetary economy.²⁹ It takes something of a leap of faith to consider attention as a *material* resource, but if this leap is made, Franck’s analysis of

²⁸ Patrick Crogan and Samuel Kinsley, ‘Paying Attention: Toward a Critique of the Attention Economy’, *Culture Machine*, 13 (2012), 1–29 (p. 3).

²⁹ Georg Franck, ‘The Economy of Attention’, *Telepolis*, 1999
<<https://www.heise.de/tp/features/The-Economy-of-Attention-3444929.html>> [accessed 25 June 2018].

how the mass media produce and disseminate attention does follow a fairly persuasive logic.

Franck begins with the assertion that being attended to is pleasurable and necessary. Having people listen to you, be nice to you, and attend to you closely, is in fact, 'an irresistible drug'. Franck proposes that wealth is overshadowed by prominence, and that in advanced capitalist societies, material need is almost completely satisfied. (This assumption is obviously deeply problematic, but this does not negate his argument overall.) Once material needs are taken care of, attention becomes a more desirable thing to accrue, and the mass media are to Franck (writing before the advent of social media) the most significant way for an individual to acquire huge amounts of attention. If a prominent individual – a star or celebrity – attracts attention to a media channel, the media channel can sell advertising space, which in itself is a promise to attract attention. This leads to a self-propagating loop of attention being generated in order to sell advertising in order to attract attention. The consequences are that things that attract attention get foregrounded and pursued, and things that don't are not pursued. It might be inferred that this leads to an escalation of content, as more shocking or extreme material generates more attention than the bland or uninteresting. The proceeds are split: the media channel gets the money while the individual, the celebrity, gets the attention.

Franck sees the business model of media channels as the offering of information in return for attention. Media channels produce information of some sort, and audiences pay attention to this content. Media channels find out what audiences like, and produce information that will increase audience numbers, which are the measure of the amount of attention that is being paid. This is an asymmetric transaction: media channels merely produce technical reproductions of information, while audiences pay live, embodied attention to each copy in return. Franck goes on to explore a notional accounting system for attentional transactions, how the media can be a speculative attention market

for people seeking prominence, and, importantly, how attention can be accumulated as esteem.

Goldhaber's contribution situates the attention economy firmly in the online world.³⁰ Attention flows in the opposite direction to information, from viewer to 'content', and is accrued by the producers of that content. This positions attention as a commodity, accumulating as property, in Goldhaber's thinking. Among the consequences of this is a shift from the ethos of the 'old economy', which regards attention-seeking as being in bad taste, to one where seeking attention has become the norm.

Goldhaber uses the example of a conference presentation, noting that the transaction of attention between speaker and audience is asymmetric. The speaker pays attention to the audience as a group, dividing her attention among them, whereas each audience member pays full individual attention to the speaker. (This is an idealised example, in which audience members are not live-tweeting or checking the news on their smartphones during the presentation.) This results in audience members feeling like they may know the speaker closely from what has been said, despite the speaker not having the same sense of this inferred proximity of their relationship. Goldhaber calls the speaker's attention to the viewer 'illusory attention', since it feels to the viewer like full attention but is actually only a subdivision of that. These asymmetric relationships that audience members might form to a speaker are sometimes described as parasocial relationships. Theorised by Horton & Wohl in the nineteen fifties, parasocial relationships refer to the sense that one has a close relationship with a figure's persona as it appears in the mass media, which to Horton & Wohl primarily meant radio or television.³¹ Parasociality is similar in quality to the type of 'ambient intimacy' Kate Crawford reports from the early days of Twitter, where a listening or 'tuning in' metaphor was proposed to describe how users maintained often one-sided levels of awareness of the

³⁰ Michael H. Goldhaber, 'The Attention Economy and the Net', *First Monday*, 2.4 (1997) <<http://firstmonday.org/ojs/index.php/fm/article/view/519>> [accessed 25 June 2018].

³¹ Donald Horton and R. Richard Wohl, 'Mass Communication and Para-Social Interaction: Observations on Intimacy at a Distance', *Psychiatry*, 19, 1956, 215–229.

activity of other users in a constantly updating Twitter feed.³² It has since been argued that this parasociality forms the basis of a 'new intimacy economy', where the attention economy has morphed into one where the pretence of intimacy is a prerequisite to financial success on the internet:

[...] watch as organizations pretend, with increasing intensity, that they are individuals. Start counting how many times platforms, services and websites entreat you in human voices, with awkward humour, for money. Watch as the things we expect to be invisible, utilitarian, start oozing emojis and winky-smileys.³³

Here, Franck's understanding of attention as 'care-giving' is recast and its illusory qualities papered over, before being exploited as more or less sincere friendship and deployed by platforms as much as it is by those who use them.

Attention as Labour

Much of the work done to explore the idea of attention as a form of labour has proceeded from Marxist or post-Marxist thought. Crogan & Kinsley alight upon Christian Marazzi as a key starting point for the theorisation of post-Fordism, and his approach to the 'New Economy' helps prepare the ground for an economy of attention. In particular, the post-Fordists' account of the expansion of the economy into leisure time is useful, identifying the crisis in the 'New Economy' as an excess of information.³⁴

However, the idea of being attentive as a form of labour is more fully articulated by Jonathan Beller. He identifies that the giving of attention produces value, and this valorising function of attention is a type of work on the part of the

³² Kate Crawford, 'Following You: Disciplines of Listening in Social Media', *Continuum*, 23.4 (2009), 525–35.

³³ Leigh Alexander, 'The New Intimacy Economy', *Medium*, 2015
<<https://medium.com/@leighalexander/the-new-intimacy-economy-51c87dc4a4d6>>
[accessed 25 June 2018].

³⁴ Christian Marazzi, *Capital and Language: From the New Economy to the War Economy*, Semiotext(e) Foreign Agents Series (Los Angeles, CA: Cambridge, Mass: Semiotext(e); Distributed by the MIT Press, 2008).

observer. To Beller, looking at an object (or, since he writes initially from the discipline of film theory, a media object) represents labour that increases the object's value.³⁵ He argues that a spectator connecting a montage of images into meaning has a structural similarity to a worker in a factory assembling components on a production line. However, the term 'cinema' is extended beyond merely film and its architecture of presentation:

"Cinema" means the production of instrumental images through the organization of animated materials. These materials include everything from actors to landscapes, to populations, to widgets, to fighter-planes, to electrons. "Cinema" is a material practice of global scope, the movement of capital in, through, and as image.

"Cinema" marks the changeover to a mode of production in which images, working in concert, form the organizational principles for the production of reality.³⁶

Beller sees an understanding of the cinematic mode of production as essential to resist and destabilise a hegemonic order of visibility, and indeed, much of his writing proceeds from a strongly Marxist position of struggle against hegemony.

His argument reiterates the asymmetry found in Franck's argument, claiming that in 'both labour and attention, sensuous activity produces value for capital through dissymmetrical exchange.'³⁷ With wage labour, workers put in more labour to the production of commodities than they take out through wages, and in the case of giving attention 'spectators do more to valorise and legitimate images, media platforms and the status quo, than they receive in pleasure or social currency'.³⁸ So for Beller, the value expropriated from a spectator is

³⁵ Jonathan Beller, *Cinematic Mode of Production: Attention Economy & the Society of the Spectacle* (University Press of New England, 2006).

³⁶ Beller, *Cinematic Mode of Production: Attention Economy & the Society of the Spectacle*, p. 14.

³⁷ Jonathan Beller, 'Informatic Labor in the Age of Computational Capital', *Lateral*, 5.1 (2016) <<http://csalateral.org/issue/5-1/informatic-labor-computational-capital-beller/>> [accessed 13 July 2017].

³⁸ Beller, 'Informatic Labor in the Age of Computational Capital'.

always greater than the value received by one in return. This forms the basis of the attentional transaction: 'The separation and expropriation of labour from the labourer, the alienation of labour, is a precursor to the separation and expropriation of vision from the spectator.'³⁹

In more recent writing, Beller extends this theorisation to the contemporary digital world, developing his theory from a cinematic to a 'computational mode of production'.⁴⁰ He argues that commodities need not be objects, and, in fact, that the object was only ever a transitional status of the commodity form. Commodities in the attention economy are constituted and operate more like financial derivatives than objects. Financial derivatives are contracts that allow purchasers to bet on 'options' to buy, assessing risk and determining price based on their guess of how future markets will fluctuate. McKenzie Wark describes the derivative as the means by which 'each of the component flows in commodification can be subdivided, valued, combined and sold again and again in the form of a financial instrument. On top of the quantitative abstraction of the energetics of production is a quantitative abstraction of the information about all of the possible future states of that system. Each of which can be separately priced and sold.'⁴¹

As comparatively few non-specialists are able to adequately conceptualise the motions of automated finance capital, it's difficult for a new system of financial relations to emerge. Beller argues that it might be possible to 'harness the financial operations within the image and make them non-exploitative' and that this control of valuation might produce steps toward a more equitable economy.⁴²

³⁹ Beller, *Cinematic Mode of Production: Attention Economy & the Society of the Spectacle*, p. 8.

⁴⁰ Jonathan Beller, 'The Programmable Image of Capital: M-I-C-I'-M' and the World Computer', *Postmodern Culture*, 26.2 (2016).

⁴¹ McKenzie Wark, 'After Capitalism, the Derivative', *Public Seminar*, 2017 <<http://www.publicseminar.org/2017/04/derivative/>> [accessed 7 March 2018].

⁴² Jonathan Beller, 'Photography, Computation, Radical Finance? - Still Searching - Fotomuseum Winterthur' <<http://www.fotomuseum.ch/en/explore/still->

Since these commodity forms are based on communicative labour, 'the expropriation of labour is also an expropriation of communication and hence an expropriation of individual consciousness, semiotic capacity, and democracy.'⁴³ This is why, for Beller, attention is a key component in the struggle against capitalism. As attention becomes expropriated, stolen, or captured, consciousness goes with it, and is subsumed by the hegemonic order that is capital.

Attention as Embodied

A consequence of a wider 'neurological turn' in the humanities is that some theorists consider attention as located in the materiality of the brain.^{44,45} An early theorist in this area of study is Katherine Hayles. Writing in 2007 and from a digital humanities perspective, she identifies a shift in attentive modes in the students she works with, noticing that their capacity to pay close attention seems to be in decline. She categorises two prevalent attentional modes as 'hyper' and 'deep' attention.⁴⁶ Deep attention is the typical mode of study in the humanities, often required for extended periods of focus on a text, while hyper-attention is a mode that uses multiple simultaneous sources of information, rapidly switching between these, and exhibiting a low tolerance for boredom. These could be seen to have a correlation with the type of 'new apperception' Benjamin and Osborne observe above: hyper-attention and 'reception in distraction' may have some degree of overlap and similarity. Invoking evolutionary explanations, as neuroscientific discussions of attention often (and questionably) seem to do, Hayles suggests that the capacity for hyper-attention probably developed first, to protect early humans from predators, with deep

searching/articles/30951_photography_computation_radical_finance> [accessed 25 June 2018].

⁴³ Beller, 'The Programmable Image of Capital'.

⁴⁴ Crogan and Kinsley, p. 13.

⁴⁵ Anna Munster, 'Nerves of Data: The Neurological Turn in/against Networked Media : Computational Culture', 2011 <<http://computationalculture.net/nerves-of-data/>> [accessed 13 July 2017].

⁴⁶ N. Katherine Hayles, 'Hyper and Deep Attention: The Generational Divide in Cognitive Modes', *Profession*, 2007, 187–199.

attention coming later as a comparative luxury. In a more deterministic passage, she notes a correlation between the rise of digital technology and increased prevalence of attention deficit disorder, arguing that ‘children growing up in media-rich environments literally have brains wired differently from those of people who did not come to maturity under that condition’.⁴⁷ The intimation is that exposure to digital devices brings about a heightened level of hyper-attention. Hayles’ term ‘hyper-attention’ refers to a condition that extends Linda Stone’s ‘continuous partial attention’, in which multitasking between multiple media sources becomes a normal yet anxiety-inducing condition for screen users.⁴⁸ In discussion of Stone’s ideas, Ellen Rose raises a question that Hayles does not with regard to pedagogy: is the development of hyper-attention a benefit or a deficit?⁴⁹ While it might make the sustained level of focus normally reserved for reading extended texts difficult, isn’t an ability to simultaneously absorb multiple information channels an important skill for the twenty-first century workplace? This echoes the question of how attention and distraction can be seen as the same except for their value, and in this case, the development of hyper-attention is seen as a potential accrual of human capital.

Neuroscientist Daniel Levitin offers a summary of contemporary neuroscientific understandings of the human attentional network. For him, the human attentional system has four components: *mind-wandering mode*; *central executive mode*; *the attentional filter*; and the *attentional switch*.⁵⁰ *Mind-wandering mode* is the way that neural networks behave when they are not in receipt of external stimulus. He calls this ‘daydreaming mode’, describing it as relaxing and conducive to creativity and wellbeing. Importantly, this mode is often described as ‘*default mode*’, because it has a powerful tendency to take

⁴⁷ Hayles, ‘Hyper and Deep Attention’, p. 192.

⁴⁸ Linda Stone, ‘When Distraction Is Good - O’Reilly Radar’, 2008
 <<http://radar.oreilly.com/2008/07/when-distraction-is-good.html>> [accessed 25 June 2018].

⁴⁹ Ellen Rose, ‘Continuous Partial Attention Teaching and Learning in the Age of Interruption’, *Antistasis*, 1.2 (2011) <<https://journals.lib.unb.ca/index.php/antistasis/article/view/18524>> [accessed 25 June 2018].

⁵⁰ Daniel J. Levitin, *The Organized Mind* (London: Penguin Random House UK, 2014), pp. 37–45.

over the brain: ‘this network exerts a pull on consciousness [...]; it hijacks your consciousness if the task you’re doing gets boring’.⁵¹ Default mode is often directed inward, towards ‘goals, desires, feelings’, as well as being active when we are feeling empathy for other people. *Central executive mode*, by contrast, is the absolute opposite of daydreaming, and represents the type of focused engagement involved when carrying out tasks that require alertness. It can only become active when default mode is inactive, and since default mode is where consciousness wants to go, it often takes effort to stay in executive mode and not to drift off into daydreaming. The *attentional filter* is continuously operating subconsciously in the background, monitoring sensory input for anything that might turn out to be important and might require action. This ‘vigilance mode’, according to Levitin, is what kept early humans alert to predators even while focusing their attention on the hunt. The *attentional switch* is a physically locatable part of the brain that controls the allocation of ‘neural and metabolic resources’ to each of the other networks.⁵² Levitin states that this operates better in some people than in others, but that it does require actual effort to use: ‘if it is called upon to switch too much or too often, we feel tired or a bit dizzy’.⁵³

Levitin’s research can offer a helpful nomenclature for the subsections of the attentional network that are being targeted in certain forms of attention capture. However, by way of caution, Anna Munster demonstrates that the foundational images of neuroscience – fMRI scans – are algorithmic constructions and are not by any means indexical representations of neurons or changes in the structure in the brain.^{54,55} As a result, humanities scholars who reach for verification by calling on these images risk inferring in them an

⁵¹ Levitin, p. 38.

⁵² Levitin, p. 45.

⁵³ Levitin, p. 43.

⁵⁴ Munster.

⁵⁵ The algorithmic construction of the image is a point also made about smartphone photography by Hito Steyerl. See David Toro and others, ‘Hito Steyerl | Politics of Post-Representation | in Conversation with Marvin Jordan’, *DIS Magazine* <<http://dismagazine.com/disillusioned-2/62143/hito-steyerl-politics-of-post-representation/>> [accessed 25 June 2018].

evidential claim that is incorrectly reproduced from earlier visual techniques such as photography.

Mark Andrejevic offers an analysis of this move toward neural imaging from within a wide-ranging discussion about the role of representation in a world characterised by a glut of information. He sees automated strategies such as neural imaging, lie-detection, and other attempts at accessing pre-conscious decision making as attempts to sidestep what he sees as a 'demise of symbolic efficiency'.⁵⁶ Making direct measurements of physical bodies, he argues, provides 'an allegedly extra-discursive, material guarantee of "immediation": direct access to feelings, thoughts and desires as yet undistorted by their translation into language.'⁵⁷ He outlines how the "science" of neuromarketing' in which brain scans reveal the 'affective response to advertising campaigns' is replacing the use of focus groups in the process of developing consumer products, and how this claims to give access to the unmediated desires of consumers. He quotes Clive Thompson:

MRI scanning offers the promise of concrete facts – an unbiased glimpse at a consumer's mind in action. To an MRI machine, you cannot misrepresent your responses. Your medial prefrontal cortex will start firing when you see something you adore, even if you claim not to like it.⁵⁸

A broader consequence of this shift is a movement of the truth standard 'in the direction of "affective" truths and the ways in which these can be read off the body', leading to a post-truth endpoint where gut instinct trumps empirical evidence.⁵⁹

⁵⁶ Andrejevic, pp. 12–15.

⁵⁷ Andrejevic, p. 78.

⁵⁸ Clive Thompson, 'There's a Sucker Born in Every Medial Prefrontal Cortex - The New York Times', *The New York Times Magazine*, 2003
<<http://www.nytimes.com/2003/10/26/magazine/there-s-a-sucker-born-in-every-medial-prefrontal-cortex.html>> [accessed 25 June 2018].

⁵⁹ Andrejevic, p. 85.

Munster offers another direction for the trajectory of the ‘neurological turn’, bringing the development of computerised systems that are based on the architecture of the brain into her analysis. The deployment of algorithmic ‘neural networks’ as part of machine learning systems forms a concerted move by major computing companies to develop tools for the prediction of behaviour. Often targeting this prediction towards consumer buying decisions, machine learning is the computing backbone of the type of automated recommendations offered by companies such as Amazon, or, as in Munster’s analysis, Google. Munster claims that

[Google] expressly ties the development of such software to its desire to become the information architecture which functions *before* we consciously think, search, act. This [...] is not so much the space of cognition but rather the territory of the pre-cognitive: that grey area of the ‘just before’ of consciousness and intentionality, where networked corporations increasingly want to insinuate themselves. All those ‘we recommend’ emails, those ‘like’ icons and those privacy settings we forget to activate are harbingers of a ‘neuro-perceptual’ soft apparatus that will soon claim to know what we want to think, where we want to go, what we want to purchase before we do.⁶⁰

The automated attention provided by neural networks is being used by advertisers to pre-empt the behaviour of consumers, attempting to make decisions about what they will direct their attention to before they do so themselves.

Shoshana Zuboff describes the collection, aggregation and use of data of behavioural data as ‘surveillance capitalism’.⁶¹ The exemplar of surveillance capitalism for her is Google, and she argues that ‘data extraction’ by the

⁶⁰ Munster.

⁶¹ Shoshana Zuboff, ‘Big Other: Surveillance Capitalism and the Prospects of an Information Civilization’, *Journal of Information Technology*, 30.1 (2015), 75–89 <<https://doi.org/10.1057/jit.2015.5>>.

company is carried out by its grabbing of undefended data up to the point that it meets resistance, either through legislation or through consumer outrage.⁶² This method was first seen through the acquisition of its Street View image database, for which no permission to photograph individual's houses was sought or granted. Any later objections were simply challenged to exhaustion in court. The company's most important data are those produced through 'subjectivities of self-determination', or the type of social production that takes place on digital platforms as a by-product of their everyday usage.⁶³ Once labelled 'data exhaust', these data are recast as 'behavioural surplus' that can be capitalised upon through aggregation, packaging and reselling.⁶⁴ The consequences for user agency are significant: 'The extractive processes that make big data possible typically occur in the absence of dialogue or consent, despite the fact that they signal both facts and subjectivities of individual lives.'⁶⁵ The data extracted passively are argued to be "stolen goods" or "contraband" as they were taken, not given, and do not produce [...] appropriate reciprocities.'⁶⁶ If this ongoing extraction of personal data can be considered as a monitoring exercise, Zuboff argues that it has the potential to reconfigure structures of power that are based on the idea of contractual obligation, replacing them with power enacted through permanent, all-pervasive monitoring. The agency present in 'anticipatory conformity', in which certain actions are avoided in order to avoid sanctions, is 'gradually subsumed into a new kind of automaticity.'⁶⁷ Coupled with this is an asymmetrical relationship between producers and extractors of data: users of Google's services really don't know what Google are doing with the data that they extract from their activities. Zuboff argues that through using these data for monitoring and behavioural prediction, Google undermine the need for trust by reducing future

⁶² Zuboff, p. 78.

⁶³ Zuboff, p. 79.

⁶⁴ Zuboff, p. 79.

⁶⁵ Zuboff, p. 79.

⁶⁶ Zuboff, p. 81.

⁶⁷ Zuboff, p. 82.

uncertainty. However, reducing the uncertainty of the future also risks predetermining it.

Before becoming too secure in a conception of the brain as a set of networks, I want to pause to consider an observation by Robert Epstein.⁶⁸ Arguing against the idea that the brain can be likened to a computer, he offers six different metaphors that have been used to understand human intelligence, ranging from a hydraulic metaphor involving the flow of humours, to a mechanical one of springs and gears, or a telegraphic metaphor involving the exchange of electrical impulses. Each metaphor for understanding the brain co-opts the most advanced technologies of the day to account for the brain's functioning. Catherine Malabou, cited in Hayles, notes that the model of the brain (and therefore attention) as a series of adaptable, flexible networks, corresponds to understandings of global capitalism.⁶⁹ Her question, then, becomes 'what should we do so that consciousness of the brain does not purely and simply coincide with the spirit of capitalism?'⁷⁰

An influential outlier in the debate is Bernard Stiegler, who develops a theory of attention that initially draws on Hayles' first steps, but then builds on a diverse range of theoretical sources including Foucault, Simondon, and Husserl. The crux of his argument is that 'attention has two inseparable faces, psychic and social', and it's this social aspect of attention that marks his approach out as significant.⁷¹ The following abbreviated account takes a trajectory outlined by Crogan.⁷² For Stiegler, attention consists of an interaction between interior and exterior 'retentions', to use terminology developed from Husserl. Primary and

⁶⁸ Robert Epstein, 'Your Brain Does Not Process Information and It Is Not a Computer – Robert Epstein | Aeon Essays', *Aeon* <<https://aeon.co/essays/your-brain-does-not-process-information-and-it-is-not-a-computer>> [accessed 25 June 2018].

⁶⁹ N. Katherine Hayles, *How We Think: Digital Media and Contemporary Technogenesis* (Chicago and London: The University of Chicago Press, 2012), p. 101.

⁷⁰ Hayles, *How We Think: Digital Media and Contemporary Technogenesis*, p. 101.

⁷¹ Bernard Stiegler, 'Relational Ecology and the Digital Pharmakon', *Culture Machine*, 13 (2012), p. 1.

⁷² Patrick Crogan, 'Stiegler, Technicity and Attention', *Digital Cultures Research Centre*, 2011 <<http://www.dcrc.org.uk/2011/11/01/stiegler-technicity-and-attention/>> [accessed 3 August 2017].

secondary retentions are interior to the subject, and tertiary retentions are exterior. Technology is central to these tertiary retentions, since recording things allows them to be recalled beyond the capacity of the mind alone to retain them. Therefore, from the development of language onwards, ‘the human and the technical are co-constituted’.⁷³ Human behaviour is *grammatised* into letters, pictures, words, code and so on, so that it can be reproduced and passed on to future generations, and these grammatisation processes are described by Stiegler as a kind of *pharmakon*. Following Derrida, a *pharmakon* is understood as a remedy that acts as both a poison and a cure, and Stiegler sees the *pharmakon* of the mechanical storage of grammatisations as an industrialisation of memory. Because attention for Stiegler consists of the interplay of interior and exterior retentions, the industrialisation of tertiary retentions is problematic. It short-circuits the long loops of attentional practice that are understood through education, which, from his reading of Simondon, he describes as *transindividuation*: an understanding of the world and ourselves arrived at through other people and things, and therefore a collective experience. Stiegler’s complex argument suggests that the biopolitical dimension of the attention economy is interiorised, operating on the brain as ‘psychopower’ as well as on the body. For him, the exteriorisation of memory and its capture by technologies such as the social web is ‘a direct attempt to (re)condition the technics of attention’.⁷⁴

Attention Ecology

Yves Citton’s contribution to the debate around the attention economy questions the usefulness of the ‘economy’ metaphor itself.⁷⁵ He argues that attention would be better considered using an ecological metaphor. This would separate the conception of attention from an economic linguistic and metaphorical paradigm, and instead allow the context within which attention occurs to be considered as constitutive of its characteristics. In doing this, the

⁷³ Crogan.

⁷⁴ Crogan.

⁷⁵ Yves Citton, *The Ecology of Attention*, English Edition (London: Polity Press, 2017).

term 'paying attention' would be replaced with 'being attentive', removing the transactional understanding of attentiveness with a conception of attention as something more intrinsically valuable in itself.

Citton sees attention as 'vector', meaning that attention is always directed *toward* something. His use of the term recalls McKenzie Wark's analysis of 'vectorial capitalism' in *A Hacker Manifesto*.^{76,77} 'Vectorialist power', Citton writes, is 'the power to move information from one place to another.'⁷⁸ Citton describes vectorialist power as 'based firmly on an ontology of visibility', and where capitalist power reduces being to having, vectorialist power reduces having to appearing.⁷⁹ The conditions of this appearing are found in the processes of grammatisation (building on Stiegler) that are pre-configured by the vectors of communication. An example of this might be a reduction in audio sampling rates: the vectorialist decides what quality of audio is acceptable, and which level of the removal of nuance might best balance cost and user experience. Citton additionally sees processes of automated recommendation as having similar characteristics to the joint attention at play when a child's gaze is directed by observing the gaze of a parent. These examples form the kind of manipulation of attention that Stiegler identifies as emerging through the industrialisation of tertiary retentions.

Citton considers that the capitalisation of the vectors of communication has become increasingly digitised, proposing that this digitisation attempts to reduce attention's vectoral nature into a scalar. This 'operation that translates arrows into numbers' can be seen in the realisation that 'everything must be reduced to figures'⁸⁰.

⁷⁶ McKenzie Wark, 'A Hacker Manifesto [Version 4.0]', *Subsol* <http://subsol.c3.hu/subsol_2/contributors0/warktext.html> [accessed 13 July 2017].

⁷⁷ Citton, p. 77.

⁷⁸ Citton, p. 65.

⁷⁹ Citton, p. 66.

⁸⁰ Citton, p. 77.

Unlike many of the other theorists previously discussed in this chapter, Citton offers not only analysis, but also some possible ways to address the problems he uncovers. Attempting to develop an ‘ecosophy’ of attention, he outlines twelve maxims following from the argument he develops in his book. These form a series of mini-proposals for various approaches to ‘attentional hygiene’. They include understanding how individuals function as filtering operators for ‘the flows that pass through us’ and taking responsibility for that; being strategic about what individual and collective attention is directed towards; extracting the self from the ‘assaults of communication’; or ‘modulating [...] attention between hyper-focusing, open vigilance, and free-floating attention’.⁸¹ The last of his twelve is to ‘learn to value background properties’, by which he means developing the ability to identify the scope from which objects of attentional focus are drawn, a scope he suggests might be referred to as ‘the commons’. He proposes that ‘it is by blinding itself to the imperceptible (because ubiquitous) role played by the commons in the continuation of our societies that individualist ideology has been able to undermine the very foundations of our existence’.^{82,83} There is a sense in Citton’s writing that giving attention to areas such as water, air or climate can produce a less exploitative method of valorisation through attention, and a further sense that the invisible infrastructures of capital and technology contribute to the continuation of this exploitation. But in order to do this, the relationship between individuals and their immediate environment need to be thought about carefully. He argues for co-constitution, suggesting that each of us has some control over our attentional environment: we can move objects close to us, turn down the radio and so on. Citton concludes that ‘modifying the environment that will condition [...] future perceptions’ is how attentional hygiene can be maintained, and that ‘it is at the precise level of this knotting together of reflexive attention and environmental

⁸¹ Citton, pp. 177–181.

⁸² Citton, p. 181.

⁸³ The idea of an ‘attentional commons’ is also proposed in Matthew Crawford, *The World Beyond Your Head: How to Flourish in an Age of Distraction* (London: Penguin Random House UK, 2015), pp. 8–20.

intervention that the alpha and omega of what we mean by “liberty” is to be found’.⁸⁴

Attention and Distraction in Mainstream Discourse

There is a strand of mainstream discourse that focuses on the way that technology might be affecting our capacity to remain undistracted. Much of the writing that covers distraction in this area is written, broadly speaking, to improve wellbeing, and it’s here that the overlap between distraction as phenomena and distraction as negative affect becomes most difficult to disentangle. Some of the questions raised here should be positioned within a wider debate about the rise of a ‘wellbeing agenda’ in the last twenty years. As William Davies outlines, the context for the adoption of wellbeing strategies by managers and policy-makers is formed by an interest in passing the responsibility for maintaining human capital to the workforce: if the duty to carry out this maintenance resides in the individual, then the social or economic context that contributes to any depreciation of human capital can be conveniently ignored.⁸⁵ In other words, if being overrun by email notifications makes you anxious, it’s your responsibility to manage your stress levels, rather than your employer’s responsibility to send you fewer urgent emails.

There is a significant body of literature concerned with dealing with work-related distraction of this kind, offering a range of methods to cut down on info-glut, manage email, and improve productivity. Maggie Jackson, for example, is a prolific writer in this area.⁸⁶ There is rarely any consideration of whether the level of attentiveness demanded by the work is realistic, or appropriate, or ethical: this literature typically sees maximum productivity as an unquestioned goal, and distraction as an impediment to this.

Nicholas Carr is a well-known voice in this debate, claiming that the internet presents challenges both to our attention spans and to our

⁸⁴ Citton, p. 176.

⁸⁵ William Davies, *The Happiness Industry* (London: Verso Books, 2015), p. 6.

⁸⁶ Maggie Jackson, ‘Distracted » Maggie Jackson’ <<http://maggie-jackson.com/books/distracted/>> [accessed 25 June 2018].

intelligence.⁸⁷ In his widely read and cited book *The Shallows*, Carr argues that humans are biologically predisposed to notice subtle changes in their surroundings, in case such changes might indicate a new risk or aid to survival, such as a predator or source of food (invoking evolutionary narratives once again). The practice of deep reading, and the ability to 'lose oneself' in a text, required training the brain to ignore many of the stimuli that might distract from such absorption. To read deeply was to think deeply, to disengage from the flow of the outer world and focus on an internal mental state of emotions and ideas.

Carr's argument is that the technology of the book was central to the consolidation and democratisation of these capacities over the following centuries. He also raises the possibility that the increase in silent reading brought about a shift in the way that knowledge was brought into being:

The development of knowledge became an increasingly private act, with each reader creating, in his own mind, a personal synthesis of the ideas and information passed down through the writings of other thinkers. The sense of individualism strengthened. [...] Quiet, solitary research became a prerequisite for intellectual achievement. Originality of thought and creativity of expression became the hallmarks of the model mind.⁸⁸

Leading on from this, he suggests that neuroplasticity—the ability of the brain to adapt its structure and function in response to external stimuli—is evidence enough that our brains are susceptible to change from the technologies we use. He claims that we now 'train our brains to be distracted' through our use of the internet and digital devices, and that this has consequences for memory, cognition, and empathy.⁸⁹

⁸⁷ Nicholas Carr, *The Shallows: How the Internet Is Changing The Way We Think, Read and Remember* (London: Atlantic Books, 2011), p. 132.

⁸⁸ Carr, *The Shallows: How the Internet Is Changing The Way We Think, Read and Remember*, p. 67.

⁸⁹ Carr, *The Shallows: How the Internet Is Changing The Way We Think, Read and Remember*, p. 194.

Carr's use of the phrase 'model mind' warrants examination. A model mind is by definition a constructed one. It can only be identified by measuring it against criteria that have been constructed by a range of social forces and influences. A model mind at this historical moment might not share characteristics with model minds of the past or the future, as the social, economic, and technological relations that produce the norm against which the model is judged shift. A model mind can only be considered to be an exemplar in relation to normative practices of its production.

Despite gaining traction in the popular imagination, Carr's argument has been roundly criticised. It has been described as 'hyperbolic determinism', in that it ignores, for example, that other more distracted forms of reading existed at the same time as the development of deep reading.⁹⁰ Munster's analysis of the evidence on which Carr bases his assertions goes back to the original neuroscientific studies and questions the veracity of his conclusions. Hayles recounts how devices such as 'book wheels' were in use during the renaissance, allowing for multiple books to be browsed simultaneously, undermining Carr's claims about focused interaction with books.⁹¹ Despite the breadth of criticism levelled against it, Carr's book *The Shallows* won the Pulitzer Prize for non-fiction in 2011, demonstrating the purchase that determinist discourse has in popular thinking about technology.

Technological determinism—that is, the claim that technologies affect our lives yet are separate and external to them—can seem compelling when looking at technological change in retrospect because it allows the nuances of everyday usage to be glossed over. Determinism downplays the social and historical context of the technology, and assumes that technologies act upon their users in ways that bypass agency. Bypassing agency permits the question of distraction to be set up in ways that construct a narrative of inner conflict in the

⁹⁰ Chad Wellmon, 'IASC: The Hedgehog Review - Volume 14, No. 1 (Spring 2012) - Why Google Isn't Making Us Stupid...or Smart - Chad Wellmon' <http://www.iasc-culture.org/THR/THR_article_2012_Spring_Wellmon.php> [accessed 25 June 2018].

⁹¹ N. Katherine Hayles, 'How We Read: Close, Hyper, Machine', *ADE Bulletin*, 2010, 62–79 (p. 66).

users of a technology: why can't I control how distracted I am? Why do I let myself become so distracted when I know it's against my interests? Or, to frame it differently, why are rational subjects drawn to irrational behaviour that isn't necessarily in their self-interest?

This dilemma is exemplified by the issue of compulsive usage of digital devices. Very often, this is described using a metaphor of addiction, and various models of 'digital detox' are encouraged in order to overcome it. From one perspective, 'internet addiction' (as it is often broadly described) might be considered as a weakness of will on the part of the addict. From another perspective, it could be seen as a consequence of the digital experience that they are addicted to – an almost weaponised level of attention capture on the part of the smartphone, game, or social media system. I would suggest that the reality is somewhere in the middle: the experience of addiction is co-produced by both the user and the digital experience itself. Users might seek out distraction, but the way that digital devices and interfaces are designed might extend this for longer than the users might have intended.

In her detailed study of Las Vegas electronic gambling machines, Natasha Dow Schüll makes several pertinent observations about behavioural addiction that have a bearing on compulsive internet usage.⁹² Her findings outline a picture of a gambling industry that exists within a thin margin: on the one hand profiting from compulsive usage in its customers while on the other, ensuring that customers don't become so addicted that they lose all of their money and cease to be profitable. Her work outlines the sometimes harrowing levels of compulsion that screen-based gambling systems engender in their users. The compulsion to play is revealed not as a weakness of will as in common sense or gambling-industry-sanctioned understandings of addiction, but, counter-intuitively, as enactive of user agency and a desire for control. The relative certainty of the win or lose game dialectic contrasts with the complexity, precarity and uncertainty many players encounter in their lives outside the

⁹² Natasha Dow Schüll, *Addicted by Design: Machine Gambling in Las Vegas* (Princeton, New Jersey: Princeton University Press, 2012).

game. Entering the 'machine zone', where players seem to absorb themselves in the game to the extent that they unmoor themselves from the passage of time, becomes a palliative response to the negative affect created by often extremely challenging economic or social conditions.

While the desire to play excessively is seen as an attempt to modulate negative affectual or emotional states, keeping players hooked is often achieved by designing interfaces with specific affordances and that function in specific ways. Drawing from gambling industry sources, Dow Schüll tells of how interfaces to computer-based gambling games have been influenced by psychological approaches such as Skinner's operant conditioning experiments, which proposed that a variable frequency of reward generates compulsive responses. In Skinner's experiments, rats or pigeons are housed in closed boxes and provided with a lever that when pushed rewards them with food. Skinner discovered that by making the frequency of the reward unpredictable, the animals pressed the lever compulsively.^{93,94}

Techniques developed from Skinner's experiments have been adopted in some parts of the digital sector, with writers such as Tristan Harris and Nir Eyal describing how websites and apps can be designed to maximise compulsive engagement. According to an article by Simone Stolzoff, many of the future tech entrepreneurs responsible for producing addictive interfaces were attendees of a specific class at Stanford University, run by the psychologist B. J. Fogg.⁹⁵ Both Eyal and Harris are reported to have attended, as well as the founders of Instagram. The class covered Fogg's psychological approaches to behavioural change ('Fogg's Behavior Model' or FBM) which enables designers to

⁹³ Nir Eyal, 'Variable Rewards: Want To Hook Users? Drive Them Crazy', *Nir and Far*, 2012 <<http://www.nirandfar.com/2012/03/want-to-hook-your-users-drive-them-crazy.html>> [accessed 25 June 2018].

⁹⁴ Michael Schulson, 'If the Internet Is Addictive, Why Don't We Regulate It? — Michael Schulson — Aeon Essays', *Aeon* <<https://aeon.co/essays/if-the-internet-is-addictive-why-don-t-we-regulate-it>> [accessed 25 June 2018].

⁹⁵ Simone Stolzoff, 'Addicted to Your Smartphone? This Formula Is Why', *WIRED*, 2018 <<https://www.wired.com/story/phone-addiction-formula/>> [accessed 2 March 2018].

identify what stops people from performing behaviours that designers seek. For example, if users are not performing a target behaviour, such as rating hotels on a travel web site, the FBM helps designers see what psychological element is lacking.⁹⁶

Fogg claims that when the ten-week term was completed, the applications developed by his students had engaged sixteen million users on Facebook. A few weeks later, when he checked again, the count was twenty-four million.⁹⁷

In Harris's account, the 'variable reward frequency' model is applied in the thumb-pull to refresh a web page on a smartphone, or the swipe-right to match a potential Tinder date. Harris likens these activities to pulling the lever on a one-arm bandit, describing the susceptibility to addictive design as 'psychological vulnerability'.⁹⁸ Harris left Google to set up the *Time Well Spent* project which advocates for responsible design and user awareness of how apps capture attention.⁹⁹ Eyal has developed a design method for producing addictive apps based in part on variable reward frequency, a system he promotes through books, conferences such as the *Habit Summit*, and talks.¹⁰⁰ He has in recent years started to mitigate his contribution to the production of addictive products by making blog posts about how to manage and reduce their impact.¹⁰¹ Harris and Eyal are not the only app producers who now claim to work against addictive design: in a recent workshop about 'gamification' and addictive design, one app developer explained similar techniques to Eyal's for

⁹⁶ B. J. Fogg, 'BJ Fogg's Behavior Model', *BJ Fogg's Behaviour Model*, 2016 <<http://www.behaviormodel.org/>> [accessed 2 March 2018].

⁹⁷ B. J. Fogg, 'The New Rules of Persuasion', *RSA Journal*, 155.5538 (2009), 24–29.

⁹⁸ Tristan Harris, 'How Technology Hijacks People's Minds — from a Magician and Google's Design Ethicist', *Medium*, 2016 <<https://medium.com/@tristanharris/how-technology-hijacks-peoples-minds-from-a-magician-and-google-s-design-ethicist-56d62ef5edf3#.79qtxh2g>> [accessed 25 June 2018].

⁹⁹ 'Time Well Spent', *Time Well Spent*, n. d. <<http://www.timewellspent.io/>> [accessed 16 August 2017].

¹⁰⁰ 'Behavioral Design Conference | Habit Summit San Francisco' <<http://habitsummit.com/>> [accessed 25 June 2018].

¹⁰¹ Nir Eyal, 'Un-Hooked: Increasing Focus in the Age of Distraction', *Nir and Far*, 2015 <<https://www.nirandfar.com/2015/06/un-hooked-increasing-focus-in-the-age-of-distraction-video.html>> [accessed 25 June 2018].

producing an addictive app, before outlining his company's new product: a mindfulness app to mollify just such an addiction.¹⁰² As Joe Edelman notes, questions around whether to produce addictive designs or not are not answered by psychology. They are ethical questions, and as such require philosophy instead: questions such as 'is this a good use of the users time?' or 'is the service we are engaging the user with meaningful to them?' are to do with agency and perhaps even dignity.¹⁰³ Furthermore, the reduction of compulsive device usage to a design problem ignores other factors at play.

It would seem that a rational response to compulsively designed technologies that covertly gather data and produce profiles of our online behaviour would be to disconnect completely from social media platforms. The recent #DeleteFacebook campaign is a call to boycott the platform in the manner of consumer activism. While this might be desirable for some, there are obvious disadvantages to this when so much of contemporary sociality is conducted online. Ben Light has written about how users exercise agency in their engagement with social media in ways that permit varying levels of disconnection. He argues that the affordances that digital devices and software systems offer are being used in ways that weren't intended by the designers of these systems, outlining a taxonomy of 'shades of disconnection' that are enacted by users that fall short of fully deleting the service in question.¹⁰⁴ Users can engage in a range of 'disconnective practices' that allow them to enjoy different levels of distance from the distractions of social media at different times. These practices sometimes involve simple steps such as setting devices to silent, and extend to more sophisticated approaches such as reading messages in their notification pop-up rather than opening messaging apps to avoid letting the sender know the message has been received, thereby delaying

¹⁰² Rob Sturges, 'Design for Addiction' (presented at the Are We All Addicts Now?, Peer UK, Hoxton Street, London, 2016).

¹⁰³ Joe Edelman, 'The Tamagotchi Trap', *Human Systems*, 2018 <<https://medium.com/what-to-build/on-the-dangers-of-mindful-and-well-being-based-design-81a165fd0597>> [accessed 2 March 2018].

¹⁰⁴ Ben Light, *Disconnecting with Social Networking Sites* (Palgrave Macmillan M.U.A) <<https://www.dawsonera.com/abstract/9781137022479>> [accessed 6 November 2015].

further communication. His description of how users negotiate affordances is a reminder of the limitations of behaviourist understandings of compulsive usage. Jenny Davis and James Chouinard argue for a theorisation of affordances that also takes into account how they operate. They suggest that affordances request, demand, allow, encourage, discourage or refuse particular types of interaction, and that these are modulated by external conditions as well as by the capabilities of the person carrying out the interaction.¹⁰⁵ While design does contribute to compulsive usage, user agency can also steer unexpected paths through rigidly designed affordances.

Referring back to Dow Schüll, it can be seen that determinism is avoided in her analysis through the adoption of a 'materialist phenomenology' approach that emphasises that the experience of compulsion is co-produced, and is shared between the user and the system.¹⁰⁶ Despite this co-production, the practical responsibility for preventing behavioural addiction is often allocated to one or other party. In Sutcliffe and Sutton's account, there are two ways of 'fixing' problems that are seen to be caused by new technologies.¹⁰⁷ These are either technical fixes, such as redesigning apps so they become less engaging or technically limiting access to them, or there are normative fixes, where an individual chooses to use the internet less or legislation offers the 'right to disconnect'. Dow Schüll describes how responsibility for behavioural addiction has been shuttled between producers of the gambling machines and the users of those machines, mirroring Sutton's analysis. In Las Vegas, small, incremental changes to legislation have moved back-and-forth in favour of each party. Whether such legislation will be called for, enacted, or could be enforceable in the digital communications arena remains to be seen.

¹⁰⁵ Jenny L. Davis and James B. Chouinard, 'Theorizing Affordances: From Request to Refuse', *Bulletin of Science, Technology & Society*, 2017 <<http://journals.sagepub.com.lcproxy.shu.ac.uk/eprint/aqub75MSJpz4ahiqEXrg/full>> [accessed 16 June 2017].

¹⁰⁶ Dow Schüll, p. 19.

¹⁰⁷ David Sutcliffe and Theodora Sutton, 'Exploring the World of Digital Detoxing', *The Policy and Internet Blog*, 2017 <<http://blogs.oii.ox.ac.uk/policy/exploring-the-world-of-digital-detoxing/>> [accessed 25 June 2018].

Summary and Discussion

A wide range of approaches and disciplinary standpoints address the question of attention, and as this chapter has made clear, very few of these regard digital technologies as an unquestioningly positive influence. Stiegler's notion of the digital as *pharmakon*, as both poison and cure, looms as a backdrop to the discussion.

The metaphor of an attention economy is helpful in that it allows an exploration of the transactional nature of being attentive and becoming distracted. Despite the question of whether the social web can be seen as a mass medium in the same way as television or radio, Franck and Goldhaber's framing of attention as a resource seems a dominant view in the advertising and media industries, with website visits often being described as 'eyeballs', and advertisers seeming to become increasingly preoccupied with the virality of their ads. Moreover, the adoption of an advertising business model by social media providers and news outlets has coincided with the recent growth of 'fake-news'. If acquiring attention is the primary goal, then a rolling news cycle, bottomless feeds, and viral content take precedence over factual accuracy or provenance. The granularity of the user profiling that platforms such as Facebook can offer enables them to function as a highly targeted site for advertising. The potential exists for the metrics to be gamed, by artificially inflating likes or retweets, which leads to the platform's algorithms misinterpreting the popularity of a particular post and disseminating it widely. As danah boyd has suggested, these strategies have also been taken up by various groups with different motivations, including those such as the hacker group Anonymous, who aim to dominate the media narrative or simply play the news media for the 'lulz'.¹⁰⁸ That this model of attention economy can be hacked for political reasons has led to ongoing and contested theorisations of the consequences for democracy of widespread

¹⁰⁸ danah boyd, 'Hacking the Attention Economy', *Data & Society: Points*, 2017
<<https://points.datasociety.net/hacking-the-attention-economy-9fa1daca7a37#.zcatlpxiu>>
[accessed 25 June 2018].

social media access and algorithmic feeds, and the impact of behavioural or psychometric profiling on user agency.

However, the consumption and sharing of fake-news can also be seen as a practice that leads to an acquisition of human capital.¹⁰⁹ As Hannah Barton outlines,

on public social media sites, news consumption can become performative. Along with our status updates, Twitter threads, hashtags, gifs, and photos, the news stories we share online signal our identities and affinities, assert status or social capital, or more plaintively, mark out our very presence. Aware of such practices, news producers with an eye on circulation targets (and fake-news makers as well) will publish stories and articles that serve this need.¹¹⁰

This seems to exemplify the financialisation argument, allowing an acquisition of attention gained by the labour of sharing fake-news. By connecting metrics, identity-signalling activity and the accrual of esteem, the apparatus of social media can be seen to operate in ways that affirm Franck's or Goldhaber's conception of an economy of attention.

In Beller's analysis though, the primacy of the image as a method of communication, and the granular measurement of attention to images in both overt and covert ways, leads to an asymmetric relationship where value is expropriated from spectators, both through the labour involved in their consumption of images and the 'dataveillance' carried out as this takes place. I would argue that this is not incompatible with the position where attention is understood as a scarce resource. The key similarity is that value is produced through attention, leaving only the question of how the proceeds are divided. In the example above, the fake-news producer extracts labour from the reader of it

¹⁰⁹ I use Barton's hyphenation in the term 'fake-news' throughout this thesis.

¹¹⁰ Hannah Barton, 'Tactical Virality', *Real Life*, 2017 <<http://reallifemag.com/tactical-virality/>> [accessed 25 June 2018].

as they interpret or share it; through responding to it, the reader accrues positive or negative esteem.

The valorising aspect of attention is a recurring theme in this discussion. Giving attention is seen as valorisation, but being distracted from something constructs the thing being distracted *from* as important, and as such the 'machine zone' of computerised gambling or casual gaming reiterates the importance of the economic precarity it displaces.

The next chapter offers an overview of contemporary artistic approaches that engage with this notional 'attention economy' and with debates surrounding online contexts, exploring specific modes of practice where the flow of attention and distraction is modulated by engagement with the internet.

3: Review of Existing Artistic Practice

Over the last few decades, digital methods have been gradually moving into the mainstream of artistic practice. Since the release of the iPhone and the uptake of mobile internet services and social media, what were once considered highly specialised digital practices have become so prevalent that they now seem almost unremarkable. In recent years, there have been a series of major exhibitions that address these themes: *Electronic Superhighway* at the Whitechapel, London; *Big Bang Data* at Somerset House, London, and touring internationally; *New Realities* at the Mobile World Centre, Barcelona; *Right Here Right Now*, at the Lowry, Salford; *Surround Audience* at the New Museum, NY; and the 9th *Berlin Biennale: The Future In Drag* each had curatorial agendas which appraised the impact of the internet on the current cultural moment. There are specific themes and approaches that emerge in contemporary digital practices that provide a relevant context for my own artistic research, and here I will attempt to review this territory by locating these concerns firstly within the set of debates that have emerged around ‘post-internet art’, and then among the digitally-inflected artistic practices that have followed this turn.

In his presentation to the *Digital Utopias* conference in 2015, the curator and critic Morgan Quaintance proposed three ‘waves’ of art that have been concerned with the internet, and while the historiography of this branch of artistic practice is still in progress, his thinking will provide a useful overview of this area of practice for the purposes of this thesis.¹¹¹ In his analysis, the first wave, the *net.art* of the 1990s, was Situationist or Dadaist in tone, offering a critique of the assumed neutrality of internet software interfaces, protocols, and underlying infrastructure. Visually, much of this work used the unrefined materials available to digital artists at that time, such as plain text or low-resolution GIF or JPEG images, to produce a particular utilitarian aesthetic.

¹¹¹ Arts Council England, *Digital Utopias - After the Future*, 2015
<<https://www.youtube.com/watch?v=fzlfw-rsONw>> [accessed 25 June 2018].

Artists who rose to prominence in this wave included JODI, Olia Lialina, Vuk Ćosić, and Alexei Shulgin.¹¹²

The second wave emerged during the early 2000s, when as Quaintance notes, the dotcom crash coincided with galleries closing their new media programmes. This wave of artists tended to bring popular culture references and ‘multimedia’, as it was called then, into their practices. Perhaps the best-known artist of this wave is Cory Arcangel, who is known for bringing the technological components of gaming experiences into his work as well as making artwork from the material that can be found online.¹¹³ These early waves of internet art are well documented and written about.^{114,115,116} From around 2008, shortly after the iPhone was first launched, Quaintance identifies the emergence of a third wave of internet art which he describes as different to the internet art that preceded it.

Third wave internet artists embraced the new power relations of the social web, setting up their own curatorial platforms and self-organising their practices around their own interest groups. Quaintance claims that artists moved from having an interest in the *internet* to an interest in the *web*, with many artists embracing the new social media platforms as sites or contexts for their work. This provided them with a type of autonomy not available in the mainstream gallery sector. Artists in this wave developed an ironic, knowing approach to their own artistic identity, earning a type of attention that allowed them to maintain their niche credibility while also drifting closer to the mainstream of the art world. Artists like this have been grouped under the term ‘post-internet’, although the meaning of this term and its usefulness as an

¹¹² This wave of internet art practice is mapped in Rachel Greene, *Internet Art (World of Art)* (London: Thames and Hudson Ltd, 2004).

¹¹³ Cory Arcangel, ‘Cory Arcangel’s Official Portfolio Website and Portal’, *Cory Arcangel’s Official Portfolio Website and Portal* <<http://coryarcangel.com>> [accessed 1 March 2018].

¹¹⁴ Greene.

¹¹⁵ Julian Stallabrass, *Internet Art: The Online Clash of Culture and Commerce* (London: Tate Publishing (UK), 2003).

¹¹⁶ Jolene Blais and Jon Ippolito, *At The Edge of Art* (London: Thames and Hudson Ltd, 2006).

identifier of any particular mode of practice are both highly contested.¹¹⁷ In fact, the heat of argument about the origins, composition, intentions and approaches of the artists associated with the term indicates the complexity of its genealogy and how heterogeneous it seems to be. The debate surrounding its composition will allow this thesis to explore some of the main contextual issues facing contemporary artists who engage with online contexts, and will help illuminate the context from which my own practical approaches emerge.

Categories of Post-internet Practice

As curator Karen Archey observed at the #FOMO conference at the ICA in May 2015, there is no universally agreed definition of what the term ‘post-internet’ actually means.¹¹⁸ There are however some broad characteristics of post-internet practices that prominent commentators have noted. Quaintance’s view is that post-internet art can be broadly categorised as concerning itself with the display context of art and how this might be modulated online. In his slightly deterministic analysis, post-internet practices take as a given that the internet has profoundly affected culture, and the primary discourse of post-internet art can be traced back to the relationship between ‘online’ and ‘real’ culture. Brian Droitcour credits Marisa Olson, Artie Vierkant and Gene McHugh for their early attempts to identify changes in artistic production, rather than display contexts, that coincided with the broadening reach of the web.¹¹⁹

The earliest examples of the term ‘post-internet’ refer, in a literal sense, to art work that has been made after using the internet, perhaps at the end of a session of web surfing. Michael Connor quotes artist Marisa Olson as saying ‘what I make is less art “on” the internet than it is art “after” the internet. It’s the

¹¹⁷ The term is variously written as ‘Post-internet’, ‘postinternet’, or ‘post-internet’; here I use the latter formatting throughout.

¹¹⁸ Karen Archey, ‘FOMO: Judy Wajcman, Olia Lialina and Karen Archey, FOMO Panel Chaired by Hito Steyerl’ (presented at the FOMO, ICA, 2015) <<https://www.ica.art/whats-on/fomo-judy-wajcman-olia-lialina-and-karen-archey-fomo-panel-chaired-hito-steyerl>> [accessed 25 June 2018].

¹¹⁹ Brian Droitcour, ‘The Perils of Post-Internet Art - Magazine - Art in America’, 2014 <<https://www.artinamericamagazine.com/news-features/magazines/the-perils-of-post-internet-art/>> [accessed 25 June 2018].

yield of my compulsive surfing and downloading.’¹²⁰ This broad definition doesn’t offer a clear indication of the types of practice that might emerge after spending time on the internet, or how specifically they might diverge from art made after doing other activities.

In an attempt to map the territory, Archey organises her commentary on the works in her co-curated *Art Post-Internet* exhibition around seven sub-themes: *distribution*, *language*, *the posthuman body*, *radical identification*, *branding and corporate aesthetics*, *painting and gesture*, and *infrastructure*.¹²¹ These categories are neither exclusive nor conclusive but do provide a framework to identify some of the recurring characteristics of post-internet art practices. *Distribution* is an umbrella category that concerns changes in the way that production, reception and dissemination of art has been reimagined on the internet. As the web has begun to supplant art magazines or exhibition catalogues as the first encounter with a work, artists have begun to explore potential changes to the status of an artwork in comparison to its documentation. This category also includes participatory work, or work that explores, visualises, or exists within the network. *Language* primarily concerns the way that the web generates new languages or abbreviates more traditional ones, but also how language online is as much comprised of images as of text. The *posthuman body* refers to a set of ideas that propose the extension of the body with technological prostheses. This covers everything from grandiose propositions of the ‘singularity’, which speculates that human consciousness will merge with technology, to considerations of animal consciousness or the post-anthropocene. *Radical identification* refers to the various ways in which artists respond to changes in the articulation of identity or subjectivity on the social web. *Branding and corporate aesthetics* covers work that refers to or embraces the disruptive ‘start-up’ ideologies that are common in the tech development

¹²⁰ Michael Connor, ‘Post-Internet: What It Is and What It Was’, in *You Are Here: Art After the Internet*, ed. by Omar Kholeif (United Kingdom: Cornerhouse Publications, 2013), p. 58.

¹²¹ ‘Art Post-Internet: Information/Data’, ed. by Karen Archey and Robin Peckham (Ullens Center for Contemporary Art, 2014).

sector. A common visual trope in this type of work is the stock photograph. *Painting and gesture* seems the least developed or persuasively argued of the categories in Archey's text, and while there are clearly artists who are concerned with the articulation of painterly concerns in this field, their approaches seem disparate and less cohesive than those in the other categories. The final category, *infrastructure*, is concerned with the tangible and physical evidence of the internet that is often ignored when viewing screens: the cables, server farms, cellular transmission masts, and so on.

For the purposes of this thesis, I treat post-internet art as a thematic terrain rather than a coherent artistic movement. By doing so, it becomes possible to plot a path through the relevant issues in order to establish a context for my own concerns, which overlap with two of Archey's categories in particular. Concerns about what happens to art, or to aesthetic experiences, 'after the internet' can be explored by thinking critically about how artworks are disseminated in post-internet contexts, and her *distribution* category will be examined to help with this. I will argue that the platforms often used for online distribution of artworks also construct a stage upon which distraction can play out, as well as producing a model of artistic production and reception. I will then go on to consider the material significance of the smartphone as the interface between users and internet-related aesthetic experiences by exploring Archey's *infrastructure* category, thereby contextualising my own approach.

Exploring these categories will also help reveal some of the internal inconsistencies that make the term 'post-internet' so antagonistic to those labelled by it. I suggest that it's these inconsistencies that have led commentators such as Droitcour to claim that the critical positions of those initial writers that coined the term have now been obscured by its use to refer to a visual style whose main aim is to make work that looks good online.¹²² Droitcour claims that as post-internet art simulates the environment of the white walled gallery (or white empty browser page) it reproduces the existing power

¹²² Droitcour.

relations of the art world, using social media platforms to position artists as entrepreneurial brands. It's perhaps the term's failure to effectively encompass the heterogeneity of the practices represented by it that leads even noted practitioners such as Constant Dullaart to describe post-internet art as 'conservative', and critics such as Droitcour to argue persuasively that the label has become merely 'a term to market art'.^{123,124}

Post-internet Art: Production and Distribution

I want to open this discussion by returning to Morgan Quaintance's broad generalisation that post-internet art is concerned with the relationship between 'online' and 'offline' culture. At the beginning of my study, I considered the border between 'online' and 'offline' experiences to be the threshold over which viewer attention shifted when becoming distracted from a landscape or artwork by their smartphone. The distinction between offline and online experience, and the assertion that online experiences are somehow less real than offline ones, can be seen as an extension of theorisation about computer games that took place in the nineteen eighties and nineties. At that time, there was a considerable amount of study directed towards ideas of immersion in 'cyberspace', and concentrated engagement in multi-user domains/dungeons (MUDs). Much of this research assumed that the user accessing the computer was physically immobile, having taken a seat at a desktop computer (or arcade game) to engage with the digital world. Sherry Turkle's recent work examines the perceived impact of mobile device usage on face-to-face sociality, but relies heavily on an assumption that being 'online' means absenting oneself from the 'real' world. In her book *Alone Together*, she often reads online experiences as inferior to offline ones, and raises notes of caution about the social development of 'digital native' teenagers.¹²⁵

¹²³ Lauren Cornell, 'Frieze Magazine | Archive | Beginnings + Ends', 2013
<<http://www.frieze.com/issue/article/beginnings-ends/>> [accessed 25 June 2018].

¹²⁴ Droitcour.

¹²⁵ Sherry Turkle, *Alone Together: Why We Expect More From Technology and Less From Each Other* (New York: Basic Books, 2012), p. 296.

Sociologists Nathan Jurgenson and Jenny Davis persuasively critique Turkle, concerning themselves with how her framing of online experiences as different and opposite to offline experiences romanticises the 'real'.^{126,127} Turkle fails to acknowledge that our everyday interactions occur both online and offline, and that the fabric of our everyday communicative landscape comprises both these modalities. Jurgenson coined the term 'digital dualism' to refer to the assertion of a solid distinction between online and offline.¹²⁸ If connected and online communications are considered to be qualitatively lacking in reality, then for Jurgenson this leads to a fetishisation and romanticisation of offline life, described evocatively by Jamie Lauren Keiles:

The man with the IRL fetish rubs himself up against the exposed brick wall of a loft in order to feel something. At 5 PM he makes a show of 'logging off', heads out into the world where he aims to cop a feel of the authentic.¹²⁹

'Copping a feel of the authentic' presupposes that there is a clear distinction between authentic offline and inauthentic online experience, rather than considering the possibility that the two have an interrelated, entangled existence. It's now more widely accepted in academic circles that online and offline experiences are not mutually exclusive, although the assumption that the reverse is true and that offline communication methods are more favourable than online ones is still widespread in popular discourse.¹³⁰

¹²⁶ Nathan Jurgenson, 'The IRL Fetish', *The New Inquiry*, 2012
<<http://thenewinquiry.com/essays/the-irl-fetish/>> [accessed 25 June 2018].

¹²⁷ Jenny Davis, 'Our Devices Are Not Turning Us into Unfeeling Robots', 2015
<<http://kernelmag.dailydot.com/issue-sections/staff-editorials/14961/sherry-turkle-reclaiming-conversation-technology-empathy/>> [accessed 25 June 2018].

¹²⁸ Jurgenson, 'The IRL Fetish'.

¹²⁹ Jamie Lauren Keiles, 'Negotiations at the IRL/URL Border', *Motherboard*
<<http://motherboard.vice.com/read/negotiations-at-the-irlurl-border>> [accessed 25 June 2018].

¹³⁰ Theodora Sutton, 'Disconnect to Reconnect: The Food/Technology Metaphor in Digital Detoxing', *First Monday*, 22.6 (2017)
<<http://firstmonday.org/ojs/index.php/fm/article/view/7561>> [accessed 25 June 2018].

In his essay *The Image Object Post-Internet*, artist Artie Vierkant addresses this issue from the perspective of the production and dissemination of art.¹³¹ Taking the ‘post-medium condition’ proposed by Rosalind Krauss as a starting point, he suggests that ‘everything is everything else’ – meaning that any instantiation of an artwork can be transcoded into another form.¹³² Concurrent with the writing of the essay, he had been working on Styrofoam sculptures that were made from an aggregation of profile models of the image histograms of the individual frames of a video file.

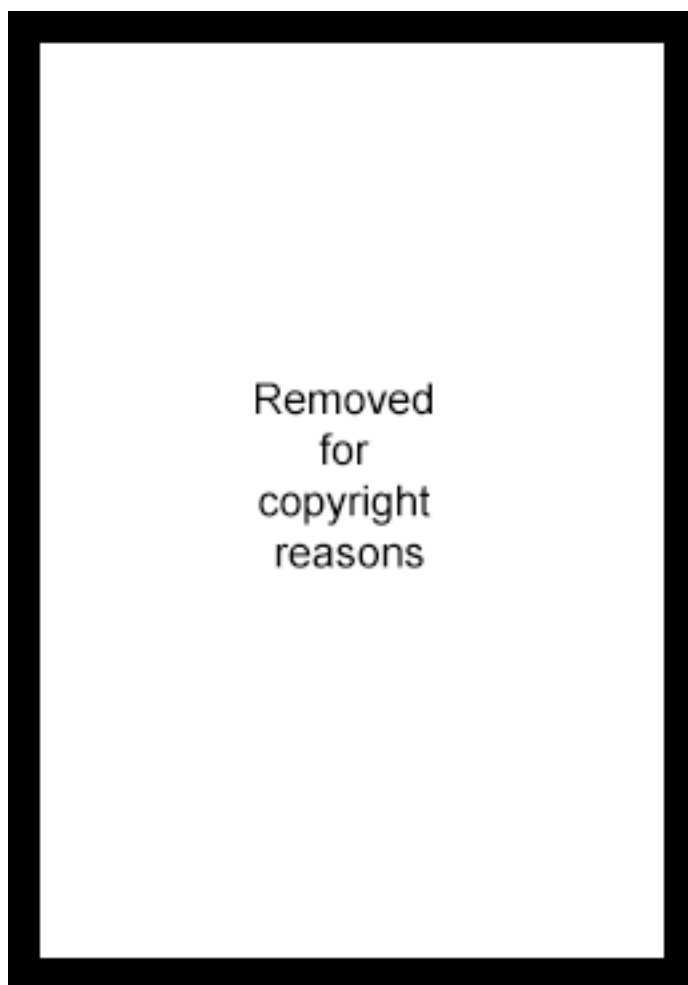


Figure 1: Artie Vierkant, *Fluorescent On Fluorescent Off*, 2010, styrofoam, histogram curves from video stills, colour digital fingerprint.

¹³¹ Arthur Benjamin Vierkant, ‘The Image Object Post-Internet’, 2010
<<http://jstchillin.org/artie/vierkant.html>> [accessed 25 June 2018].

¹³² Rosalind E. Krauss, ‘Reinventing the Medium’, *Critical Inquiry*, 25.2 (1999), 289–305.

Stacked together, these individual histograms offer a sense of the progression and change in the video. If a video file is ultimately comprised of brightness and contrast data, then that data can be reinterpreted and presented in potentially infinite ways. This approach is also a common strategy among 'glitch' artists.¹³³ These works could perhaps be identified as data visualisations, but Vierkant denies this reading. Firstly, he rejects the possibility that art communicates empirical truths or knowledge in the same way a data visualisation might. He also draws Joseph Kosuth into his argument, invoking Kosuth's own disavowal of the visual in favour of a more tautological ontological status for art. To quote Donald Judd, who paraphrases Kosuth's argument, 'if someone calls it art, it's art'.¹³⁴

Vierkant then applies this logic of transcoding to question the status of material artworks and their documentation. If every type of media can be transformed in this way, and video can be reconfigured as sculpture, then where is the 'art' situated? Is there an original 'source' that is being transformed through these material changes? Vierkant thinks not:

In the Post-Internet climate, it is assumed that the work of art lies equally in the version of the object one would encounter at a gallery or museum, the images and other representations disseminated through the internet and print publications, bootleg images of the object or its representations, and variations on any of these as edited and recontextualized by any other author.¹³⁵

For Vierkant then, 'online' documentation of physical works becomes indistinguishable from the 'offline' tangible artefact, and in his series of works entitled *Image Objects*, this theory is put into practice. These works consist of printed digital images of geometric shapes and gradient fills originated in

¹³³ Nick Briz, 'Thoughts On Glitch[Art]v2.0', *Nick Briz*, 2015
<<http://nickbriz.com/thoughtsonglitchart/>> [accessed 25 June 2018].

¹³⁴ Joseph Kosuth, 'Art After Philosophy', in *Art After Philosophy And After: Collected Writings, 1966–1990* (Cambridge, MA: MIT Press, 1991), p. 17.

¹³⁵ Vierkant, p. 5.

Photoshop, which are displayed in galleries and then photographically documented. The documentation images are then further modified in image editing software before dissemination on the web.

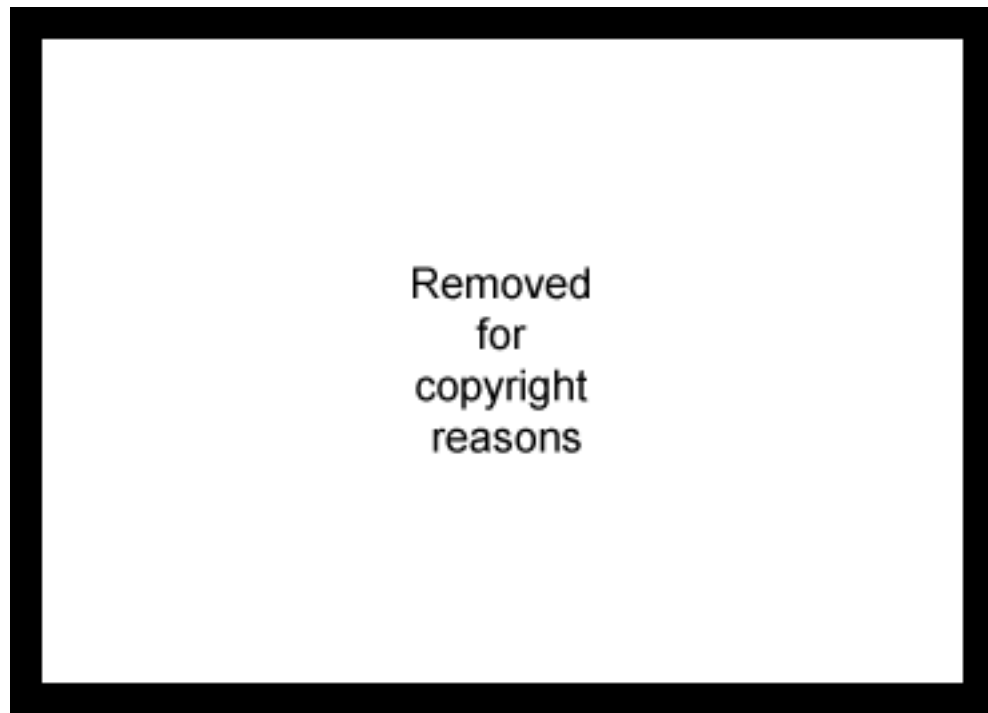


Figure 2: Artie Vierkant, Installation view, Image Objects at Untitled, New York, 2015

The consequences of this are significant. As there is no definitive original artwork, the work resists commodification based on scarcity in a similar fashion to the way many conceptual works of the 1960s attempted to, in their case by virtue of the art existing only as an idea rather than an artefact. (Of course, in practice, the secondary documentary materials that this type of conceptual art generated, such as photographs and writings, were exhibited and sold as art market commodities.) However, Vierkant considers his work to be operating outside of traditional systems of commodification, preferring to consider his work as instead functioning within an economy of attention. It therefore follows that in order to generate the maximum value for an artwork in an attention economy, the largest possible audience should attend to the artwork.

Vierkant's work proliferates across the internet, and through that proliferation the artist freely cedes authorship and loosens control over the form of the work. Every version of the work stands as the work as a whole, as does

every modification or 'remix' of it. This means that the work, existing as a distributed network of documentation images, circulates more freely than an authorial original object could. This dispersal also indicates a collapse of the traditional value hierarchy applied to artworks: Vierkant writes about how the mythological status of the original artefact and the quotidian, everyday nature of its reproduction collapse into each other in his practice.

Hito Steyerl expands on this idea with her coinage of the term 'circulationism'.¹³⁶ This term refers to an opposite to twentieth-century Soviet avant-garde productivism, which posited that art should have a socially productive function and be integrated into industrial production. For Steyerl, the production of images has been replaced by post-production: 'The world is imbued with the shrapnel of former images, as well as images edited, photoshopped, cobbled together from spam and scrap. Reality itself is post-produced and scripted [...]' ¹³⁷ Steyerl implies that the 'suavely vacuous' conditions of circulationism could be exploited as a methodology for social change, asking questions such as 'if copyright can be dodged and called into question, why can't private property?'¹³⁸ Therefore, by blurring the distinction between artefact and documentation, as in the work of Artie Vierkant, post-internet art proposes that the real and the digital are very much part of the same continuous reality, and that each is a modifiable version of the other.

The Merging of 'Online' and 'Offline'

The blurry edge between online and offline, or between the digital and the physical, appears repeatedly in my analysis of other artists' work and in my own artistic research. There are a number of ways this can be considered critically. One way is explored by Miya Tokumitsu in a short article about the

¹³⁶ Hito Steyerl, 'Too Much World: Is The Internet Dead?', *E-Flux*, #49, 2013.

¹³⁷ Steyerl, p. 6.

¹³⁸ Steyerl, pp. 6–7.

broadening scope of the practice of curation.¹³⁹ According to Tokumitsu, audiences seek out ‘hand-curated’ recommendations because hand-curation offers a sense of personal authenticity that is in contrast to the automation of algorithmic recommendations. The physicality implied in the prefix ‘hand-’ allows a sense of offline craft to conjoin with largely dematerialised online cultural forms. This preference for the hand-made is described as an articulation of control: the self-determination of curating a Pinterest board for example sits in contrast to the external forces that govern economic or political life over which audiences have little or no control. I would argue that this control is better described as agency.

Another way of considering this transition is articulated by Paul Soulellis with reference to his project the *Library of the Printed Web*.¹⁴⁰ Soulellis uses Marcel Duchamp’s concept of the *infrathin* to describe the condition of works that consist of matter from the web that has been printed out and formed into published books. Like the difference between two casts of the same mould, the ‘web-to-print’ space creates a difference and a sameness that these works oscillate between. Soulellis argues that ‘we recognize both without collapsing into either; we hover in a state between states.’¹⁴¹

This straddling of the online and offline is exemplified by Michael Manning’s recent work *100 Paintings*, which combines ‘a selection of 100 paintings in five layers’ to create unique compositions, claiming up to nine billion possible combinations.¹⁴² The source paintings themselves mix pastel gradients common to much post-internet visual styling with gestural mark making. As

¹³⁹ Miya Tokumitsu, ‘The Politics of the Curation Craze’, *New Republic*, 2015 <<https://newrepublic.com/article/122589/when-did-we-all-become-curators>> [accessed 25 June 2018].

¹⁴⁰ Paul Soulellis, ‘About: Library of the Printed Web’ <<http://libraryoftheprintedweb.tumblr.com/post/43311353240/about>> [accessed 25 June 2018].

¹⁴¹ Paul Soulellis, ‘Performing Publishing: Infrathin Tales from the Printed Web’, *Hyperallergic*, 2014 <<http://hyperallergic.com/165803/performing-publishing-infrathin-tales-from-the-printed-web/>> [accessed 25 June 2018].

¹⁴² Michael Manning, *100 Paintings . Gallery*, 2015 <<http://www.100paintings.gallery/>> [accessed 25 June 2018].

Manning describes it on the Cura website, 'It's like coconut bath wash, sandy hair, palm tree sunset vaped out pelican art lol'.¹⁴³ Generatively produced images are nothing new in visual art, but if there is innovation here it's in the way that gestural mark making, often read as an indicator of the authorial presence of the genius artist, is mediated and redeployed as almost infinitely reproducible automated art making. It seems evident that *100 Paintings* leads to nine billion artistic commodities rather than nine billion aesthetic propositions, and the fact that a selection of images from the project have been published as a 183-page limited edition monograph underlines this fact. It seems that the production of online attentional commodities isn't quite enough: the production of offline physical art world commodities needs to happen too.

I consider the indistinct boundary between online and offline experience as central to the premise of this study. The point at which everyday sociality transits between these two registers is the focal point where distraction takes place. As people become engaged by online modes of communication, their focus shifts from their physical environment and towards the mediated environment of the screen. The sociality that takes place there is no less real. This permeable borderline, across which a project like *The Library of the Printed Web* sits, allows a two-way traffic of social practices. Terms from the online world find their way into everyday spoken language (such as 'hashtag') as much as the practices of managerialism find their way into the media ecology of the online world.

Social Media and Metricised Display Contexts

If, as Olson suggests, the term 'post-internet' referred to the art that was made after surfing the web and perhaps submitting interesting links to the 'surf clubs' of the early- and mid-noughties, then the introduction of the social blogging service Tumblr in 2007 modified the context for this practice.¹⁴⁴ Tumblr

¹⁴³ CURA, 'Michael Manning — 100 Paintings', *CURA*, 2016
<<http://curamagazine.com/shop/books/micheal-manning-100-paintings/>> [accessed 25 June 2018].

¹⁴⁴ Connor.

allowed user-produced content to be straightforwardly displayed alongside and amongst appropriated content in a rolling blog-like format, and many artists used it to display their own work in close proximity to work from other genres or periods. Noting that almost every undergraduate art student has a Tumblr on which they show their own work alongside artists they are influenced by, artist Brad Troemel characterises this phenomenon as producers 'inserting themselves in a historical discourse', where documentation of historical work is wrenched from its context and read wherever and however it is found.¹⁴⁵

Affirming a postmodern emphasis on pluralism, he claims that as a result of this, art has lost its 'home base', and that 'there is no building or context that contains and describes art in a way that uniformly attributes meaning for all'.¹⁴⁶

Others corroborate this, claiming that decontextualising artworks in this way undermines the 'quality and status' of art by detaching it from its grounding in history.¹⁴⁷ The process of 'reblogging', in which a Tumblr post can be reposted on a different blog, often without attribution or indication of its original context, has the potential to further exacerbate this decontextualisation. Furthermore, artworks can be juxtaposed with other material, potentially recontextualising this material as having artistic value. The blog owner's artworks can be placed alongside works by artists with international credibility, as both producers and consumers of art curate their Tumblrs to accurately reflect their taste.¹⁴⁸

Troemel's account of the transition from the 'surf club' to Tumblr is worth scrutinising more closely.¹⁴⁹ He describes the 'surf club' as the archetypal organisational structure for art online in the mid-2000s, describing such clubs as

¹⁴⁵ Brad Troemel, 'Art After Social Media', ed. by Omar Kholeif, *You Are Here: Art After the Internet* (Manchester: Cornerhouse, 2014), pp. 36–43.

¹⁴⁶ Troemel, 'Art After Social Media', p. 39.

¹⁴⁷ Susanne Von Falkenhausen, 'Too Much Too Fast I Features I Archive I Frieze d/e', 2014 <<https://frieze.com/article/too-much-too-fast>> [accessed 25 June 2018].

¹⁴⁸ Tumblr isn't exclusively used in this way, but this is not an uncommon approach taken by artists.

¹⁴⁹ Brad Troemel, 'From Clubs to Affinity: The Decentralization of Art on the Internet « 491', 491, 2011 <<https://web.archive.org/web/20120707101824/http://fourninetyone.com/2011/01/06/from-clubstoaffinity/>> [accessed 25 June 2018].

comprising between fifteen and thirty members who contributed to an ongoing blog, privately hosted on their own server. The social dynamic on these sites was often conversational, with image posts being responded to with images rather than texts, and works being remixed and combined with found elements. Importantly, these clubs had a closed membership but could be viewed by any web user, leading to Troemel making contestable claims about their influence on other artists.¹⁵⁰ He suggests that Tumblr and Blogger had the scope to operate similarly to ‘surf clubs’ but with a more open membership, since these platforms lowered the barrier to participation by allowing users to post content without knowledge of web programming. Of course, ‘surf clubs’ generally had open membership to begin with: *Nasty Nets*, as an example, was formed by a group of people who had already identified common visual interests on the social bookmarking platform *del.icio.us*.¹⁵¹ Troemel claims that the next step for art online should involve a wider adoption of private platforms such as Tumblr and an increase in the decontextualisation and anonymisation of content that the platform provides. This claim was criticised by some as a blatant plug for his own Tumblr project (*The Jogging*) that misrepresented and generalised the concerns of the ‘surf clubs’, and a minor flame war erupted in the comments section of Troemel’s now deleted article.^{152, 153, 154, 155, 156}

¹⁵⁰ Paddy Johnson, ‘The Decentralization of Art on The Internet: An Imagined History’, *Art F City*, 2011 <<http://artfcity.com/2011/01/18/the-decentralization-of-art-on-the-internet-an-imagined-history/>> [accessed 25 June 2018].

¹⁵¹ Tom Moody, ‘Dissent from the Early Bourgeois Public Sphere at Tom Moody’, 2011 <<https://www.tommoody.us/archives/2011/01/09/dissent-from-the-early-bourgeois-public-sphere/>> [accessed 25 June 2018].

¹⁵² Johnson.

¹⁵³ Moody, ‘Dissent from the Early Bourgeois Public Sphere at Tom Moody’.

¹⁵⁴ Tom Moody, ‘More “Affinity” Footnotes at Tom Moody’, 2011 <<https://www.tommoody.us/archives/2011/01/11/more-affinity-footnotes/>> [accessed 25 June 2018].

¹⁵⁵ Michael Manning, ‘RESPONSE: From Clubs to Affinity by Brad Troemel’, *MICHAELMANNING*, 2011 <<http://blog.themanningscompany.com/post/2753243369>> [accessed 25 June 2018].

¹⁵⁶ “JOGGING” <<http://thejogging.tumblr.com/>> [accessed 25 June 2018].

Despite the disagreement surrounding it, Troemel's account of the move to blogging platforms such as Blogger and Tumblr does highlight a shift in focus from the more communal production process of contributing to a 'surf club' site to the aggregation of artistic content around an individual personal profile on a hosted service such as Tumblr. To paraphrase him, linking out to another artist's website on a 'surf club' blog says 'I like this', while placing appropriated Tumblr content alongside one's own work says 'I *am* this'.¹⁵⁷ Rather than the public conversation between individuals taking place on a 'surf club' blog, Tumblr and other social platforms emphasise the generation of a personal profile, and an aggregation of content that arguably forms an expression of self.^{158,159} To view this in terms of an economy of attention, I would argue that this practice is about gathering attention from the posted artworks to acquire it as attentional capital for the self. Artists described as post-internet sometimes mirror this approach to the gathering of attentional capital on other social media platforms, both performing and critiquing notions of authenticity that accompany the production of a curated personal profile.¹⁶⁰

Perhaps more importantly, the shift to Tumblr, a privately-owned social platform, allowed audience feedback to operate in a more direct way than the 'surf club' structure. In a typical 'surf club', only the other members could respond to a post, whereas on Tumblr, responses could come from any other user of the site and might be articulated as likes, comments, or re-blogs. In its early incarnations, a Tumblr user's popularity, or '*Tumblarity*' as it was named, could be measured using a data dashboard that displayed the quantity of re-blogs, likes and so on, forming an early iteration of the more common analytics and metrics found in today's social media platforms.¹⁶¹ Here, engagement is

¹⁵⁷ Troemel, 'From Clubs to Affinity'.

¹⁵⁸ Tokumitsu.

¹⁵⁹ Ida Hattermer-Higgins, 'Facebook Adé', *N+1*, 2014 <<https://nplusonemag.com/online-only/online-only/facebook-ade/>> [accessed 25 June 2018].

¹⁶⁰ Suvi Uski and Airi Lampinen, 'Social Norms and Self-Presentation on Social Network Sites: Profile Work in Action', *New Media & Society*, 18.3 (2016), 447–464.

¹⁶¹ 'Tumblr Staff — Introducing Your New Activity Page (and "Tumblarity")', *Tumblr Staff*, 2009 <<https://staff.tumblr.com/post/104680564/activity>> [accessed 1 March 2018].

measured and popularity quantified, offering a seemingly objective indication of how much attention a post, or a work of art, has generated. The members of 'surf clubs' didn't always claim what they were doing was art, and it's likely that Tumblr users also make posts with a range of differing intentions and intended audiences.¹⁶² As Baym & boyd argue, users of social media platforms work within and around the affordances of the platform, and 'struggle with both the visibility and obscurity of their mediated acts', carefully navigating different audiences and contexts.¹⁶³ The shift in display context for this art-like activity from public blog to privatised, metricised platform shunts the attention economy to the centre of these types of artistic practices.

This turn to quantification is critiqued in Benjamin Grosser's *Facebook Demetricator*, an artwork in the form of a web-browser plug-in that removes all of the numbers from Facebook pages.¹⁶⁴ Instead of revealing the number of people who like a post, or the time since it was posted, the 'de-metricated' Facebook page simply states that 'people like this', or that a post was made 'recently'. Quantification of social capital in social media conforms to the neoliberal imperative to measure, and Grosser claims that this is propelled by capitalism's logic of accumulation.¹⁶⁵ By enumerating likes and friends, Grosser suggests, Facebook creates a desire for more likes and friends.

A different approach to the removal of metrics is to redesign the social media service in its entirety. Harman Van Den Dorpel's *Deli Near Info* is an artist-designed social platform produced with the intention of circumnavigating

¹⁶² Nancy K. Baym and danah boyd, 'Socially Mediated Publicness: An Introduction', *Journal of Broadcasting & Electronic Media*, 56.3 (2012), 320–29.

¹⁶³ Baym and boyd, p. 322.

¹⁶⁴ Benjamin Grosser, *Facebook Demetricator* | Benjamin Grosser, 2012
<<http://bengrosser.com/projects/facebook-demetricator/>> [accessed 25 June 2018].

¹⁶⁵ Matthew Fuller, 'Matthew Fuller » Don't Give Me the Numbers – an Interview with Ben Grosser about Facebook Demetricator', 2012
<<http://www.spc.org/fuller/interviews/don%E2%80%99t-give-me-the-numbers-%E2%80%93-an-interview-with-ben-grosser-about-facebook-demetricator/>> [accessed 6 November 2015].

the timeline-based visual metaphor of most other social media services.¹⁶⁶

Designed to operate without the pre-made page templates common to social platforms, *Deli Near Info* permits posts to be visually arranged and organised freely on screen. Posts are associated with a user, and users can connect to each other, but metrics such as the familiar 'likes' or 'retweets' are absent. While a work such as this provides a more playful alternative to the formality of the mainstream platforms, in my view, it is constrained by its affordances in the same way that mainstream platforms are. Foregrounding the linking of dissociated visual elements does bypass the enumerated metrics common to social media platforms, but the imperative to connect with others and to 'share' material remains, as does the accrual of esteem into a personal profile.

While designed to invoke responses that are characterised by self-expression, social media platforms (Van Den Dorpel's included) also offer a paradigm of expression that is limited by the potentialities of the site interface and the ideological or commercial backdrop to its design. I suggest that as the web itself has become more insular, with large providers such as Google and Facebook taking an ever more centralised role in the delivery of web experiences, it should not be surprising that art work becomes less critical of these platforms as their apprehensibility recedes into the background.

These, then, are some of the ways that the relationship between artistic production and dissemination and notions of an economy of attention have been articulated in post-internet art. The role of metrics will be explored more thoroughly shortly, but for now, it should be borne in mind that the viewers of art on these platforms are also bound up with a similar investment in their own profiles as articulations of their social capital as the artists who produce work on these platforms. The attention users give to these metrics might be seen as contributing to the distraction from 'real life' experiences that commentators such as Turkle observe.

¹⁶⁶ Harman Van Den Dorpel, *Deli Near Info*, 2014 <<http://harmvandendorpel.com/deli-near-info>> [accessed 1 March 2018].

Post-internet Art: Infrastructure

I now want to return to Archey's taxonomy and explore a second relevant category of post-internet practice: artworks that are concerned with infrastructure. The physical matter that comprises the internet has become an interest for many artists, and it's a particularly nuanced interest in the materiality of internet infrastructure that sets post-internet work apart from its *net.art* ancestry. Broadly speaking, the tendency in *net.art* was to consider the *network* as the focus for critique in the artwork. The network was a conceptual proposition: a notional set of interconnected entities that could share communication over distance using technology. Influential early work by Roy Ascott, predating *net.art*, explored the potential of fax machines and the early internet to foster communication, proposing that the art was somewhere in the network. In works such as *Planetary Network*, the content of the communication shared across the network appeared to be secondary to the fact that it could be shared at all.¹⁶⁷ The ontology of the assemblages through which the communication took place was not the primary focus of works such as these. MTAA's widely shared GIF artwork *Simple Net Art Diagram* from 1997 reiterates this view that the art happens somewhere in the network, the network itself radically simplified as a single connecting line between two computers.¹⁶⁸ Works such as *I/O/D 4: The Web Stalker* began to reveal some of the underlying messaging infrastructure of the experience of browsing the web, but principally critiqued the emerging consensus around interfaces and structures of interaction.¹⁶⁹ Even in works such as this, much of the internet's physical presence in the world remained abstracted, the work instead visualising websites as diagrams of links whose physical locations remained obscured behind opaque IP addresses.

¹⁶⁷ Media Art Net, 'Media Art Net I Ascott, Roy; Foresta, Don; Sherman, Tom; Trini, Tomaso; Mattei, Maria Grazia; Adrian X, Robert: Planetary Network', 2017 <<http://www.medienkunstnetz.de/works/planetary-network/>> [accessed 25 June 2018].

¹⁶⁸ MTAA, 'MTAA-RR [off-Line_art/Snad.Html]', 1997 <http://www.mtaa.net/mtaaRR/off-line_art/snad.html> [accessed 25 June 2018].

¹⁶⁹ Matthew Fuller, 'Crawl, Map, Link, Read, Copy, Repeat', *Rhizome* <<http://rhizome.org/editorial/2017/feb/17/iod-4-web-stalker/>> [accessed 13 June 2017].

The counter-tendency in post-internet art aligns with a critique of the digital dualist position of the early conceptualisers of the internet. Post-internet art's approach to infrastructure rejects considerations of the internet as a dematerialised 'cyberspace', instead focusing critique on the very material aspects of data transmission, such as cables, transmission towers, and server farms. As P. J. Rey argues, the idea of 'cyberspace' emerged in response to a desire to make sense of what happens when people communicate over long distances.¹⁷⁰ Where, for example, does a long distance phone conversation take place? Rey, citing Sterling, argues that the idea of a shared digital space between the two ends of the phone conversation is a way of squaring the cognitive dissonance invoked by remote presence:

How can the other person on the line be so far and yet seem so near? To overcome this disconnect, we create for ourselves a little expository travel narrative. We begin to imagine information as occupying space and then imagine this space as something that can be traversed and experienced, an alternate geography that provides a new path to reach the other person on the line.¹⁷¹

What is handy about this idea of cyberspace is that it allows an avoidance of any detailed consideration of the complexity of the physical infrastructure that converts and carries our electrically encoded voice from one physical location to another.

Archey's analysis, and perhaps post-internet art's approach more generally, takes as its basis a fairly narrow definition of the term 'infrastructure', primarily concerning itself with the internet's normally ignored physical manifestation in the world.¹⁷² A more complete understanding of infrastructure can be arrived at from a number of different directions in the wider theoretical realm, opening up a range of potential methodological and ontological stances

¹⁷⁰ P. J. Rey, 'The Myth of Cyberspace', *The New Inquiry*, 2012
<<http://thenewinquiry.com/essays/the-myth-of-cyberspace/>> [accessed 25 June 2018].

¹⁷¹ Rey.

¹⁷² Archey and Peckham.

on the topic. While there will not be room to cover this ground fully here, there are some key considerations emerging from this territory that will be helpful when analysing my own work later on.

Focusing on the physical aspects of infrastructure produces only a partial analysis of the infrastructure's significance. Scholarship in science and technology studies (STS) and more recently in media studies describes infrastructures as not just technical, but also cultural, social and economic entities.^{173, 174} Rather than considering infrastructure as a set of wires or pipes that are 'stripped of use', Susan Leigh Star for example describes infrastructure as 'fundamentally relational', only becoming real when coupled with organised practices or cultural contexts.¹⁷⁵ Infrastructures need to be seen as complex heterogeneous socio-technological assemblages.

Star observes several properties or dimensions of infrastructure. Of these, embeddedness (where infrastructures interlock with other infrastructures, technologies or social systems) and transparency (where infrastructures invisibly support the tasks they are supposed to support) form typical target areas for artistic critique. In many cases, the assumption seems to be that by making the physical aspects of the infrastructure visible, the relational social systems in which they are embedded will also be revealed, uncovering the implicit ideological biases in those social systems. I find this to be a problematic assumption: to some artists, making the physical component of the infrastructure visible seems to be critique enough, without going further and identifying or questioning its underlying ideologies.

In this spirit, works such as *Internet Machine* by Timo Arnall or *Farm (Pryor Creek, Oklahoma)* by John Gerrard offer moving-image representations

¹⁷³ Casper Bruun Jensen and Atsuro Morita, 'Infrastructures as Ontological Experiments', *Engaging Science, Technology, and Society*, 1.0 (2015), 81–87.

¹⁷⁴ *Signal Traffic*, ed. by Lisa Parks and Nicole Starosielski (Chicago, Illinois: University of Illinois Press, 2015).

¹⁷⁵ Susan Leigh Star, 'The Ethnography of Infrastructure', *American Behavioral Scientist*, 43.3 (1999), 377–91.

of server farms.^{176,177} Gerrard's *Farm* presents a live 3D-rendered simulation of the exterior of a Google data server building, constructed from a photographic survey conducted by helicopter. Sited in a virtual environment that experiences real-time environmental changes, the virtual camera slowly pans around the exterior of the model server buildings, with the daylight hours synchronised with the server farm's physical location.¹⁷⁸ Arnall's *Internet Machine* uses video compositing techniques to stitch together still photographs taken from inside a data centre in Spain owned by the telecommunications company Telefónica.¹⁷⁹ While Gerrard was denied access to Google's infrastructure (hence the helicopter) and Arnall was invited in to Telefónica's, neither of the works take their analysis very far into the complexity of the non-material aspects of the infrastructure. Converting the infrastructure into an aesthetic proposition, in simulated or composited form, is seen as adequate critique, as if absorption into the ambit of art and presentation as an object for contemplation unlocks the complexity of the system under scrutiny.

Evan Roth's *Web Portals* makes a different proposition.¹⁸⁰ The works consist of life-size embossed rubbings of manhole covers in Cornwall, near the landing points of the transatlantic fibre-optic cable over which most European internet traffic is transmitted. When exhibited in London in 2015, the gallery's notes claimed that 'these manhole covers may well be the closest points within public access to the actual laser light that is the Internet'.¹⁸¹ The process of taking a rubbing is commonly carried out on gravestones, an association that perhaps proposes an inference about how the more democratic internet of the

¹⁷⁶ Timo Arnall, *Internet Machine*, 2014 <<http://www.elasticspace.com>>.

¹⁷⁷ John Gerrard, *Farm* (Pryor Creek, Oklahoma), 2015.

¹⁷⁸ Thomas Dane Gallery, 'John Gerrard - Exhibitions', *Thomas Dane Gallery*, 2015 <<http://www.thomasdanegallery.com/artists/40-john-gerrard/exhibitions/>> [accessed 25 June 2018].

¹⁷⁹ Timo Arnall, 'Internet Machine – Timo Arnall', *Elastic Space*, 2014 <<http://www.elasticspace.com/2014/05/internet-machine>> [accessed 25 June 2018].

¹⁸⁰ Evan Roth, *Web Portals*, 2015.

¹⁸¹ Carroll / Fletcher, 'Evan Roth: Voices over the Horizon - 6 March - 11 April 2015', *Carroll / Fletcher*, 2015 <<http://www.carrollfletcher.com/exhibitions/39/overview/>> [accessed 25 June 2018].

1990s might have ‘died’ after the rise to prominence of the ‘big five’ internet companies (Facebook, Apple, Microsoft, Google, and Amazon).¹⁸²

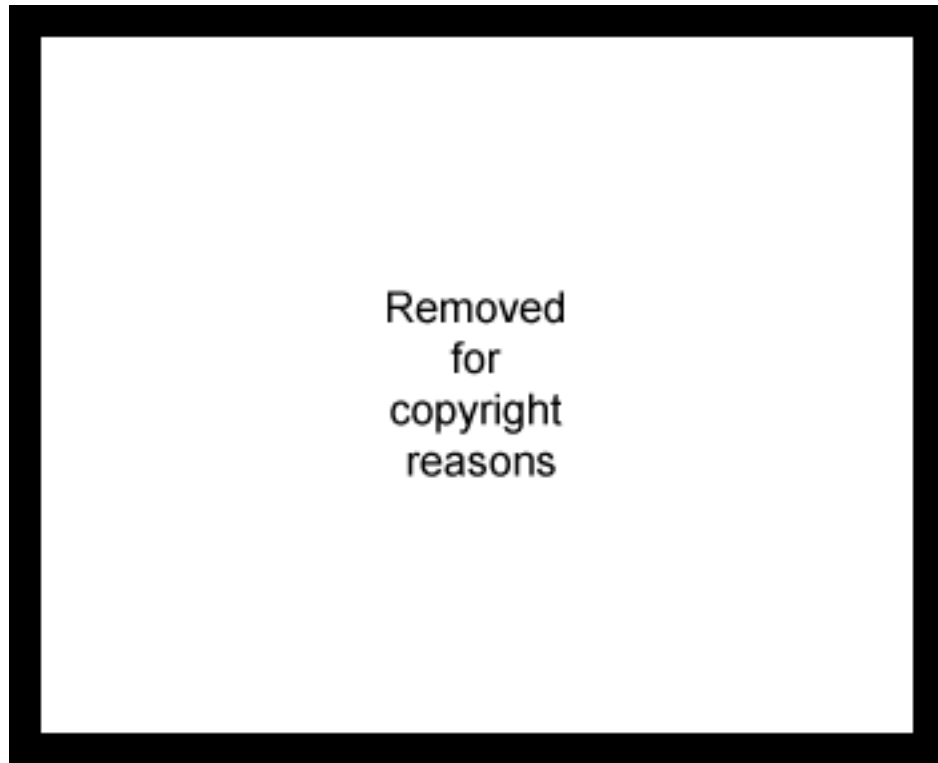


Figure 3: Web Portals, Carroll / Fletcher Gallery, March 2015

Seeing these works as material objects in the gallery does allow a kind of speculation about how proximity to the material internet might feel. However, during a conversation with the owner of the gallery staging Roth’s solo show, I discovered that the process of the production of these works was more complex than might be inferred from their visual appearance. Because the manholes were in remote and fairly inaccessible locations, the artist digitally photographed them in sections at high resolution, and these sections were then recombined into single images in the artist’s New York studio. From these composite images, laser-cut plastic relief models of the manhole covers were made, from

¹⁸² Kevin Holmes, ‘Artist Evan Roth Used Ghost Hunting Equipment to Find the Physical Internet’, *Creators Project*, 2015
<<http://www.carrollfletcher.com/usr/library/documents/main/kevin-holmes-artist-evan-roth-used-ghost-hunting-equipment-to-find-the-physical-internet-creators-project-10-march-2015.compressed.pdf>> [accessed 25 June 2018].

which the rubbings were then produced.¹⁸³ While this knowledge self-evidently undermines the claims to proximity made by the work, I would argue that it actually makes the work's critique of infrastructure more viable. Even if audiences are unable to physically touch the rubbing in the gallery, they still get the sense from its visual appearance that it is an indexical impression of an original object. However, after filtering the manhole covers through a series of mediations, any potential claim to veracity that might be proposed by its indexical status and verified through touch is undermined. What is lost is the singularity of the source site, replaced by the idea of photographic decomposition, re-composition and manufacture – authenticity replaced by reproducibility. The original objects these works are indexes of are themselves reproductions. This 'versioning' of objects that are supposed to have a kind of singular aura about them is exactly the game played by Vierkant above, but in this case, it's an appropriated yet indexical element of the physical world that is being rendered unstable and implausible. Infrastructurally then, the complex relations that led to the production of the work become exposed and integrated into its critique. The internet isn't the laser light, the cable, or the manhole, but this work does begin to highlight the lengths we might go to in order to hold on to the idea that it could be.

A different method of making infrastructure visible is the infrastructural tour, an approach that involves following the path of an action from start to finish along its infrastructural corridor. Jussi Parikka was amongst the first to have explored this method, applying it to the route a book takes when requested from the British Library archive.¹⁸⁴ Artist Ingrid Burrington has developed a tour of New York City's surveillance infrastructure, and published this as a book,

¹⁸³ Private conversation with Jonathan Carroll, March 2015.

¹⁸⁴ Jussi Parikka, 'The Tour as a Method: Infrastructures of Data', *The IoCT*, 2016
<<https://internetofculturalthings.com/2016/03/31/the-tour-as-a-method-infrastructures-of-data/>> [accessed 25 June 2018].

Networks of New York.¹⁸⁵ Andrew Blum's book *Tubes* covers similar ground.¹⁸⁶ As Parikka claims these approaches as critical spatial practices, there is again a nuanced question to be raised about their effectiveness: simply making an infrastructure visible may not critique the power discourses it enacts, although it's possible that *mapping* an infrastructure might. The *New Cloud Atlas* is just such a map, attempting to produce an online open-source resource showing 'each data place that makes up the cloud, in an open and accountable way'.¹⁸⁷ While designed as a resource and not explicitly intentioned as an artwork, this project's focus on accountability and unpicking the implied neutrality of the ambiguous term 'the cloud' goes beyond mere visibility and asks more complex questions of the social, economic and geopolitical forces that are expressed in internet infrastructure.

The focus on physical elements of infrastructure, or, in Roth's case, the longing for them, diverts from the obvious fact that some elements of internet infrastructure are impossible to make visible without transcoding into another form. Timo Arnall has tackled this in his collaborative *Immaterials* research project.¹⁸⁸ This project led to work that visualised the radio patterns produced by near-field radio chips (RFID, commonly found in Oyster cards and touch-payment systems), Wi-Fi, and eventually GPS, culminating in the production of a number of what were titled *Satellite Lamps*. These mobile objects lit up more brightly when the GPS signal was at its strongest, typically when a GPS satellite was overhead. As the objects were portable, the patterns of interference produced by urban architecture could be explored by moving them around, thus producing a kind of map of a genuinely invisible infrastructural system.

¹⁸⁵ Cora Currier, 'A Walking Tour of New York's Massive Surveillance Network', *The Intercept*, 2016 <<https://theintercept.com/2016/09/24/a-walking-tour-of-new-yorks-massive-surveillance-network/>> [accessed 25 June 2018].

¹⁸⁶ Andrew Blum, *Tubes: A Journey to the Centre of the Internet* (New York, NY: Ecco, 2012).

¹⁸⁷ Ben Dalton and others, 'New Cloud Atlas', 2015 <<http://newcloudatlas.org/about.htm>> [accessed 25 June 2018].

¹⁸⁸ Timo Arnall, 'The Immaterials Project – Timo Arnall', *Elastic Space*, 2013 <<http://www.elasticspace.com/2013/09/the-immaterials-project>> [accessed 25 June 2018].

If these approaches engage with an idea of infrastructure as formed by social and cultural factors as well as having a material dimension, then a question worth asking is what the non-physical infrastructural concerns that post-internet art investigates actually are. In part, this question involves asking who is doing the investigating: as Star notes, a stairway means one thing to an architect and something very different to a wheelchair user.¹⁸⁹ Each artist will have their own set of concerns and will approach the subject with their own emphases. It's also worth noting that many of the artistic questions directed toward infrastructure are themselves subordinate to a desire to analyse and resist apparatuses of subjectification. Here the term 'apparatus' refers to Michel Foucault's way of describing the network between 'a thoroughly heterogeneous set consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral, and philanthropic positions' that are 'inscribed into a play of power'.¹⁹⁰ For now, I'll restrict my commentary to an infrastructural frame of reference, but this crossover will be developed later in this section.

Some prominent artists working in this area, most of whom would not consider or describe themselves as 'post-internet' artists, see internet infrastructure as an enactment of political power, with consequences for agency, privacy, and ultimately, for democracy. Even before Edward Snowden's revelations of widespread intelligence agency monitoring of internet traffic, an activist turn within art practice was focused on communications infrastructure where it most pointedly becomes an apparatus of the state. Julian Oliver's *Border Bumping* explores what happens when a person having crossed a border remains connected to a cellular network in the country they were previously in, mapping and recording these discrepancies.¹⁹¹ James Bridle's *Dronestagram* auto-posted satellite images of the sites of drone strikes to the

¹⁸⁹ Star, p. 380.

¹⁹⁰ Michel Foucault, cited in Giorgio Agamben, *'What Is an Apparatus?' And Other Essays*, Meridian, Crossing Aesthetics (Stanford, Calif: Stanford University Press, 2009), p. 2.

¹⁹¹ Julian Oliver, *Border Bumping*. In *GSM We Trust*, 2012 <<https://borderbumping.net/>> [accessed 27 June 2017].

Facebook-owned image-sharing service Instagram as they occurred, revealing both their temporal frequency and providing a visual reference to the location of the strike.¹⁹² Trevor Paglen's *Limit Telephotography* is a body of work consisting of a series of photographs of classified military installations in the United States that have been taken using very high-powered telescopes.¹⁹³ Such sites are typically surrounded by miles of inaccessible land designed to render the buildings and activities taking place there inscrutable to the naked eye. Paglen uses telescopes that are usually used for astronomical photography to capture images of these sites from distances of up to thirty miles. Perhaps more frivolously, Allison Burtch takes issue with the commonplace practice of commercial cellular network masts being disguised as trees. Her intervention *Log Jammer* consists of a cellular signal jammer disguised as a log, placed in a forest environment to block mobile communication and produce a disconnected space where solitude and uninterrupted thought can emerge.¹⁹⁴

Other artists target the surveillance infrastructure that has developed around the prevalence of CCTV and its combination with image processing algorithms. Adam Harvey's work has been directed towards the reverse-engineering of and resistance to automated face detection and recognition. Harvey's *CVDazzle* is a good example of a body of research that frames itself in relation to the affordances of the system it critiques.¹⁹⁵ The hairstyles and make-up designs that this piece consists of are produced with the intention of thwarting automated facial recognition technology as deployed from CCTV cameras. The fashion designs were developed with knowledge of the capabilities of the recognition algorithms, and permit a type of oppositional user agency when mobilised against those algorithms. More recently, his *HyperFace*

¹⁹² James Bridle, 'James Bridle / Dronestagram', 2012
<<http://jamesbridle.com/works/dronestagram>> [accessed 25 June 2018].

¹⁹³ Trevor Paglen, 'Trevor Paglen ::: WORK :: LIMIT', 2007
<<http://www.paglen.com/?l=work&s=limit>> [accessed 25 June 2018].

¹⁹⁴ Allison Burtch, 'Log Jammer', *Allison Burtch*, 2014 <<http://www.allisonburtch.net/log-jammer/>> [accessed 25 June 2018].

¹⁹⁵ Adam Harvey, 'CV Dazzle: Camouflage from Face Detection' <<http://cvdazzle.com/>> [accessed 25 June 2018].

textile design is patterned with ‘maximally activated false faces’, which are geometric designs that look unlike faces to the human eye but have all the characteristics of a face as it might appear to automated face detection software.¹⁹⁶ Zach Blas also approaches face detection as a site of dissent in his *Facial Weaponisation Suite*, which protests against biometric facial recognition through the production of masks made from the aggregated facial recognition data of a number of workshop participants.¹⁹⁷

To conclude the discussion of infrastructure for now, I want to consider the language that is being used to describe how perceivable or apprehensible infrastructure is. Sometimes infrastructure is described as ‘invisible’, sometimes ‘out of awareness’, and sometimes ‘below the threshold of attention’ or ‘not noticed’. At times, it’s described as ‘obscure’ or ‘opaque’. Each of these terms for infrastructure’s non-appearance lends a particular framing to our understanding of it, and suggests the appropriateness of particular theoretical models to analyse it. I see an understanding of attention and distraction as having a bearing on the imperceptibility of infrastructure. Questions about what is apprehensible in comparison to what processes have material effects will keep returning throughout this thesis.

Data Visualisation and Self-Tracking

Departing from Archey’s post-internet framework and Quaintance’s analysis, I now want to look more closely at some modes of practice briefly introduced above. While Vierkant denies that his *Histogram Sculptures* are visualisations of data, it’s not uncommon for creative practitioners to work with data as a key element in their work. This type of ‘data art’ practice often seems to occupy a position on the border between visual art and information design, and as such it’s sometimes hard to clarify through which tradition a particular work should be interpreted. Attempting to iron this out, Viégas and Wattenberg

¹⁹⁶ Adam Harvey, ‘HyperFace Camouflage – Adam Harvey’, 2016
<<https://ahprojects.com/projects/hyperface/>> [accessed 25 June 2018].

¹⁹⁷ Zach Blas, ‘Facial Weaponization Suite’, *Zach Blas*, 2011
<<http://www.zachblas.info/works/facial-weaponization-suite/>> [accessed 25 June 2018].

avoid the philosophical problem of defining what art is by claiming that ‘artistic visualizations are visualizations of data done by artists with the intent of making art’, a position not so far from Vierkant’s invocation of Kosuth above.¹⁹⁸ I would perhaps go further by arguing that data visualisation is often but not always a critical practice, and it’s the level of criticality in evidence as well as intention that might identify a particular visualisation as a successful work. How effectively the data and the criticality can be communicated is an open discussion: one study revealed that non-expert audiences are *not at all* fluent in interpreting data visualisations and need a significant level of interpretative skill in order to do so.¹⁹⁹ General audiences were seen to relate to data visualisations emotionally as much as cognitively, with the field requiring ‘softer, arts-based approaches’ to help bridge the visual literacy gap.²⁰⁰

While it would be impractical to give an exhaustive overview of this very broad area of artistic practice, a few key works warrant mention. *Live Wire*, by Natalie Jeremijenko, is an early and significant example of a data visualisation artwork. The piece consists of a hanging wire that ‘wiggles proportionally to the amount of traffic on the net’ in its place of installation.²⁰¹ This piece is often cited as a foundational example of ‘calm technology’, a type of information display that operates in an ambient way, and that has a different relationship to attention than is the norm in information visualisations.²⁰² Radical Software Group’s *RSG Carnivore* is another milestone in the data visualisation field,

¹⁹⁸ Fernanda B. Viégas and Martin Wattenberg, ‘Artistic Data Visualization: Beyond Visual Analytics’, in *Online Communities and Social Computing*, ed. by Douglas Schuler (Berlin, Heidelberg: Springer Berlin Heidelberg, 2007), MMMMDLXIV, 182–91 (p. 183).

¹⁹⁹ Data Seeing, ‘What We Found: Publications and Outputs’, *Seeing Data* <<http://seeingdata.org/original-seeing-data-research/what-we-found-on-seeing-data/>> [accessed 25 June 2018].

²⁰⁰ Helen Kennedy, ‘Seeing Data: Visualisation Design Should Consider How We Respond to Statistics Emotionally as Well as Rationally.’, *Impact of Social Sciences*, 2015 <<http://blogs.lse.ac.uk/impactofsocialsciences/2015/07/22/seeing-data-how-people-engage-with-data-visualisations/>> [accessed 25 June 2018].

²⁰¹ Natalie Jeremijenko, ‘Tech90s: Natalie Jeremijenko’, *Walker Art Centre*, 1995 <http://tech90s.walkerart.org/nj/transcript/nj_04.html> [accessed 25 June 2018].

²⁰² Mark Weiser and John Seely Brown, ‘The Coming Age of Calm Technology’, 1996 <<http://www.ubiq.com/hypertext/weiser/acmfuture2endnote.htm>> [accessed 25 June 2018].

forming an example of an open access packet-sniffing or wiretapping tool made available to the artistic community.²⁰³ After being released as an add-on library for the creative coding development environment *Processing*, it facilitated the production of live visualisations of network traffic by any artist with basic coding skills.²⁰⁴ Unlike many other data artworks of the time, which visually interpreted data that had been previously gathered and entered into a database, both *Live Wire* and *RSG Carnivore* allowed the live flow of data to be perceived in real time. What both these works propose is that it is difficult to conduct networked activity without producing data, and that the production of this data is seemingly continual. As Jenny Davis argues, ‘we don’t have data, we *are* data [...] We live in a mediated world, and cannot move through it without dropping our data as we go.’²⁰⁵ Melissa Gregg prefers a more visceral metaphor, exploring the idea of ‘data sweat’.²⁰⁶ She writes that ‘sweat literalizes porosity: it seeps out at times and in contexts that we may wish it did not’.²⁰⁷

Writers such as Jurgenson and Boesel also see the generation of personal data as an unavoidable consequence of networked communications.^{208,209} In some of the cases they and others such as Brunton and Nissenbaum discuss, data about activity is gathered passively, such as when being sensed by networked cameras or tracked by beacons or cookies

²⁰³ Transmediale Festival, ‘Carnivore I Transmediale’, 2001
<<https://transmediale.de/content/carnivore>>.

²⁰⁴ Radical Software Group, ‘Carnivore’, 2016 <<http://r-s-g.org/carnivore/>> [accessed 25 June 2018].

²⁰⁵ Jenny Davis, ‘We Don’t Have Data, We Are Data’, *Cyborgology*, 2014
<<https://thesocietypages.org/cyborgology/2014/12/22/we-dont-have-data-we-are-data/>> [accessed 25 June 2018].

²⁰⁶ Melissa Gregg, ‘Inside the Data Spectacle’, *Television & New Media*, 16.1 (2015), 37–51.

²⁰⁷ Gregg, p. 45.

²⁰⁸ Nathan Jurgenson, ‘Digital Dualism versus Augmented Reality - Cyborgology’, 2011
<<http://thesocietypages.org/cyborgology/2011/02/24/digital-dualism-versus-augmented-reality/>> [accessed 25 June 2018].

²⁰⁹ Whitney Erin Boesel, ‘A New Privacy Pt. I: Distributed Agency & the Myth of Autonomy’, 2012 <<https://thesocietypages.org/cyborgology/2012/05/21/a-new-privacy-pt-i-distributed-agency-the-myth-of-autonomy/>> [accessed 25 June 2018].

while browsing the web.²¹⁰ In other cases, data about an individual is produced outside of the autonomy and agency of the affected party. An example of this is when someone without a social media profile of their own is tagged in a photo by someone else: they become subject to the face-tracking algorithms and profiling that accompany online presence even if this data can't immediately be connected with their name, location, or other characteristics.²¹¹ As artist Adam Harvey has outlined, the most popular image on the internet is the transparent GIF, as it forms a part of the mechanism whereby page visits are tracked using Google's Site Analytics suite of tools.²¹² The image file itself is completely blank but the metadata that is sent along with the empty image allows for extremely detailed information about the user's habits to be gathered and aggregated. More recently, the widespread use of 'site replay' scripts that can record and play back user interaction with a website or app has been revealed.²¹³

Whether engagement happens passively or actively, interaction with most digital systems generates a data trail that can be aggregated from multiple sources and combined into a unique data profile that is not always accessible to its producer. This leaves the individual open to targeted advertising or other methods of categorisation. If this data is produced passively by the user, the consequences of its leverage by marketers can be unsettling: the possibly apocryphal story of a retailer correctly inferring that a customer is pregnant from

²¹⁰ Finn Brunton and Helen Nissenbaum, 'Vernacular Resistance to Data Collection and Analysis: A Political Theory of Obfuscation', *First Monday*, 16.5 (2011) <<http://firstmonday.org/ojs/index.php/fm/article/view/3493>> [accessed 25 June 2018].

²¹¹ Chris Davies, 'Facebook "Shadow Profiles" Detail Non-Members, Prompt Investigation', *SlashGear*, 2011 <<http://www.slashgear.com/facebook-shadow-profiles-detail-non-members-prompt-investigation-21189885/>> [accessed 25 June 2018].

²¹² Adam Harvey, 'Retail Surveillance / Retail Countersurveillance' (presented at the CCC: Works For Me, Köln, 2016) <https://media.ccc.de/v/33c3-8238-retail_surveillance_retail_countersurveillance> [accessed 25 June 2018].

²¹³ Steven Englehardt, 'No Boundaries: Exfiltration of Personal Data by Session-Replay Scripts', *Freedom to Tinker*, 2017 <<https://freedom-to-tinker.com/2017/11/15/no-boundaries-exfiltration-of-personal-data-by-session-replay-scripts/>> [accessed 25 June 2018].

their purchasing data before the customer had revealed this to their family is just one widely cited example of this.^{214,215}

Resistance to these data gathering practices is problematic, as many sites or services that are important facilitators of everyday sociality require the use of cookies or beacons (small snippets of code that can identify the user) in order to function. It's impractical for many people to avoid the use of these services completely, but various browser plug-ins exist that permit the selective blocking of individual cookies and trackers, allowing users some degree of agency over their data trail. The consequence of this is that sites that are funded solely by advertising clicks lose revenue; some actively deny content to viewers who use ad-blockers. Brunton et al developed *AdNauseum* as an alternative approach based on their work on obfuscation as a mode of resistance to surveillance. *AdNauseum* is a browser plug-in that instead of inhibiting the display of adverts on a web page, automatically clicks on all of them. This results in the data that is produced becoming 'dirty', no longer representing a true record of the particular user's interests or preferences, and rendering the generated data profile less valuable for marketing purposes without denying revenue to the site hosting the advert. *AdNauseum* for Google Chrome was banned from the Google Web Store at the end of 2016.²¹⁶

While web browsing data is gathered passively, some personal data production is conducted voluntarily. Analogue self-monitoring has been fairly widely used as an aspect of art practice, for example in the early work of Ellie

²¹⁴ Charles Duhigg, 'How Companies Learn Your Secrets', *The New York Times*, 16 February 2012 <<http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html>> [accessed 25 June 2018].

²¹⁵ Gregory Piatetsky, 'Did Target Really Predict a Teen's Pregnancy? The Inside Story', *KDNuggets*, 2014 <<https://www.kdnuggets.com/2014/05/target-predict-teen-pregnancy-inside-story.html>> [accessed 2 February 2018].

²¹⁶ Daniel C. Howe, Mushon Zer-Aviv, and Helen Nissenbaum, *Ad-Nauseum: Clicking Ads So You Don't Have To*, version 1.0 beta, 2014 <<https://adnauseam.io/>>.

Harrison, or the data diaries of ‘data illustrator’ Stefanie Povasec.^{217,218} The increased availability of mobile devices in recent years, and the introduction of health monitoring hardware into recent smartphones, has led to digital self-tracking becoming a commonplace activity. Specialist hardware devices such as fitness trackers, along with a wide range of mobile apps for tracking bodily functions such as sleep, menstruation, or mood, have created more opportunities to digitally gather quantitative data about oneself. The *Quantified Self* website, set up by *Wired* magazine editors Gary Wolf and Kevin Kelly, is premised on ‘self-knowledge through numbers’.²¹⁹ It forms a focus for a community of individuals who use digital techniques to capture data about themselves with the objective of self-improvement. The Quantified Self movement implicitly proposes to users that data, the raw, quantified numbers, will reveal something that qualitative analysis of their activities will not. The narrative propelling this activity is one of individualism and control: by taking charge of their own data in this way, users can identify patterns of behaviour that enable them to optimise or improve themselves. However, as tech journalist Luke Dormehl outlines, measuring of any sort is reductive, as the things that can’t be measured by the instruments in question are often discarded.²²⁰ Another consequence of self-tracking can be anxiety: the self-tracker might experience an impetus to avoid situations that are unpredictable or unknown in order to maintain the verifiability of the data, or might experience discomfort if the hardware or software malfunctions, producing ‘dirty’ data.²²¹ The agency enacted in self-tracking is complex.

²¹⁷ Ellie Harrison, ‘Day-to-Day Data / Homepage’, 2008
 <<http://daytodaydata.ellieharrison.com/welcome.html>> [accessed 1 March 2018].

²¹⁸ Stefanie Posavec, ‘Eyeo2012 Keynote: Hand Crafted Data’ (presented at the Eyeo 2012, Walker Art Centre, New York, 2012) <<https://vimeo.com/46304381>>.

²¹⁹ ‘Quantified Self - Self Knowledge Through Numbers’, *Quantified Self*
 <<http://quantifiedself.com/>> [accessed 25 June 2018].

²²⁰ Luke Dormehl, *The Formula: How Algorithms Solve All Our Problems ... and Create More* (United Kingdom: W H Allen, 2015), p. 33.

²²¹ Candice Lanier, ‘The Hidden Anxieties of the Quantified Self Movement - Cyborgology’, 2015 <<http://thesocietypages.org/cyborgology/2015/05/05/the-hidden-anxieties-of-the-quantified-self-movement/>> [accessed 25 June 2018].

Deborah Lupton's analysis of self-tracking proposes a typology of modes of digital self-tracking, preferring the term 'dataveillance' to describe the practice.²²² Lupton makes a useful distinction between dataveillance conducted in public, such as CCTV or car license plate recognition, and that conducted in private: typically, the private self-tracker has access to their data in a way that is not usually the case when under public dataveillance. By sharing the data and looking at other people's data, self-trackers begin to move private, domestic surveillance into public locations, and vice versa. These shifts form the rationale for her typology, identifying five modes of self-tracking: private, pushed, communal, imposed and exploited.

Lupton goes on to describe self-tracking as 'active and purposeful' data acquisition, leading to the production of 'data assemblages' that flatten out the heterogeneity in the data produced, detaching the numbers from their temporal and spatial context.²²³ Lupton hints at the complexity of the data assemblages under production, suggesting that they propose types of selfhood 'that conform to cultural expectations concerning the importance of self-awareness, reflection and taking responsibility for managing, governing oneself and improving one's life chances.'²²⁴ Locating these types of selfhood in relation to the prevalence of 'audit culture', Lupton's analysis brings Foucault to bear on the problem of self-tracking. Kitchin and Lauriault's construction of the concept of the 'data assemblage' describe it as similar to the Foucauldian apparatus.²²⁵ The influence of these factors leads to the conclusion that data are not neutral or objective, and are in fact 'never raw but always cooked to some recipe by chefs embedded within institutions that have certain aspirations and goals and

²²² Deborah Lupton, 'The Diverse Domains of Quantified Selves: Self-Tracking Modes and Dataveillance', *Economy and Society*, 45.1 (2016), 101–22 <<https://doi.org/10.1080/03085147.2016.1143726>>.

²²³ Lupton, p. 114.

²²⁴ Lupton, p. 115.

²²⁵ Rob Kitchin and Tracey P. Lauriault, 'Towards Critical Data Studies: Charting and Unpacking Data Assemblages and Their Work', *Social Science Research Network*, 2014 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2474112> [accessed 25 June 2018].

operate within wider frameworks.²²⁶ In Lupton's analysis of self-tracking, the cooking that is taking place is governed by a managerial culture of monitoring that proposes that the self is always in a state of lack, and that optimising the self will lead to personal efficiency gains in line with the imperatives of a self-realising neoliberalised subject. Self-tracking is seen here as having a related objective to the construction of metricised social media profiles: an accrual of human capital. This can be understood through a specific reading of the contentious and complex term 'neoliberalism' as a cultural phenomenon rather than as an economic doctrine. I invoke the term here in the same specific sense as Wendy Brown elaborates:

I treat neoliberalism as a governing rationality through which everything is 'economized' and in a very specific way: human beings become market actors and nothing but, every field of activity is seen as a market, and every entity (whether public or private, whether person, business, or state) is governed as a firm. [...] Neoliberalism construes even non-wealth generating spheres—such as learning, dating, or exercising—in market terms, submits them to market metrics, and governs them with market techniques and practices. Above all, it casts people as human capital who must constantly tend to their own present and future value.²²⁷

The urge to quantify and optimise is the central proposition of *pplkpr* ('people keeper'), a mobile app created by artists Kyle McDonald and Lauren McCarthy.²²⁸ It intervenes in the social interactions of the user by allowing them to associate fluctuations in their heart rate with their emotional responses to the people they are spending time with. It quantifies and measures the emotional states that particular social relationships bring about, auto-scheduling meetings

²²⁶ Kitchin and Lauriault.

²²⁷ Timothy Shenk, 'Booked #3: What Exactly Is Neoliberalism?', *Dissent Magazine*, 2015 <<https://www.dissentmagazine.org/blog/booked-3-what-exactly-is-neoliberalism-wendy-brown-undoing-the-demos>> [accessed 25 June 2018].

²²⁸ Lauren McCarthy and Kyle McDonald, *Pplkpr*, 2015 <<http://pplkpr.com/>> [accessed 25 June 2018].

with people that make the user feel good, and cutting out those that don't. This piece presents itself as an awkward version of many mindfulness apps that have the stated intention of improving the mood of the user, making the user feel calm and relaxed. Similarly to other self-tracking systems, the quantification of the self here is willingly carried out by the user, in return for a perceived service of self-improvement. But by employing a process of quantification to a phenomenon that is relational and qualitative, the logic of objectivist certainty is brought to bear on it, uncomfortably invoking Taylorist efficiency measures and misapplying them to friendships. The result is a tool that reinforces the neoliberal idea of a self-realising individual, and converts friendships into consumable commodities. Here, seemingly raw data is being used as ammunition to end friendships. *Pplkpr* beautifully stages the awkwardness at the centre of the debate over the quantification of social data, and in common with some post-internet approaches, is both critical and complicit at the same time.

One further aspect of self-tracking and the rise of Big Data, as the phenomenon has been termed, is the assumption that through the algorithmic processing of data, knowledge can be uncovered that might not otherwise be discernible. I see this as an assumption related to the argument about infrastructure and visibility above, in that the uncovering of the 'knowledge' alone might not always permit the inference of its hidden non-neutrality. Key writings on the emergence of big data do indeed invoke infrastructural analysis as a starting point. An influential set of provocations made by boyd and Crawford begin to tackle assumptions about the capacity of algorithmic analysis to reveal truths in several ways.²²⁹ Firstly, they debunk claims to objectivity by highlighting the subjectivity involved in the design of the measuring system and in the selective process of discarding 'dirty data'. But importantly, they question the validity of the correlations that emerge when certain algorithmic analyses

²²⁹ danah boyd and Kate Crawford, 'CRITICAL QUESTIONS FOR BIG DATA: Provocations for a Cultural, Technological, and Scholarly Phenomenon', *Information, Communication & Society*, 15.5 (2012), 662–79.

are applied to very wide data sets. 'Too often', they write, 'Big Data enables the process of apophenia: seeing patterns where none actually exist'.²³⁰

Interestingly for data artists, whose own practices of visualising data might also fall prey to apophenia, it could be argued that the introduction of more subjective modes of interpretation of data creates a space where critique might be allowed to emerge. If, as Davies argues, elites can be defined as those who control the narratives over data, then the explication of new narratives, regardless of their statistical veracity, might offer the potential for the type of critique of power that much work in this area seeks.²³¹ A limiting factor is that artists often only get to handle the *outputs* of a complex set of data assemblages, visualising these in the hope that the social, political and economic parts of the assemblage will be inferred.

'Interruptive' Artwork

One further area of practice that is relevant to my approach is a type of work that seeks to intervene in the spatial or temporal norms of experience in an unannounced way, producing an interruption of some kind. This type of work doesn't exist in its own neatly-defined category, operating more as a characteristic of approach rather than a genre of work.

²³⁰ Baym and boyd, p. 668.

²³¹ William Davies, 'Elite Power under Advanced Neoliberalism', *Theory, Culture & Society*, 2017
<<http://journals.sagepub.com.lcproxy.shu.ac.uk/doi/full/10.1177/0263276417715072>>, p. 230.

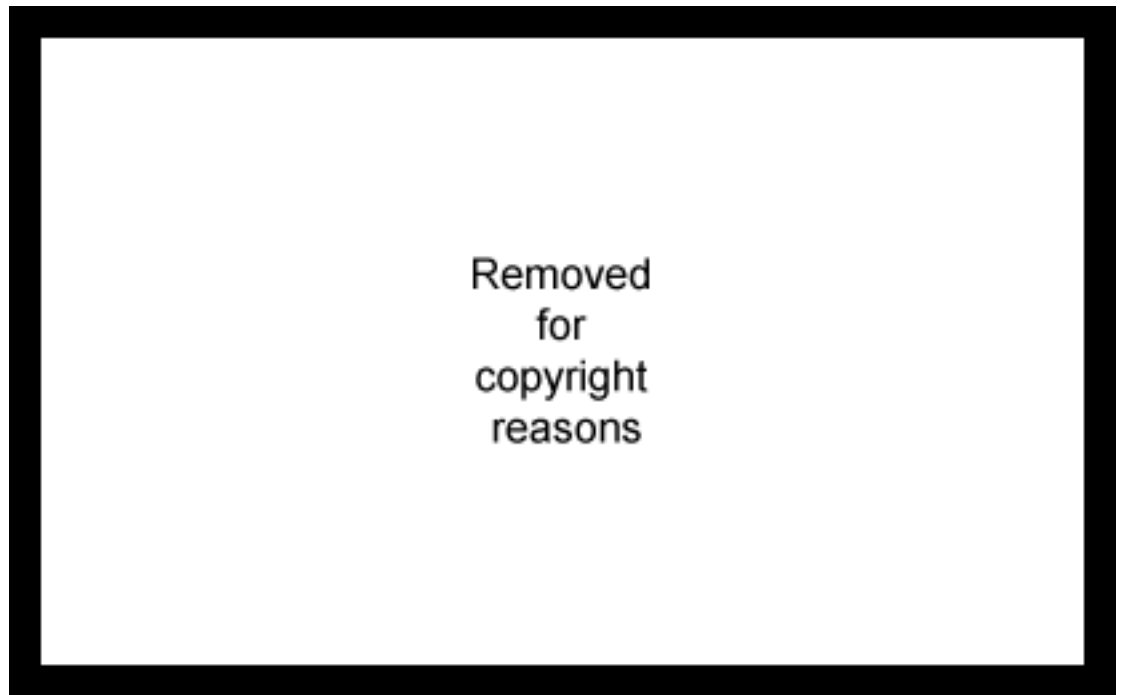


Figure 4: *Skrekkøgle, Durr, 2013–14.*

Skrekkøgle was a small Norwegian design studio that produced work for clients as well as conceptual projects. Their project *Durr* is a conceptual design for a wrist-wearable electronic device that vibrates every five minutes in the same way as a mobile phone notification might.²³² The vibration is an encouragement for the wearer to be mindful of time passing, which in itself might form a distraction from processes of mindfulness, or of concentration or focused attention. All *Durr* does is distract – and the notification it provides is always the same.

A broader seam of interruptive work has been the subject of a research project by Sam Mercer and Matthew de Kersaint Giraudeau. After developing their research through a series of events, they produced a work in collaboration with Field Broadcast that existed as a browser plug-in for the Chrome browser. This plug-in permitted the interruption of the viewer's everyday browsing activity with occasional 'unexpected moments of visual, aural and conceptual interruption dependent on the time of day, the websites you visit, and the

²³² Skrekkøgle, 'DURR - Skrekkøgle', 2013 <<http://skrekkogle.com/projects/durr/>> [accessed 16 March 2018].

content you see'.²³³ Their project has its roots in Field Broadcast's earlier work that took a similar formal approach, and in the *Pala* project curated by Laura Mansfield.^{234,235} Each of these projects uses a similar method to insert media artworks into the flow of everyday computer usage experience, either by providing custom client software to deliver the broadcasts, or by using a browser plug-in.

Mercer and de Kersaint Giraudeau's iteration of this project was accompanied by research materials that contextualised the work in a lineage of interruptions to screen media, beginning with David Hall's *TV Interruptions* from 1971.^{236,237} Their research moves on from these unannounced broadcasts to instead look at interventions and stage invasions (such as Jarvis Cocker's gate-crashing of Michael Jackson's performance at the Brit Awards in 1996). I would argue that the interruption of a television broadcast in this way has a different quality to the beeps and vibrations that digital devices emit. A stage invasion is something out of the ordinary: updates and notifications are the everyday from which we might wish to be distracted by a remarkable artistic intervention. Furthermore, the argument for this work weakens when considering artistic interruptions in the browser window. In my view, the inconsistency in this work can be simply described as context collapse: the browser window is used for all sorts of activities, such as banking, email, becoming informed, entertained, and so on. Multiple tabs already subdivide many people's normal browsing experience into a dispersed juggling of different information sources. It could be argued that broadcast television was a social space in which a range of

²³³ Field Broadcast and The Bad Vibes Club, *Interruptions*, 2017
<<http://fieldbroadcast.org/interruptions.html>> [accessed 4 March 2018].

²³⁴ Rebecca Birch and Rob Smith, 'Field Broadcast' <<http://fieldbroadcast.org/about.html>> [accessed 4 March 2018].

²³⁵ Laura Mansfield, 'Pala Project', 2015 <<http://www.aplacecalledpala.net/about/>> [accessed 4 March 2018].

²³⁶ Tate, 'BP Spotlight: David Hall: TV Interruptions', *Tate* <<http://www.tate.org.uk/whats-on/tate-britain/display/bp-spotlight-david-hall-tv-interruptions>> [accessed 4 March 2018].

²³⁷ Matthew de Kersaint Giraudeau and Sam Mercer, 'Screen Interruptions: Invasions, Interventions and Infiltrations', 2017
<<http://fieldbroadcast.org/interruptions/interruptions.html>> [accessed 4 March 2018].

activities (entertainment, becoming informed etc.) happened too, but the difference is that in the case of broadcast television, at least in the pre-digital era, these activities are structured, scheduled and delivered by a broadcaster over which the viewer can enact only rudimentary levels of agency. The experience of the web browser differs in that each version of the web browser is organised and managed by the user. Even though the browser could be seen as a media space that is in part constructed by centralised platforms such as Google and Facebook, or by the affordances of the browser, each iteration of it is as singular as the user who has co-constructed their own customised view. As such, I would argue that the browser window should not be considered a 'mass' medium in the same way as broadcast television might, and that what is disrupted by artistic browser interruptions might be the viewer's own agency rather than a status quo imposed by the broadcaster. The artistic interruption becomes merely another interruption to be ignored or 'snoozed', and is more complicit with than antagonistic to the object of its critique.

Summary and Discussion

This chapter and the last have sought to establish some of the qualities of the attention/distraction dialectic that are prevalent in digital practices such as self-tracking, social networking, and in artistic practice that engages with the internet as a context. Perhaps the most important thread that runs through the discussion is the way that many of these artworks grapple with the distinction between online and offline experiences. At times this is expressed as a yearning for the veracity of the real, as in Evan Roth's work, and elsewhere, it's explored through the conversion of online content to printed books, or the translation of artefacts to images and their dispersal and circulation.

In response to the dissolution of the boundary between online and offline, some artists have developed practices that engage with a notional 'attention economy'. Visibility online can be measured, analysed and optimised through the use of detailed metrics. Some artists have embraced this and centred their practices on it, whereas others have been embraced by it. A consequence of engaging with an economy of attention, combined with the adoption of

metricised distribution platforms, is that questions concerning neoliberal rationality, and human capital in particular, become more significant to an analysis of these practices. As Ben Vickers has written, post-internet art ‘got drunk on followers and likes’, a metaphor of intoxication that expresses something of the trade-off between compulsion and pleasure that creative work in an attention economy exemplifies.²³⁸ It might be argued that an obsession with likes and followers can be attributed to how quantified a measure these are of one’s own human capital, whether the human in question is an artist or a viewer of art. The development, or perhaps curation, of a personal social media profile can be seen as an imperative of this governing rationality, and its requirement for constant maintenance a compellingly measurable distraction from everyday life.

The unintended consequences of this are that through everyday engagement with connected technologies, data trails are produced that have a bearing on personal visibility, exposing activity to analysis and processing by commercial and state actors and agents. Importantly, the infrastructure over which this data-gathering takes place is kept out of the purview of the users of these platforms and systems. Some artistic practices seek to uncover the infrastructural aspects of the gathering and processing of personal data, with varying degrees of effectiveness. Artistic approaches that address the apprehensibility of infrastructure often foreground its spatial configurations: work such as Bridle’s, Oliver’s or Paglen’s described above have at their heart an acknowledgement of the spread of these infrastructures across traditional social, economic or geopolitical boundaries. This spatiality chimes with the way that distractions often draw a person’s focus away from their immediate physical surroundings and towards a message initiated from a remote location.

Having established theoretical positions that are relevant to the research terrain and surveyed the scope of artistic practices that are being conducted in this field, I now want to argue for the relevance of artistic research as a way of

²³⁸ Karen Archey and others, ‘Post-Net Aesthetics Conversation, London, 2013: Part 3 of 3’, in *Mass Effect*, by Lauren Cornell and Ed Halter (MIT Press, 2015), pp. 413–418 (p. 417).

building on this to produce further insight. Firstly, I will appraise some relevant standpoints on the role of the artist as a researcher and the ways insight might emerge from artistic practice as a way of contextualising my own position as an artistic researcher.

4: Approaches to Artistic Research

This chapter aims to identify key literature that assists with the positioning of my own artistic research practice in an appropriate epistemological, methodological, and theoretical framework. This discussion will loosely address Michael Crotty's 'four elements' model for social research, which proposes a hierarchy of *epistemology*, *theoretical perspective*, *methodology* and *methods* as structuring elements in the preparation of a research design.²³⁹ Crotty's 'four elements' are referenced in order to explore some of the tensions present in artistic research that are not experienced to the same degree by social research. While the first three elements (epistemology, theoretical perspective and methodology) tend to merge somewhat in discussions about art practice as research, the 'methods' element will be kept distinct and will be embedded in the analysis of individual works later in the thesis.

Art as Research

A good place to begin with a consideration of artistic practice as a research activity is to consider the criteria by which research is assessed and audited in the United Kingdom. The Higher Education Funding Council's *Research Excellence Framework* defines research as 'a process of investigation leading to new insights, effectively shared'.²⁴⁰ This succinct definition obscures the depth and complexity found in the composition of artistic research methodologies. These methodologies and approaches often differ for each practitioner and are not typically viewed as static unchanging frameworks. The mutability of artistic research methodology is perhaps the main reason that it attracts criticism from other areas of the academy over its expression of rigour. To begin to address this, I want to critically consider the ways in which

²³⁹ Michael Crotty, *The Foundations of Social Research* (London: Sage Publications, 2004), p. 4.

²⁴⁰ HEFCE, 'Assessment Framework and Guidance on Submissions', 2012, p. 48
<<http://www.ref.ac.uk/2014/media/ref/content/pub/assessmentframeworkandguidanceonsubmissions/GOS%20including%20addendum.pdf>> [accessed 25 June 2018].

artistic research qualifies as a *process of investigation*, and how it might *lead to new insights*.

With regard to the first of these points, the initial scoping of the field conducted by Frayling helps situate artistic research as a process of investigation.²⁴¹ Frayling's formulations of different types of artistic research were influential on the formation of an initial structure for debate around artistic research in the post-1992 United Kingdom research landscape. He described research *into* art and design as primarily concerned with historical research or research into theoretical perspectives on art and design. Research *through* art and design included materials research or development work, and also action research, where the process of production is recorded and 'the diary and report are there to communicate the results'.²⁴²

He identified a third 'thorny' category, as research *for* art and design: 'Research where the end product is an artefact – where the thinking is, so to speak, embodied in the artefact [...]' ²⁴³ Research *for* art is the type of ongoing practical activity that informs the production of a body of artwork, and is claimed to be effectively shared through the exposure of the artwork itself to an audience. A common critique of this approach is to question whether the insight is accessible to that audience, or about the form that this insight might take. Some contest the argument that insight can be embodied in the artwork, instead suggesting that insight can be found more readily in the textual material that accompanies, precedes, or follows the artwork.

Modes of Knowing: Where is the Insight?

A question that arises when looking for the insight produced by artistic research is that of the epistemological paradigm through which this insight

²⁴¹ Christopher Frayling, 'Research in Art and Design', *Royal College of Art Research Papers*, 1.1 (1993)
<http://researchonline.rca.ac.uk/384/3/frayling_research_in_art_and_design_1993.pdf>
[accessed 25 June 2018].

²⁴² Frayling, p. 5.

²⁴³ Frayling, p. 5.

might be understood. It has been argued that artworks are unable to embody knowledge that has been defined as such using objectivist epistemological paradigms. Stephen Scrivener's initial definition of knowledge as 'justified, true belief' leans heavily on an objectivist epistemology that excludes modes of knowing that are outside of a narrow understanding of 'propositional knowledge' – knowledge that something is true.²⁴⁴ Others at a similar point in the debate on artistic research were already calling for arts practices to abandon objectivism and to develop more appropriate epistemological models.²⁴⁵

Henk Borgdorff helps by expanding the epistemological frame to accommodate types of knowing that Scrivener overlooks.²⁴⁶ Borgdorff contrasts Scrivener's propositional knowledge with two other types of knowledge: knowledge as *skill*, which might include knowing how to make something, or how to perform an act; and knowledge as *acquaintance*, such as knowing a situation or a person.²⁴⁷ He also adds 'understanding' as an extra category of knowledge where theoretical knowledge, know-how, and acquaintance can intersect. Importantly, he deploys the synonyms *insight* and *comprehension* with regard to artistic research, implying that research conducted with these as intentions seeks to enhance experience, by which he means 'the knowledge and skills accumulated through action and practice, plus apprehension through the senses.'²⁴⁸ It's unclear whether the experiencing subject he refers to at this point is the artist-researcher themselves or the audience for the research, but in either case, there is a clear shift here from Scrivener's *knowledge* as a

²⁴⁴ Stephen Scrivener, 'The Art Object Does Not Embody a Form of Knowledge', *Working Papers in Art and Design*, 2 (2002), p. 3
<http://ualresearchonline.arts.ac.uk/783/1/WPIAAD_vol2_scrivener.pdf> [accessed 25 June 2018].

²⁴⁵ Linden Reilly, 'An Alternative Model of "Knowledge" for the Arts', *Working Papers in Art and Design*, 2 (2002).

²⁴⁶ Henk Borgdorff, 'The Production of Knowledge in Artistic Research', in *The Routledge Companion to Research in the Arts*, ed. by Michael Biggs and Henrik Karlsson (London: Routledge, 2011), pp. 44–63.

²⁴⁷ Borgdorff, p. 55.

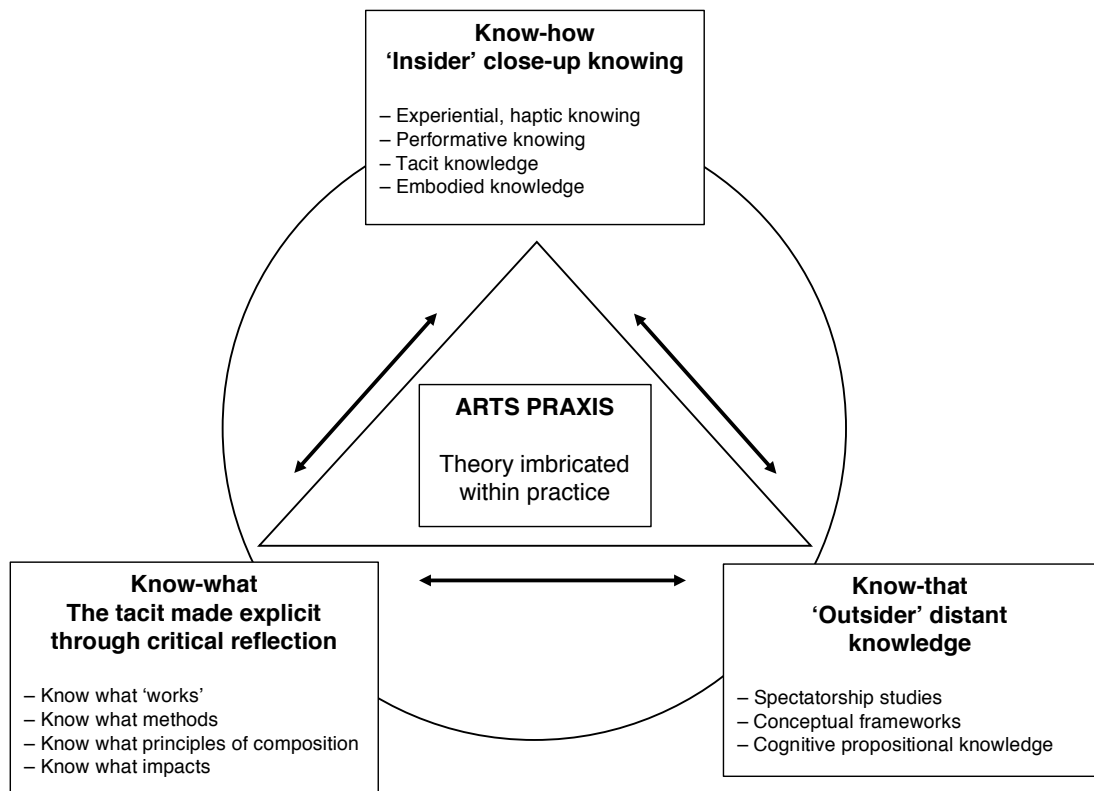
²⁴⁸ Borgdorff, p. 55.

graspable, communicable external element that is separate to the self, to a more embodied, situated *knowing*.

Robin Nelson identifies broadly similar categories of knowing.²⁴⁹ He retains Borgdorff's definition of propositional knowledge (*know-that*) but reframes *skill* as *know-how* (performative knowing or tacit knowledge) and *acquaintance* as *know-what* (which could be described as an acquaintance with methods or principles – knowing what works, for example). A large part of Nelson's argument around practice-as-research (henceforth abbreviated to PaR) is to do with the relevance of *know-what* and the methods that bring about and monitor its emergence through critical reflection on practice.²⁵⁰ This is an important moment of assonance between these epistemological standpoints: 'insight' in Borgdorff's analysis and the 'praxis' that Nelson advocates both emerge from the researcher's experiential handling of the movement between and recombination of these three different types of knowledge. Nelson and Borgdorff each explain the ways in which this can happen from their own perspectives.

²⁴⁹ Robin Nelson, *Practice as Research in the Arts: Principles, Protocols, Pedagogies, Resistances* (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2013), p. 37.

²⁵⁰ Nelson, p. 44.



*Figure 5: Robin Nelson's multi-mode epistemological model for PaR, 2013.
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Nelson's 'multi-mode epistemological model for PaR' revolves around an idea of research that allows for movement between the three modes of knowing mentioned above.²⁵¹ He invokes an epistemological frame in which knowledge exists on a spectrum between fully tacit knowledge at one end (which might be identified as non-conceptual or pre-reflective in Borgdorff's analysis), and fully explicit, communicable knowledge at the other end (Scrivener's propositional knowledge). Crucially, he considers that most knowledge exists somewhere between these extremes, and permits the mobility of the practitioner and their practice around his epistemological model through what he describes as praxis.

Praxis, for Nelson, is 'intelligent practice' that imbricates theory and reflection in the practice of making art.²⁵² Highlighting the primacy of discovery through doing, Nelson asserts that the process of devising an artwork involves

²⁵¹ Nelson, p. 37.

²⁵² Nelson, p. 40.

the acquisition of *know-that* prior to the practice (through reading, for example) and critical reflection after the event, and that these two bracketing methods converge upon the practice itself, temporally nudging themselves into the present tense of the act of making. Taking performative practices as his main focus, he infers that the practice itself includes the acquisition of *know-how* (learning how to move in a certain way for example) that can be explicated later through writing. I would argue that the process of devising an artwork *is* the practice (and the research) as much as the material construction of an artwork might be. It is in the devising of a work that new connections between contextual elements that have been alighted upon through the acquisition of *know-that* are made apparent through the process of production. The insight can emerge in the devising of *and* the production of *and* reflection on an artwork.

Borgdorff supports Nelson by supplying a more detailed overview of the epistemological lens through which the insight produced through artistic research might be identified. He looks at the problem using a broadly phenomenological perspective, foregrounding the situatedness of knowledge and the primacy of bodily interaction with the world as formative of our engagement with it. He argues that pre-reflective, non-conceptual knowledge is 'embodied in art practices and products', and that if artistic research is only about explaining or extracting this non-verbal knowledge and explicating it through verbal means, research is reduced to a decoding exercise.²⁵³ Instead, Borgdorff proposes that the pre-conceptual content produced by artistic research can be accessed through at least two theoretical frameworks, outlining constructivism and hermeneutics as prime candidates.

Constructivism, as distinct from constructionism, is defined by Crotty as social constructionism minus the emphasis on the role of the social in the constitution of reality, instead foregrounding the meaning-making potential of the individual mind.²⁵⁴ Through this perspective, Borgdorff claims, the product of

²⁵³ Borgdorff, p. 59.

²⁵⁴ Crotty, p. 58.

artistic research constitutes a new reality: ‘only in and through art do we see what landscapes, soundworlds, histories, emotions, relations, interests or movements really are or could be.’²⁵⁵ The hermeneutic perspective asserts that the artistic research discloses the world rather than actively constituting it, and this disclosure can be subjected to any number of hermeneutic interpretative methods to derive meaning from it. Borgdorff’s central assertion though is that this world-constituting or world-disclosing power is ‘fundamentally non-conceptual’, and that the primary purpose of artistic research is to produce or disclose the not-known, or the not-yet-known. In both these cases, the artwork proposes something that is beyond the limits of current knowledge and therefore must be described as an extension of knowledge. Emma Cocker elucidates this beautifully:

[...] within artistic practice, the possibility of producing something new is not always about the conversion of the not known towards new knowledge, but rather involves the aspiration to retain something of the unknown in what is produced. In these terms, the new is that which exceeds existing knowledge, not by extending its limits but by failing to be fully comprehended within its terms.²⁵⁶

Graeme Sullivan agrees with this, asserting that ‘artistic research creates new possibilities from what we do not know to challenge what we do know.’²⁵⁷

The characteristics of this not-knowing are analysed more closely by Janneke Wesseling, who deploys Hannah Arendt’s comparison between ‘reason’ and ‘intellect’ to do so.²⁵⁸ Reason and intellect each have a different function for Arendt. *Intellect* is a type of thinking that corresponds to

²⁵⁵ Borgdorff, p. 61.

²⁵⁶ Emma Cocker, ‘Tactics For Not Knowing’, in *On Not Knowing: How Artists Think*, by Elizabeth Fisher and Rebecca Fortnum (London: Black Dog Publishing, 2013), pp. 126–36 (p. 127).

²⁵⁷ Graeme Sullivan, ‘The Artist as Researcher: New Roles for New Realities’, in *See It Again, Say It Again: The Artist as Researcher*, Antennae, 6 (Amsterdam: Valiz, 2011), pp. 79–102 (p. 93).

²⁵⁸ Janneke Wesseling, ‘Introduction’, in *See It Again, Say It Again: The Artist as Researcher*, Antennae, 6 (Amsterdam: Valiz, 2011), pp. 9–11.

(propositional) knowledge, which is verifiable by evidence and the certainty of proof; *reason* on the other hand is concerned with questions to which there might not be clear answers. Reason is motivated by the quest for meaning rather than the quest for knowledge, but additionally, it differs from intellect through its self-reflexivity. Reason is 'the pure activity of thinking and the simultaneous *awareness* of this activity while we are thinking.'²⁵⁹ For Arendt though, thinking is an activity that is separate to the world, as one has to withdraw from the flow of everyday life to do it properly. To concentrate is to be 'absent'. This absence is in contrast to works of art, which are usually very much a part of the visible, sensory world. Wesseling argues that 'the work of art is the materialisation of thinking; thinking is rendered visible in the work of art.'²⁶⁰ For her, then, the artwork is material manifestation of the 'absent' reasoning conducted (through practice, praxis, and through other means) by the artist. At the point where the work is made public, the audience take over and 'pick up the train of thought as it is embodied in the work of art'.²⁶¹

What Wesseling's argument proposes is that the artwork is the product of reasoning that is itself an intelligent, theoretically informed and reflective practice, and that this reasoning is accessible in the artwork and may be extrapolated. This differs from Scrivener's approach in that its emphasis is not on the transmission of objectively verifiable knowledge. Rather, the reader of the work produces meaning that has been directed by the reasoning of the artist, reasoning that has itself become reified in the artwork.

Proposing that artworks are starting points for trains of thought is a compelling description of how they might engender a kind of knowing, as the viewer speculatively moves forward into their own new extrapolations, and backward into a personally-inflected reconstruction of the artist's own reasoning. This double-movement in the act of readership feels in keeping with

²⁵⁹ Wesseling, p. 10.

²⁶⁰ Wesseling, p. 12.

²⁶¹ Wesseling, p. 12.

the academic expectation that the artwork produces insight, yet also leaves the work's capacity for multiple readings intact.

Borgdorff's broadly phenomenological theoretical perspective contrasts with Wesseling's more interpretivist approach, but both hold a constructionist epistemological stance: the artwork is part of the toolkit from which meaning is made by the viewer. In Mika Hannula et al's account, which is characterised by a more postmodernist theoretical perspective, the role of the viewer – the 'self-evident authority of an outsider's position' – is minimised in favour of a dialogic understanding of practice as an 'open-ended, internally conflictual enterprise'.²⁶² What postmodernist perspectives can bring to the epistemological party is the implication of a greater subjectivism. Nelson, Borgdorff and Scrivener allude to this when they speak of the role of the experiencing subject in the construction of the knowledge, but Hannula et al specifically locate the acts of knowing and doing in the artist-researcher. Research for them begins with the kind of play that is advocated by Paul Feyerabend, and the mantra of 'anything goes' that signals methodological abundance must for them be framed by a 'certain specified and historically entrenched framework'.²⁶³ This they describe as context, and insist that the context for the research is 'never a priori but is always in great need of being articulated, formed, discussed, maintained, and renewed'.²⁶⁴ For them, the methodological and epistemological dilemmas involved in artistic research are productive as they allow for an ongoing exploration and renewal of the context of the practice, which can in turn be relatable through textual means.

It can be seen therefore that there are numerous theoretical positions that can persuasively frame artistic practice as a research activity. My own practice as a researcher emerges from this field but deploys an approach that is specific to my own history of making, skills base, and area of inquiry. The next

²⁶² Mika Hannula, Juha Suoranta, and Tere Vadén, *Artistic Research Methodology* (New York: Peter Lang, 2014), p. 4 <<http://mikahannula.com/s/ArtisticResearchWhole.pdf>> [accessed 25 June 2018].

²⁶³ Feyerabend (2010, p. 178.) quoted in Hannula, Suoranta, and Vadén, p. 5.

²⁶⁴ Hannula, Suoranta, and Vadén, p. 5.

section of the thesis will relate and analyse the practical research activity that has been undertaken during this study, and will begin by clarifying my own research approach.

5: Practical Research Activity

My Research Approach

At a pragmatic level, I see the outputs of artistic research as having the capacity to evoke experiences that defamiliarise those modes of engagement with the internet that viewers might be more or less oblivious to, inviting viewers to consider their relationship with it anew. These reconsiderations can be invoked either by making representations of engagements with the technologies or systems in question – ‘picturing’ these engagements in new ways (corresponding to disclosure in Borgdorff’s terminology) – or through creative intervention in the interactions themselves, turning viewers into readers, performers or participants (corresponding to Borgdorff’s constructionist stance). The production of artworks can also help identify the right questions to ask about the experience of these technologies, through the extension of the artist’s reasoning as in Wesseling’s approach. This extension of reasoning helps to reconfigure the context which frames the next instance of practice.

My research process has several stages, identified in Fig. 6. as a sequential flow of events. I contend that insight has the potential to emerge at multiple points during this process.

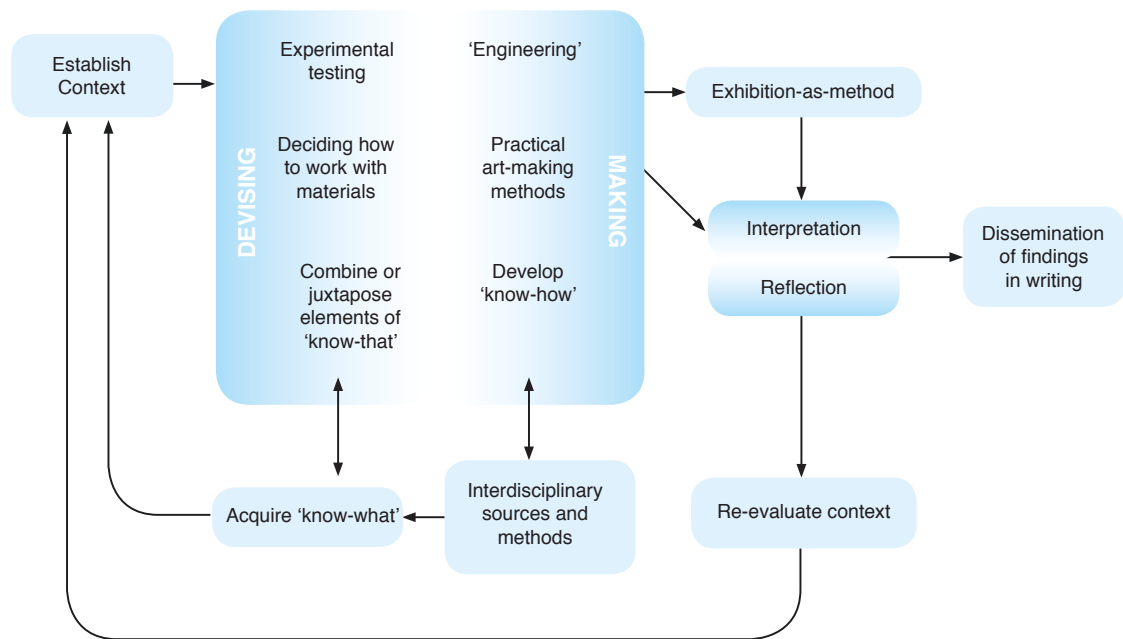


Figure 6: Flow diagram of my research process, 2015

Establishing the context for practical research is a task akin to the literature review in traditional research but with some nuances of difference. Working in a tradition of research and a history of making, establishing a context means situating the current research effort within a history of artistic practice and ideas. This is developed from the interpretation and reflection on previous works, as well as through gathering new material from both inside and outside of the discipline of art. This enables the identification of a subject domain that will inform the production of artworks.

The study of attention and distraction as it applies to digital media is a highly interdisciplinary field of study, and establishing of a context for my research practice has involved broad reading in a cross-section of different subject domains. The interdisciplinary sources that are gathered are used as a resource in the devising and making of artworks: the information gets merged and recombined, sometimes becoming incorporated into artworks (through quotation or appropriation, for example), sometimes forming a theoretical context to which the artwork might refer, sometimes inflecting the decisions made during the devising of a work, and sometimes offering steerage toward particular interpretations of or reflection on the artwork after it has been made.

The encounter with interdisciplinary sources and methods contributes to the acquisition of outsider or propositional knowledge that Nelson might term *know-that*.

The processes of devising and making the work overlap and are sometimes interchangeable. They also happen concurrently with the acquisition of *know-that*, as reading is a part of the research process that persists throughout. The practical art-making methods I use include the production of still and moving images in various media, the recording and editing of sound, the production of printed matter, coding, and electronics work. While there is no typical method that can be applied to the devising of a work within my research approach, there are a number of characteristics that crop up with some regularity. On many occasions, the work itself consists of the recontextualisation (or decontextualisation) of already existing visual or textual elements, and the devising process tends to be a consideration of how to creatively handle this material in ways that might embody my reasoning about that material. Decisions about how to handle material are often made semi-instinctively or experimentally, utilising the type of *know-what* that comes from experience in artistic practice. One of the approaches that recurs in my practice is to consider the potential for utilitarian computer-generated material to express my reasoning if recontextualised as an aesthetic rather than informational proposition. This recontextualisation could be seen as a type of speculation on the potential of such material to function aesthetically that resonates with the description of financialised attentional commodities found earlier in this thesis. As Richard Lanham succinctly puts it, ‘art is an act of attention the artist wishes to invoke in the beholder’, and this aspect of my approach could be seen as a means of directing the attention of the viewer toward particular concepts using appropriated visual material that might once have had a more explicit informative function.²⁶⁵ At times, the ‘engineering’ of a work is in support of this

²⁶⁵ Richard A. Lanham, *The Economics of Attention* (Chicago and London: University of Chicago Press, 2006), p. 43.

specific aesthetic approach, as effort is expended to find ways to stage this material that remove it from its functional context.

Once a work has been formulated, it is sometimes but not always staged in a public setting. While putting the work in front of an audience can be useful as a way of receiving external feedback, my initial Ph.D. research proposal was driven by my own retrospective critical readership of my work. In order to identify an area for study, I looked at my recent and previous work to locate thematic areas that might have the potential for further investigation. This was based on an analysis of the ideas the work raised from my own position as a practitioner, temporarily stepping outside of that position to occupying the role of a viewer or reader of the work. To use Wesseling's terminology, I followed my own line of reasoning backward into the work to identify a set of assumptions that needed to be revised because of changes in the context outside of the work.

That the researcher operates as both a reader and producer of the artwork is a key methodological point that emerges from the debates outlined in the previous chapter. Nelson refers to the importance of reflection by the artist throughout his account, while Hannula et al describe the 'insider/outsider alternation' involved in the act of reflection on one's own work as positioning researchers as 'both-and, both readers and writers'.²⁶⁶ Scrivener & Chapman agree with this positioning:

Thus we would argue that, in general, the knowledge reified in original and novel artefact has to be recovered, through analysis and reflection on the relationship between what is known and what is to be known. Paradoxically, the creator [...] is likely to be in exactly the same position as the viewer of the artefact. This is because the creative process is one of establishing the conditions

²⁶⁶ Hannula, Suoranta, and Vadén, p. 4.

for the realisation of what has not been seen before, not one of thinking the thing out in advance.²⁶⁷

Adopting the role of the reader of the work allows for the reasoning in the work to be extrapolated into insight that extends the context before the next episode of practice. This will find form in the practical work, but can also be elucidated through written critical reflection.

Nelson describes critical reflection as being central to identifying the movement of the researcher between different types of knowledge on the spectrum between objectivity and subjectivity. For him, 'the purpose of critical reflection in a PaR context is better to understand and articulate [...] whatever is at stake in the praxis in respect of substantial new insights'.²⁶⁸ Making an account of the research enquiry accessible through written critical reflection is a fundamental part of every artistic research methodology cited in this thesis. Whether the artworks are seen to embody the insight themselves or not, Nelson's idea of praxis mobilises the researcher to forge links between context (*know-that*) and skill (*know-how*) through the devising and manufacture of artworks, and the *know-what* that emerges is arrived at and expressed through critical reflection.

It follows that the insight generated through this approach is generated for both the viewer and the artist-researcher. In those cases where the work is not staged publicly, the insight generated for the artist-researcher can be articulated in writing and disseminated that way, and it also bears on the developing trajectory of the enquiry.

The 'both-and' position of producer and reader of the work is one I adopt in the following account of my practical research activity. This account is organised thematically, although some artworks extend the understanding of more than one thematic area. Each section below begins with commentary on

²⁶⁷ Stephen Scrivener and Peter Chapman, 'The Practical Implications of Applying a Theory of Practice Based Research: A Case Study', *Working Papers in Art and Design*, 3.1 (2004), p. 11.

²⁶⁸ Nelson, p. 60.

research aims and context, moves on to the process of production, and concludes with a discussion about dissemination and the insights drawn from the practice, and how these lead forward into the next instance of practical enquiry. This structure acknowledges the relevance of Nelson's 'clews' to the decision-making processes that take place during my practical research.²⁶⁹ Nelson describes the usefulness of clues to the research inquiry in the practice where it might not be immediately evident to a reader of the work, and by using the old version of the word, 'clew', which means 'thread', he invokes a useful metaphor for 'holding onto the line of research inquiry as it weaves through the overall process.'²⁷⁰

These 'clews' follow from some of the questions emerging from the preceding theory and practice review chapters, while some emerge from practice and have helped form the lines along which the theoretical reading, or reflective analysis, has proceeded.

Starting Points: Landscape and Data Infrastructure

Landscape was a preoccupation in my prior practice, functioning as a restorative visual trope that was posited as a counterpoint to the fast pace of digital communications. There is a relationship between landscape imagery and technology that extends along a number of axes. Much of the mainstream argument against screen-based media contrasts it against the restorative experience of nature.²⁷¹ It has been argued that landscape images are sometimes used as a shorthand for oppositions between natural and non-natural, or perhaps between biological and technical.²⁷² Screensavers often depict mountains or forests, and the soothing escapism of this type of imagery remains a relevant area of interest.

²⁶⁹ Nelson, pp. 10–12.

²⁷⁰ Nelson, p. 10.

²⁷¹ Nathan Jurgenson, 'The Disconnectionists', *The New Inquiry*, 2013 <<http://thenewinquiry.com/essays/the-disconnectionists/>> [accessed 25 June 2018].

²⁷² Emily Gaynor, 'May Waver Interview', 2014 <<http://newhive.com/newhive/may-waver-interview>> [accessed 25 June 2018].

However, rather than using images that depict landscape as I had done in prior practice, I sought out ways of representing landscape that moved away from photographic imaging. I began looking into open repositories of data gathered from landscapes that might be developed into artworks. This reflected an intention to use the internet reflexively in the production of the work: whereas previously I had photographed or filmed landscapes, I now wanted to encounter them in an already-mediated, digitised form. I alighted upon the United States Geological Service's archives, and became interested in the data gathered by their earthquake alert system. This system is designed to enable an urgent emergency response in the event of an earthquake of a significant magnitude, but the monitoring system measures even low-magnitude earthquakes and provides data on their location and estimated range of impact.²⁷³

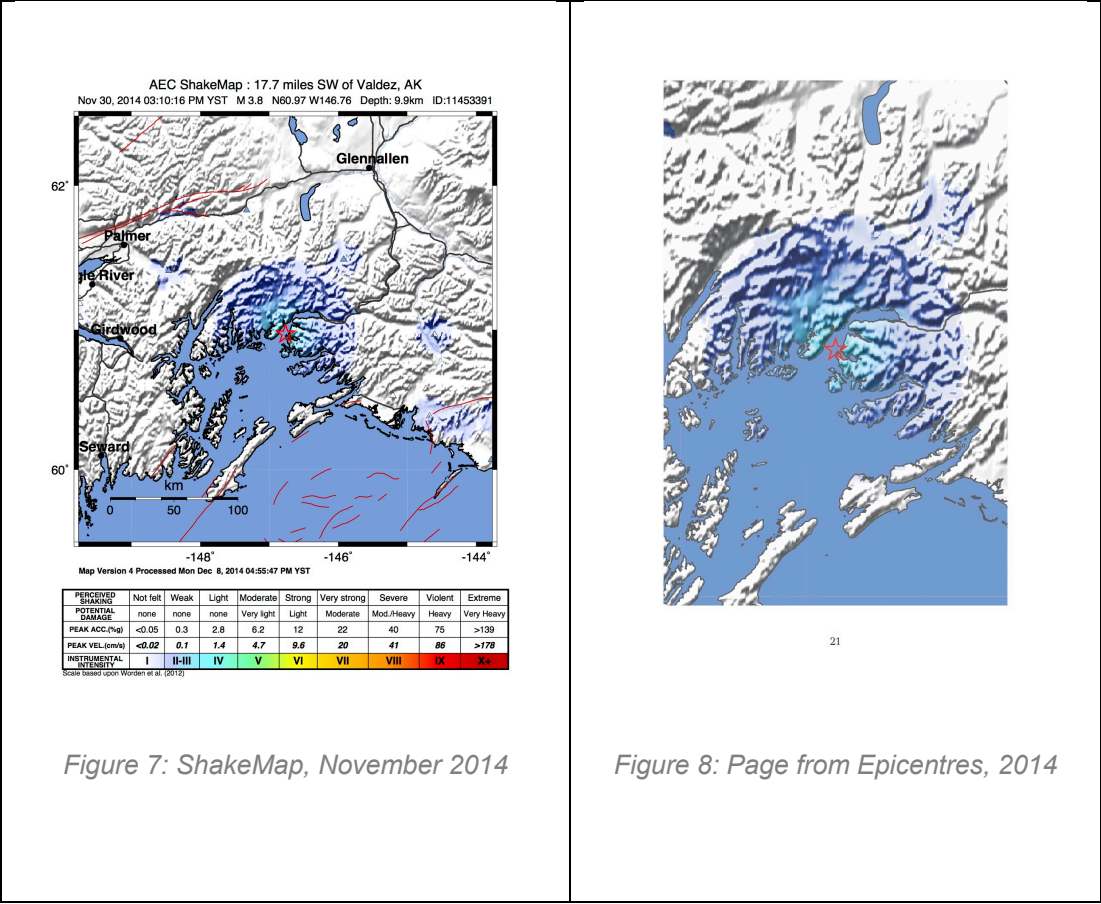
I identified that the timescales that were evident in the practice of earthquake monitoring were relevant. On the one hand, these monitoring systems have been set up to reduce the time between awareness of a seismological event and an emergency response, approximating real-time monitoring to the extent that the direction of earthquake science in the near future will be attempting to predict earthquakes before they happen.²⁷⁴ Contrary to this, the timescales over which seismological events build up is (literally) geologically slow, and can only be perceived by humans through technological processes of perceptual augmentation. Furthermore, the first-hand experience of an earthquake is a potentially terrifying and sudden experience in which the fixed conditions of bodily movement that are usually ignored, such as the horizontal ground, become unstable and therefore are made shockingly noticeable.

The particular data sources I worked with are described as 'ShakeMaps', and visually represent the intensity of an earthquake and identify its epicentre on a map. These maps show a colour-coded scale on which the intensity of the

²⁷³ United States Geological Survey, 'ANSS - Advanced National Seismic System' <<https://earthquake.usgs.gov/monitoring/anss/>> [accessed 25 June 2018].

²⁷⁴ United States Geological Survey.

shaking can be measured, from white ('not felt'), through blue and green to yellow ('moderate'), and ending with orange and red ('extreme'). The epicentre of the earthquake is shown as a star on the map, with the colour of the star having a bearing on the magnitude of the earthquake, although not on the same colour scale.



The images are organised on the USGS site by region, and I found myself drawn to more remote locations, seeking to maintain a continuity with previous work that had deployed images of remote wildernesses. I found that an amount of very small earthquakes had recently taken place in Alaska.²⁷⁵

Having established the context for the work (see Figure 6 on p. 93) and having been invited to participate in a collaborative publishing project with other

²⁷⁵ The USGS earthquake data site is no longer organised in this way, having since been redesigned and now carries metricised ‘Did you feel it?’ counters.

postgraduate students, I decided to use cropped versions of ShakeMaps from this region to produce a small book of images, titled *Epicentres*.²⁷⁶ The number of images was selected based on a fixed time period dictated by the page count of the book. I adopted a conceptualist strategy of appropriation whereby data is appropriated and re-presented, with the work operating as merely a 'pointer to what exists'.²⁷⁷ Alongside the necessary colophon and indexing information, the book contained a page that listed the coordinates, dates and times of the earthquakes depicted. This process corresponds to the devising/making section of the methodology diagram shown in Figure 6.

²⁷⁶ Documentation of this project is available at
<<https://www.michaelday.org.uk/phd/epicentres/>> and in the supporting material that
accompanies this thesis.

²⁷⁷ Stallabrass, p. 27.



Figure 9: Page from *Epicentres*, 2014.



Figure 10: Pages from *Epicentres*, 2014.

At a point in my inquiry when I was still considering ‘real’ and ‘online’ experiences to be separate, it interested me that these earthquakes might not actually have been felt by a human: the only experience of them is as an

automated image generated from sensor data, with no guarantee that the image itself will receive a human viewing. There is an obvious reading of the work that questions the existence of the unperceived earthquake at all, but the devolution of the experience of noticing the earthquake to remote sensing equipment seemed more significant. The technological data-gathering apparatus pays attention to this geological event so we don't have to; data is gathered, quantified, and visualised, and everyday life remains undisturbed by these events. It might be said that the sensing apparatus constructs the real through an automated mediation of it, by determining what constitutes a seismological *event to be noticed*. Additionally, this data is used in order to develop the capacity to predict seismological events. This relationship between a technologically-constructed real and the gathering of data for prediction chimes with the questions about agency posed by Zuboff.²⁷⁸ This system is angled toward seismological data but echoes approaches to personal behavioural data taken by social media platforms. The complex agency in such platforms is foreshadowed in this work by its foregrounding of a constructed real as the field from which action might emerge.

The utilitarian aesthetic qualities of these images, whose diagrammatic form reveals almost nothing about the physically unsettling experience they refer to, further distances the event from the realm of the subjective. Collecting the images in a book could be seen as an attempt to reclaim some relatable materiality, or possibly some subjective humanness, from this automated sensing system. The form of the book also invites the type of focused attention that many commentators claim is being eroded by digital technologies.²⁷⁹ It also commodifies, sequences and fixes images that are otherwise intangibly circulating on the web.²⁸⁰ The hand-held form of the book also reflects a desire for tactile materiality that can be seen in Roth's work.²⁸¹

²⁷⁸ Zuboff.

²⁷⁹ Notably Nick Carr, discussed on pp. 29–31 of this thesis.

²⁸⁰ This approach is also a characteristic of The Library of the Printed Web, a project by Paul Soulellis. See Soulellis, 'About: Library of the Printed Web'.

²⁸¹ See pp. 61–63 of this thesis.

While the use of cartographical imagery in the work initially came from a desire to invoke landscape as data, maps themselves bring a wide range of complex contextual references into the work. The idea central to critical cartography, that maps are not neutral, emerges in this work and in later works that explore infrastructural maps more fully.²⁸² Since the maps used as components in these works are not the principal focus of my study, the power relations expressed by them will only be discussed in broad overview, except where they have an explicit bearing on the potential meaning of the work.

In this work I adopt a conceptual approach that appropriates existing material and re-presents it within the interpretive context of art. *Epicentres* refers to subjective affectual experiences that are only noticed in mediated form with the assistance of a complex infrastructural network of sensors. But in terms of artistic agency, the piece relies on existing visual material that is re-presented in a form that changes the way it is consumed and attended to by a viewer. In the earlier discussion on post-internet art, Vierkant described a situation where the art is circulated online and is remixed, altered, or reshaped, and each of these different forms of the work are considered to be equal.²⁸³ In *Epicentres*, this logic is inverted: material found online is converted into art by making it into something more material and singular. Producing the books in a limited edition acts as an imposition of scarcity on a series of objects that have been created from material that is ostensibly free and accessible. This could be seen as an enclosure of the commons – quite an unpalatable expropriation and commodification of open resources. This approach is evident in Manning's *100 Paintings* project and in the *Library of the Printed Web*, where online material is shifted from an attention economy into a commodity economy, although in Manning's case the material is not in the public domain to begin with.

The book was exhibited as part of a larger collection, titled *The Editions*, which first met an audience at the *Pages* artist book fair at The Tetley in Leeds,

²⁸² Jeremy W. Crampton and John Krygier, 'An Introduction to Critical Cartography', *ACME: An International Journal for Critical Geographies*, 4.1 (2005), 11–33.

²⁸³ See pp. 47–50 of this thesis for an explanation of Vierkant's argument.

before subsequently touring to a number of regional and national artist's book fairs. At the time, my primary interest in the work was the way that it presented images that signified seismological events that were too insubstantial to be bodily perceived, making experiences that were at the thresholds of attention more noticeable. Reflecting on this project now at the end of my study, I can see how this piece also prefigured the infrastructural aspects of my inquiry. The cropping of the images is significant in that it removes information that allows them to be decoded as data, instead inviting an aesthetic encounter with them. This both decontextualises them as data sources and defamiliarises them. The aids to interpretation that are withheld prompt questions about what else might be missing, or more precisely, what is *not noticed*. What is not noticed is the complex infrastructural assemblage of data gathering and interpretation that allows these images to come into existence in an automated way in the first place.

The compilation of the series of images into a book formed the first iteration of the piece, and a smaller selection of them were subsequently enlarged and exhibited as part of *Northern Lights*, an exhibition of photography exploring the idea of North.²⁸⁴ The inclusion of these images as part of a photography exhibition enabled them to be analysed using the historical context of photography as a theoretical framework. It might initially seem quite a stretch to consider these images as photographs, but I would argue that the domain of photography might include many images created with the assistance of technical apparatus, and if we consider photograms, medical images such as fMRI, or CCTV, this need not rely on authorial intent or any specifically optical apparatus to hold true. Indeed, it has been claimed that photographic images captured by smartphones are constructed principally using algorithms, despite their superficially optical appearance.²⁸⁵ If these graphical images are to be thought of as photographs, then the ever-questionable status of the photograph as evidence, or its potential to act as an articulation of power, become relevant

²⁸⁴ The *Northern Light* exhibition took place at SIA Gallery in Sheffield during July 2016.

²⁸⁵ Toro and others.

poles of discussion. The question of what constitutes a camera is also pertinent, invoking a consideration of infrastructure through its absence in a slightly different way to that mentioned above.

The insight generated from this work is a reconsideration of how thresholds of perception can be augmented by digital sensing infrastructure. The tiny, remote earthquakes that the work focuses on can only be noticed with the assistance of the technological infrastructure that senses them. Reflection on this work helped identify which questions needed to be approached in the practical work that followed, allowing for a re-evaluation of the context for the study (Figure 6). I decided at this point to continue developing work that addressed infrastructure as a theme by focusing on maps as visual indicators of this. Alongside this, I decided to develop a line of practice that began to explore the idea of data and bodily experience that was raised by the absence of first-hand subjective experience of the earthquakes that form the basis of this work. These two 'clews' ran in parallel for much of the second year of my study.

Bodily Data ('Data Sweat')

In order to think about how the body generates data, I began gathering data about my own levels of productivity through my engagement and interaction with my computer. My initial approach was to use a piece of off-the-shelf software called *Rescue Time*.²⁸⁶ This commercial software runs as a background process on the user's computer and measures the quantity of time spent on particular tasks. While mainly marketed as a tool to help freelancers measure the amount of time they might be spending using particular pieces of software so they can bill their clients more accurately, it's also promoted as anti-distraction software, to help its users focus on work by revealing how productive (or otherwise) they might have been during a specified time frame. It situates itself as an optimisation tool, and if productivity is seen as a store of our own worth, it optimises the capacity for the accrual of human capital. However, the information *Rescue Time* provided about how much time I spent on particular

²⁸⁶ Downloadable from <<http://www.rescuetime.com>>.

tasks informed me about my interaction with the device only in terms of my software usage and productivity, and ignored the embodied interaction – the clicks, taps, swipes and so on – that are central to the experience of being a computer user.

In order to find out more about these interactions, I used a piece of open source software called *RUI–Recording User Interface*.²⁸⁷ Designed for use by interface designers so that they can record interactions with designed interfaces for the purposes of software testing, the software consists of a script written in the programming language C.

Subject Name: mday				474.419 Moved	416	538
File Created: 4/5/2015 12:30:40 PM				474.435 Moved	418	538
Elapsed Time Action X Y				474.452 Moved	420	538
0	Moved	307	222	474.559 Pressed	Left	
0.714	Moved	306	222	474.655 Released	Left	
0.980	Moved	306	223	474.718 Moved	421	538
0.997	Moved	306	225	474.801 Moved	422	538
1.013	Moved	307	232	474.818 Moved	422	537
1.030	Moved	314	248	474.834 Moved	423	537
1.046	Moved	324	268	475.712 KEY	RETURN	
1.063	Moved	334	287	475.768 KEY	TAB	
1.080	Moved	344	310	476.520 KEY	w	

Figure 11: Sample RUI Dataset, April 2015.

RUI measures mouse or track-pad movement, and records cursor position, as well as key strokes and mouse-button presses, time-stamping all of these and presenting them in a tab-delimited text file for further processing.

Having gathered several sessions of this data, I wanted to try and defamiliarise this data and therefore my interaction with the computer, hoping that this would facilitate more insight into these processes. Taking into account Vierkant’s assertion that ‘everything is everything else’, I began to look at ways of transcoding and visualising this data.²⁸⁸ My first attempts to work with the

²⁸⁷ For more information, see Frank Ritter, *RUI–Recording User Interface*, version 2.1, 2012 <<http://acs.ist.psu.edu/projects/RUI/>>.

²⁸⁸ See pp. 47–50 of this thesis.

data involved producing a system (using Processing) to simply play back the mouse movement from the data in real time as an animation.^{289,290}

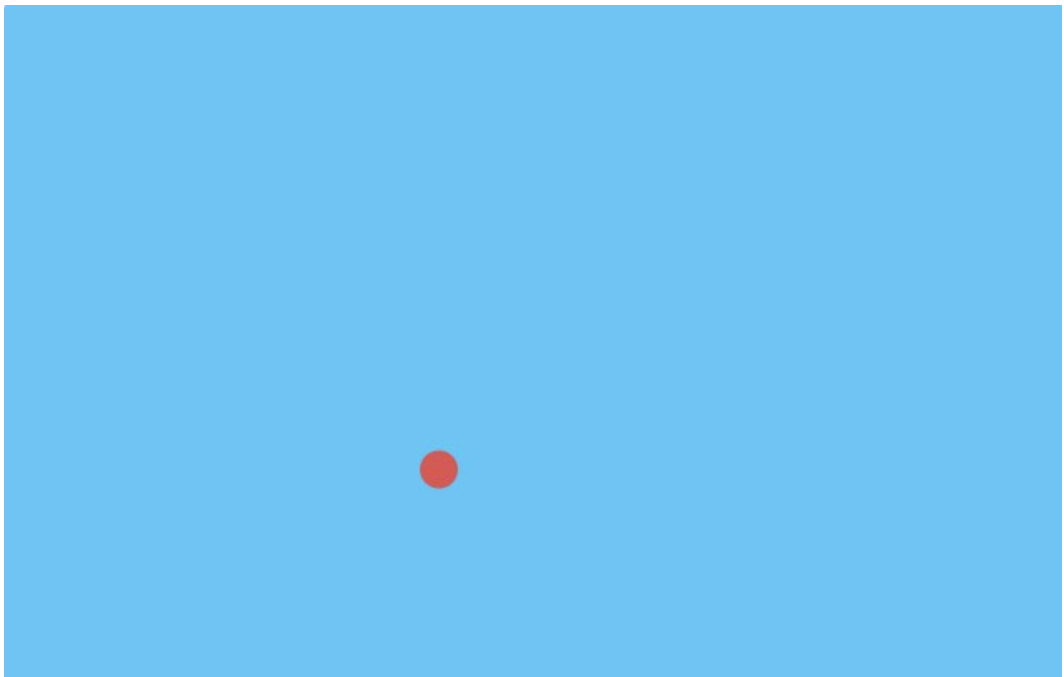


Figure 12: Screenshot of mouse movement animation, 2015.

On seeing the animation, the first thing I noticed and that was surprising was that the movement of the dot looked very organic and human. This shouldn't have been surprising, since I am organic and I generated the movement that created the data, but there is something about the process of abstracting that movement through numerical data that made me expect it to play back less fluidly than it did.

In terms of its status as an animation, and aside from its relationship to data gathering, the piece deploys the viewer's attention in particular ways: there are moments of action, and moments when the viewer might experience

²⁸⁹ Processing is a programming language, development environment and community. For more information, see Processing Foundation, 'Overview \ Processing.Org' <<https://processing.org/overview/>> [accessed 16 March 2018].

²⁹⁰ Documentation of this project is available at <<https://www.michaelday.org.uk/phd/dot/>> and in the supporting material that accompanies this thesis.

suspense or expectation while waiting for the next flurry of activity. In the absence of contextual anchors, it also becomes tempting to anthropomorphise the movement of the dot, perhaps to see it as a sentient creature running around the screen.



Figure 13: Three-dimensional visualisation, 2015.

In order to develop the work further, I made a test piece that moved the visualisation into three dimensions, adding elements that reveal the mouse clicks in the data set.²⁹¹ I produced two LED signs to indicate the status of the left mouse button: the ON sign was programmed to light up when the mouse button is pressed, and the OFF sign to light up when the mouse is not pressed. The typographical design of the signs was drawn from railway signalling, a decision I now read as an unconscious attempt to bring questions of infrastructure to the work. I was interested in how the language plays tricks: when the mouse button is not clicked, the OFF sign is actually on. A version of the mouse movement animation was projected onto the signs. While the piece

²⁹¹ Documentation of this project is available at <<https://www.michaelday.org.uk/phd/on-off/>> and in the supporting material that accompanies this thesis.

does begin to visually address the simultaneity of the layers of interaction that are experienced when using a computer, it also contains inconsistencies that are problematic in terms of my enquiry. There is a potential reading of the work in which online and offline activity could be seen to be different, separate, and diametrically opposed experiences. As discussed above, I now feel that online and offline experiences are far more blended or interleaved than the piece might infer on this reading.

I decided to try and visualise the key-presses from the data in a more physical way. I produced a system that would play them back from the data using an Arduino microcontroller and a solenoid.²⁹² For every key press in the dataset, the solenoid was triggered.

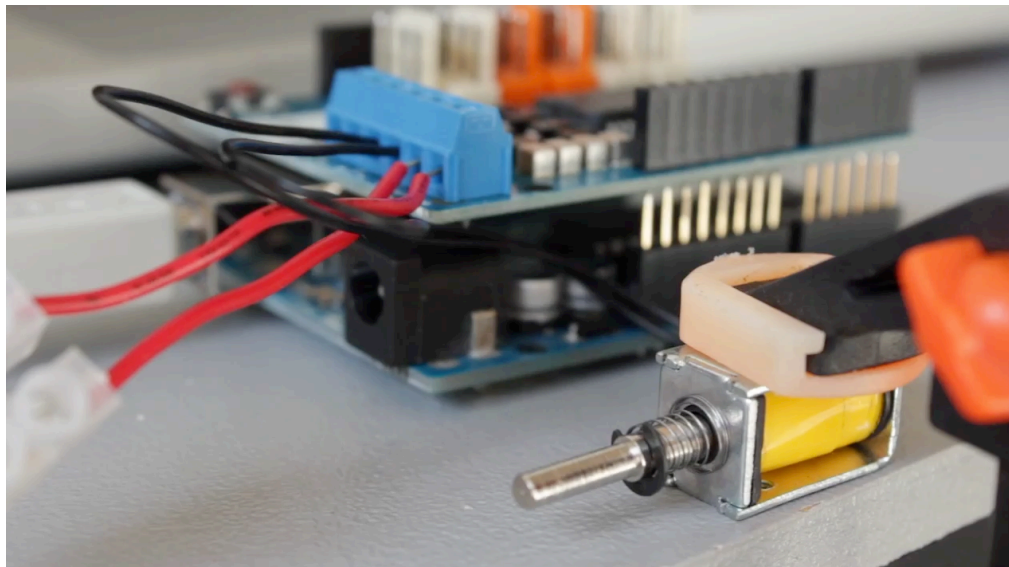


Figure 14: Solenoid system, tentatively titled 'Tap', 2015.

Once this system was up and running, I made the instinctive decision to position the solenoid in my studio against a metal surface, in this case the radiator, so that when activated the motion of the solenoid would sound like the

²⁹² Arduino is an open-source electronics platform based on easy-to-use hardware and software. See <<http://www.arduino.cc/>> for more information.

keys of a traditional typewriter. The tapping action on the radiator also transmitted the sound through the heating system of the studios, sending a hard to locate but very annoying tapping sound around the building.²⁹³

The lack of an overly aestheticised presentation for this piece is also significant. It looks like a mini-computer doing something, as LEDs flicker while the playback of data runs. The ad-hoc physical form of the piece can be seen as an attempt to draw the attention of the viewer to the components of the work as instances of computing infrastructure. The piece would perhaps engender different meanings if the mini-computers were boxed into Perspex casings or were sited in a backstage area outside of the sight of the audience.

It seemed relevant that a dataset generated by productive activity was being deployed as a distraction to somebody else's productive activity in another part of the building. The sense that the piece both gathered its data from the very tip of an infrastructural assemblage yet played it back into a different one seemed like the right sort of approach for the work. The tapping might be read as that of a prisoner seeking to gain attention and release, but sounding more like a typing pool than Morse code. These readings invoke the idea that the unbidden arrival of information into the thematic focus of attention is uncomfortable, distracting, and potentially overwhelming, and locates this discomfort in relation to productive work.

This piece speaks to the passivity of data gathering by digital systems, which takes place as a by-product of other computer-enabled and online activities. In this case, the material being gathered is metadata associated with the act of using a laptop to write an essay. The passivity of the gathering of this metadata – the 'data sweat' as Gregg would have it – is what raises the question of user agency.²⁹⁴ A user may not be able to actively prevent the leakage of data during their everyday online activities, and this leakage might

²⁹³ Documentation of this project is available at <<https://www.michaelday.org.uk/phd/tap/>> and in the supporting material that accompanies this thesis.

²⁹⁴ Melissa Gregg, 'Inside the Data Spectacle', *Television & New Media*, 16.1 (2015), 37–51 (p. 44).

also be not noticed by them. The experience of the piece highlights this sense of accidental spillage of data. Before a viewer encounters the artwork visually, the sound of the tapping interrupts their audio perception, bringing this accidental leakage of data to mind. Once sonified and visualised, the metadata that forms the basis of this piece is revealed to be the by-product of human physical labour, as the patterns of mouse movement or keyboard tapping retain their organic characteristics even when translated into different forms. Even if the data itself (what was typed) is obscured, the metadata (the timings of the key taps) still retains the unmistakable trace of bodily interaction with the keyboard. The quantification of human activity and its translation into movement and sound doesn't quite flatten out the humanness, and this is a reminder that in other contexts, the patterning of the passively-gathered data can remain personalised even after anonymization.

While this experimental piece began to produce some insight into infrastructure and attentional regimes associated with productive work, it was also compromised by its dependence on the use of the keyboard and mouse (or trackpad) as primary vectors for the gathering of data. Despite being useful as a starting point, I wanted instead to explore these interactions using mobile devices. It quickly became evident that mobile operating systems are far less accessible to the type of logging that *RUI* permitted, and this technical roadblock put this line of enquiry onto an indefinite hiatus. The findings from this experiment were disseminated at the postgraduate conference on method at SHU in spring 2015.

Gesture and Material Interaction

While trying to work around the problems with mobile device data-logging, I also started to investigate the point of contact between the user and the endpoints of communications infrastructure, and how the materiality of this interaction is often below the threshold of attention. At first, this involved visual

investigations of the physical characteristics of the mobile phone touchscreen surface, using close-up photography.²⁹⁵

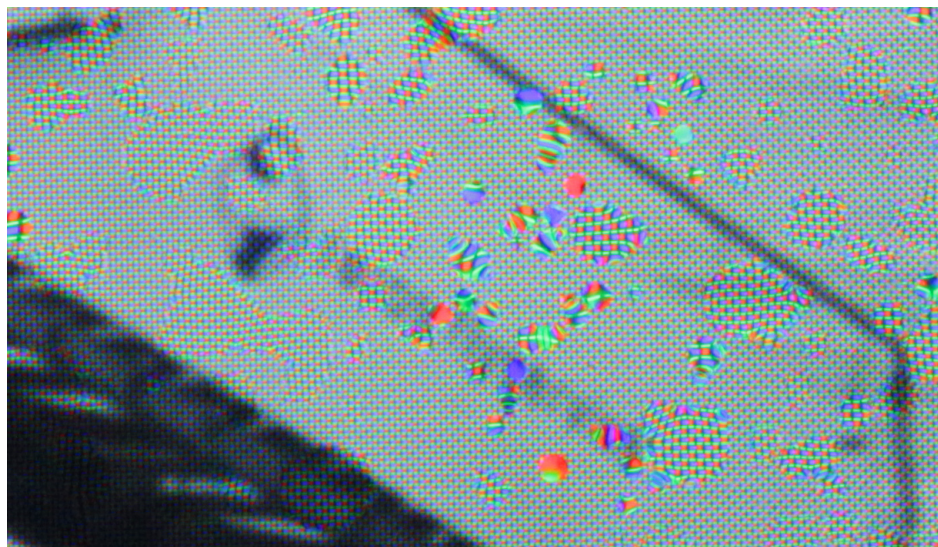


Figure 15: Macro photograph of smartphone screen, 2015.

The intention of these works was to focus on the granular composition of the smooth surface of the screen as a way of invoking the complexity of the data transmission infrastructure that it masks. Using water droplets to magnify the pixels was a first step to making the surface visible in a way that reveals it to be a representation rather than the stage for interaction with virtual objects. These images remained inconclusive and didn't distinguish mobile screens clearly enough from other types of flat screen, so I quickly moved on from this approach.

I began to gather footage of mobile phones being used, staged in my studio, with a view to exploring the physical aspects of these interactions. Observing the repetitive hand movements involved in everyday device usage led me to reflect on the gestures being used and their consequence. At about this time, I read Ilana Gershon's speculative paper that asks how mediated selves might be understood not as performances, but as animations.²⁹⁶ She

²⁹⁵ This project can be viewed at <<https://www.michaelday.org.uk/phd/screen-droplets/>> and in the supporting material that accompanies this thesis.

²⁹⁶ Ilana Gershon, 'What Do We Talk About When We Talk About Animation', *Social Media + Society*, 1.1 (2015), 2056305115578143.

asks what work an audience has to do to co-create an animated character, and applies this thinking to the fragmentary selves constructed collectively through social media profiles. With this at the back of my mind, but also with a desire to maintain the utilitarian visual style from *Epicentres*, I produced some tentative rotoscoped animations of hands using smartphones. I found the pinch-to-zoom gesture particularly compelling, as it forges a relationship between the user and the image that can't be replicated with a physical material. Zooming is not something that the eye can do without help, and the factor of zoom caused by the gesture would induce vertigo if not bounded by the tiny edges of the smartphone screen.

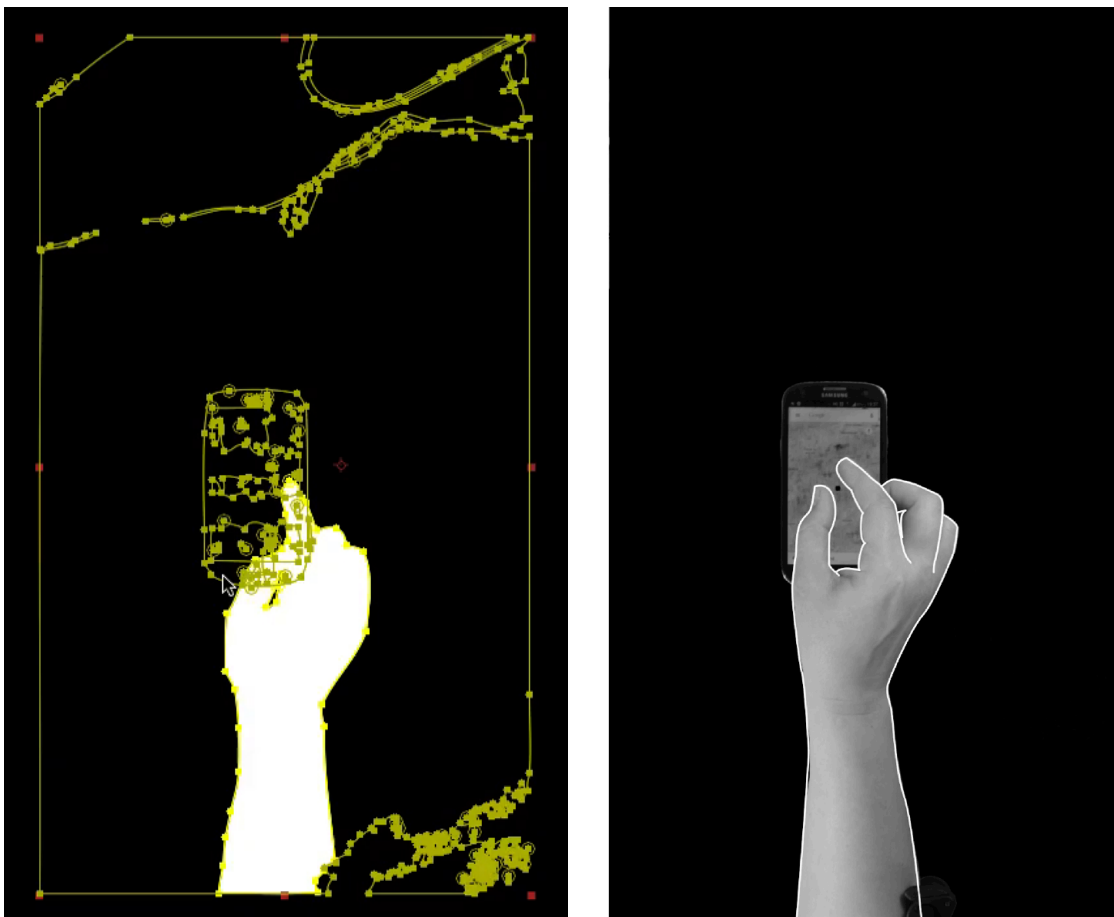


Figure 16: Invisible Layers, screen shots of work in progress, 2015.

While these experiments were taking place, I was commissioned to produce a work for a group exhibition that was funded by the Tinsley Art Project. The exhibition was broadly concerned with a particular site close to a motorway and tram interchange to the north of Sheffield that was due to be redeveloped, including a public art programme, and the particular angle I was encouraged to take with my work was to bring infrastructural questions to bear on the project. Having already begun to explore the mobile device interface as a way of thinking about personal interaction with data infrastructure, I returned to mapping as a way of considering the bigger infrastructural picture.

In the first instance, I searched through databases of LiDAR and Landsat images that were freely available from the USGS. This involved learning how to use their *Earth Explorer* interface and then spending a significant amount of time converting topographical images into vector images that could be enlarged in video editing software without visually deteriorating.²⁹⁷ The files I was working with were extremely high resolution and routinely resulted in vector files that were 1.5GB and upwards in size. This made the process of rendering the footage unwieldy, but also had the positive side effect of allowing a glimpse of the detail of this data. Vector image files, such as EPS or PDF, consist of mathematical formulas that determine the direction and inflection points of lines, and to imagine a 1.5GB text document consisting solely of mathematical formulas gave a different texture to the experience of handling the data.

The initial intention was to use a satellite map of the site in Tinsley as the centre of the pinch-to-zoom gesture, but the topographical data that was available for the area was visually unspectacular and didn't have the level of visual complexity I was seeking. While browsing the *Earth Explorer* interface, I decided to look at Silicon Valley in California, and discovered that the terrain there was more visually interesting. I then decided to audition, and eventually use, terrain data from the locations of the head offices of major mobile device manufacturers. This offered a more coherent connection with the infrastructural

²⁹⁷ 'EarthExplorer' <<https://earthexplorer.usgs.gov/>> [accessed 7 January 2018].

network that the animated hand was at an endpoint of, and also invoked a more direct infrastructural reading that angled towards economic, political or social understandings of infrastructure, while retaining a sense of the scale and complexity of landscape inherited from previous work.

In discussions with the curator, it was felt that the piece didn't sit well with the other works in the exhibition, which focused more overtly on the transport intersections that were associated with the site around which the exhibition was themed, and I was encouraged to address this. In response, I began to seek out route maps and road maps as a potential alternative to the topographical contour data I had already rendered into a finished work.

I quickly realised that *Open Street Map* data would be visually complementary to the topographical data already rendered into the work. Road and rail offered a different level of complexity than the topography and allowed the work to remain visually dense at even the highest levels of zoom. The initial intention was to exhibit the work as an installation, with the animated hand shown on a small monitor and an overlaid projected image of the maps moving in sync with the zoom and swipe gestures. The exhibition venue could not be made dark enough for this approach to be viable, so the piece was instead shown on a single large flat-screen monitor.²⁹⁸

²⁹⁸ Documentation of the development of this project and its exhibition can be viewed at <<https://www.michaelday.org.uk/phd/invisible-layers/>> and in the supporting material that accompanies this thesis.



Figure 17: Invisible Layers, installation view at The Scottish Queen, Sheffield, August 2015.



Figure 18: Invisible Layers, detail, August 2015.

Combining USGS topographic data with infrastructural mapping from the crowd-sourced *Open Street Map* database placed the results of two very

different modes of data-gathering in close visual proximity. The topographical elevation map was generated using a complex and inscrutable infrastructure through which reflected infra-red light is captured by a sensor on an orbiting satellite before being algorithmically processed into a series of digital images.²⁹⁹ The *Open Street Map* database, by contrast, is gathered and produced by a community of amateur geographers who crowd-source and co-edit each of its layers.³⁰⁰ Both modes of data gathering have infrastructural concerns but in the final work, this distinction is not as clearly articulated as I might have hoped. In addition, the consequences of this overlaying of qualitatively different datasets seems hard for the viewer to access.

Rather than this being a shortcoming of the work, the other elements of the piece are instead organised in order to draw attention to the inaccessibility of this overly complex assemblage of data. The piece represents the user of the smartphone in the same schematic line drawing as the maps, and the pinch-to-zoom and swipe actions are repeated to infer a lack of sustained attention to the imagery, or a lack of satisfaction with it. The animated hands constantly flick through the maps, never quite settling on an image. The hands are shown close to life-size on the screen, and are depicted as if seen over the shoulder of their owner, but at a shallow enough angle that they might allow the viewer to read the hands as mediated versions of their own. Additionally, the absence of an identifiable protagonist makes it possible for the viewer to 'project an affective connection' to the protagonist, or occupy that role themselves.³⁰¹ In the relentless dismissal of these complex map images, the 'swipe' gesture is depicted as a restless, repeated action that inevitably leads to dissatisfaction.

As the piece is not interactive, the viewer has no control over the pace of the swipes and zooms, they can only look on as the images repetitively shift. This might invite feelings of powerlessness or helplessness with regard to a

²⁹⁹ NASA LP DAAC, 'ASTER DEM Product' (NASA LP DAAC, 2001).

³⁰⁰ 'About OpenStreetMap - OpenStreetMap Wiki'
<https://wiki.openstreetmap.org/wiki/About_OpenStreetMap> [accessed 25 June 2018].

³⁰¹ Gershon, p. 2.

viewer's own interactions with mobile devices, bringing their capacity for agency to mind and into consideration. Conversely, the repetitiveness of the imagery and the passivity of its reception by the viewer might invoke a more hypnotic invocation of the 'machine zone' as identified by Dow Schüll.

Despite the compromises involved in the production of this piece, the insight that it generated led to a re-focusing of my enquiry onto the affective dimensions of compulsive device usage. I began to consider ways that the viewer of an artwork might be invited to consider their own behaviours with regard to device usage, and directed my reading more toward compulsion, behavioural addiction, and so-called 'digital detox' as a potential cure for 'internet addiction'.

Compulsion

As this thesis has already established, the question of whether 'internet addiction' is an adequate term for a range of internet or gaming-related compulsive behaviours remains under discussion. Regardless of this, as Sutcliffe and Sutton argue, the prevalence of the term and the proliferation and gradual acceptance of the idea of 'digital detox' reflects something in the cultural zeitgeist that does see compulsive usage of the internet, mobile devices, or computer games, as problematic, and sees withdrawal from these as a possible palliative.³⁰² The urge to pathologise compulsion allows a position to be taken on personal agency that foregrounds the user as solely responsible rather than as a co-producer of their experience of compulsion. While reserving judgement about my own position on the plausibility of 'digital detox' and its positive benefits, I continued to research the phenomena of compulsive device usage, internet addiction and 'digital detoxing' to inform the next steps in the work.

I began by making literature searches for existing theoretical work on internet addiction, and the literature, particularly in the 'cyber-psychology' field, is extensive. Having already decided at an early stage to limit the influence of

³⁰² Sutcliffe and Sutton.

psychology on my study, I wanted to continue to suspend my judgement about the existence of the phenomenon of 'internet addiction' or its definition. I decided that contributing to psychological understandings of the phenomenon was likely to be out of scope for my project, and this decision liberated me to read the literature as a resource that could inform practice rather than assessing its veracity as psychological research. This body of literature seemed intensively focused on the production of ways of measuring compulsive usage, measures which I deemed to be in the service of the inclusion of 'internet addiction' in the DSM-5 manual of diagnosable mental health conditions.³⁰³ The imperative to quantify phenomena that might be experienced qualitatively forms a broad contextual backdrop to my study, and I viewed these particular attempts to find a plausible way of quantifying compulsion as a means of preparing the ground for the control of access to treatment. Quantified measures of the level of device addiction in a user allow decisions to be made about whether a user is addicted *enough* to warrant intervention, or to become eligible for a fully DSM-compliant diagnosis. My disagreement with this was that the threshold for pathological diagnosis implied by quantitative measures disregarded the lower-level compulsions that seemed more widespread though less obviously disruptive to the lives of those affected by them.³⁰⁴ While addiction is a serious and life-altering diagnosis, the term has also fallen into casual usage that allows widespread self-diagnosis of compulsive behaviour of a much lesser order. Without wishing to disregard the suffering of those experiencing severe addictive symptoms, my interest was less directed toward those gamers whose disengagement from social life was studied by Turkle in the 1980s for example, and much more directed toward the way that lower-level compulsive behaviours

³⁰³ American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)*, 5th ed., (Washington: American Psychiatric Publishing, 2013).

³⁰⁴ Jenny Davis argues that the push toward the inclusion of 'internet addiction' in the DSM is based on problematic assumptions about the similarity between biological and behavioural dependence. She outlines her objections to its inclusion in 'The Problem with Internet Addiction - Cyborgology', 2012
<<https://thesocietypages.org/cyborgology/2012/03/20/the-problem-with-internet-addiction/>> [accessed 10 February 2016].

permit the infiltration of digital technology into everyday experience on a much wider basis and in subtler ways.³⁰⁵

Therefore, seeking a less quantitative set of measures, and alert to the role that the capacity for attentiveness plays in considerations of personal value, I began seeking out self-help and lifestyle blogs which listed symptoms characteristic of the need for 'digital detox'. Taking the blogs as instances of discourse, I focused on the types of language that were being used and the possible articulations of power or models of personal agency that were enacted through them. Broadly speaking, the sense of self-admonishment at the heart of the self-diagnosis of 'internet addiction' was extremely strong. Compulsive usage of the internet was positioned by these texts as being responsible for all manner of physical, emotional and social ills, to a ridiculous extent: from bruised thumbs to anxiety, from sleeplessness to inattentiveness. What surprised me was the proximity between the use of language in the lifestyle blogs and in the psychological measures: concerns about lack of sleep, for example, are common to many of the blogs and some of the diagnostic measures.^{306,307}

I first made an experimental web piece that delivered appropriated texts from these blogs as pop-up notifications in a browser window. The backdrop to the pop-ups was a colour-tinted view of a seascape, an image selected from an archive of work produced on an earlier residency, with the intention of invoking a sense of reflective or restorative solitude to be punctured by a hectoring notification.³⁰⁸

I had also been experimenting with sound as part of my artistic practice, in a way that was initially prompted by earlier research into mouse clicks and interaction gestures. While developing the solenoid piece described above, I

³⁰⁵ Sherry Turkle, *The Second Self: Computers and the Human Spirit* (New York: Simon & Schuster, 1984).

³⁰⁶ G.-J. Meerkerk and others, 'The Compulsive Internet Use Scale (CIUS): Some Psychometric Properties', *CyberPsychology & Behavior*, 12.1 (2009), 1–6.

³⁰⁷ A list of links to the self-help sites referenced is attached as an appendix.

³⁰⁸ This experiment is viewable at <<https://www.michaelday.org.uk/phd/text-popup/>> and in the supporting material that accompanies this thesis.

had become aware of the phenomenon of ‘autonomous sensory meridian response’, or ASMR, which is described as a pleasurable tingling sensation brought about by acoustic triggers such as whispering, or certain types of ambient noise, including fingers tapping and in some cases, mouse clicks.³⁰⁹ This led to a consideration of the role of ambient sound as one type of field from which interruptions might distract, analogous to the default mode of brain activity outlined by Levitin.³¹⁰ When a notification arrives on a mobile device, it’s often accompanied by an alert sound or vibration, which interrupts the ambient soundscape with a type of sound that is often shrill or piercing, yet still friendly in tone. This relationship between ambient sound and jarring notification alert was deployed in the work by using copyright-free alert sounds over a self-produced drone-like ambient background sound.³¹¹

³⁰⁹ ASMR Fun Factory, *ASMR Computer Mouse Using PC Mouse Relaxation Clicks* <https://www.youtube.com/watch?v=idIE_ITRID0> [accessed 7 January 2018].

³¹⁰ Levitin.

³¹¹ This experiment can be viewed at <<https://www.michaelday.org.uk/phd/artefacts/>> and in the supporting material that accompanies this thesis.

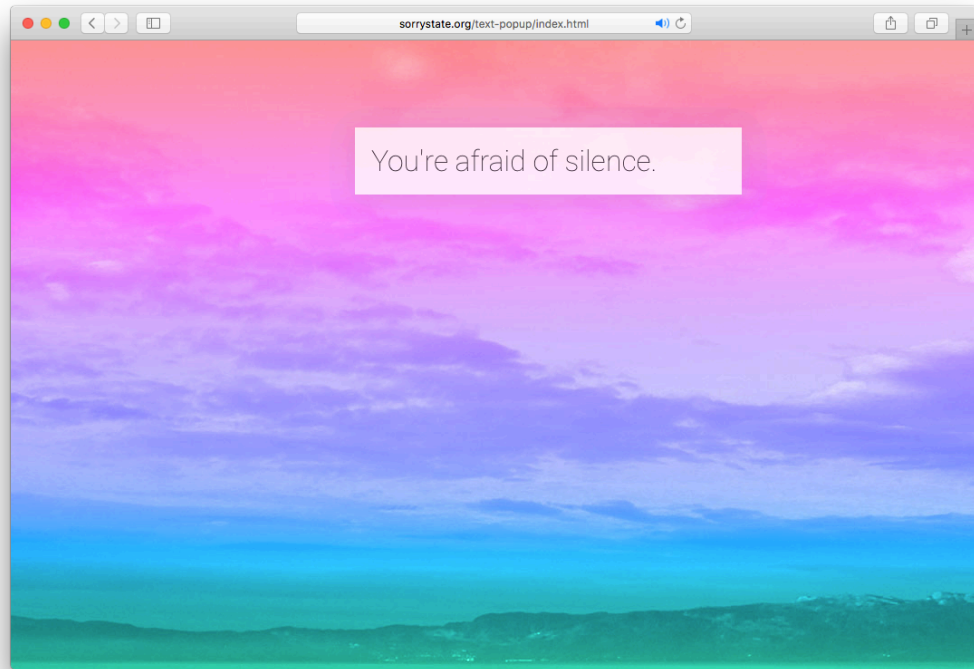


Figure 19: 'text-popup' experiment, screen grab, January 2016.

I had continued looking at mapping software after the work done for *Invisible Layers*, and had begun to try and find a solution to the highly resource-intensive way that it had been produced. Moving the map data to Adobe After Effects for rendering to video, with intermediate stages using Geographical Information System (GIS) software, had made the process of producing a short video very time consuming. I reasoned that if GIS software can show complex map data in real time, there should be ways in which this data could be interacted with live or programmatically, rather than rendering output to a video file. I initially hoped to recreate *Invisible Layers* using different technology in order to make it easier to exhibit, but subsequently tried merging the new mapping approach with the pop-up texts to develop a new piece.

Part of the method from *Invisible Layers* was redeployed, with map coordinates centring on hubs of tech industry activity, but instead of the hyperactive swipe and zoom, a very slow zooming out motion was programmatically applied to the map data. The piece uses Open Street Map

views of digital industrial hotspots – the ‘Googleplex’, Facebook’s headquarters, London’s ‘digital roundabout’ – but in this instance shows them as blocky, retro computer-game-like approximations. While clearly referencing the visual language of gaming, the work offers less of a sense of control than is common in game interaction, instead invoking a feeling of powerless drift. The camera slowly zooms out of the scene, offering a gradually widening view of the location, before switching to the next scene at a much closer zoom and repeating the process. This gives a semi-static background over which the pop-up texts about device usage appear, but offers more visual interest than the seascape on the test piece had done. After trialling the piece with the alert sounds from the test piece, they seemed incompatible with the imagery and the decision was made to leave the piece silent.³¹²

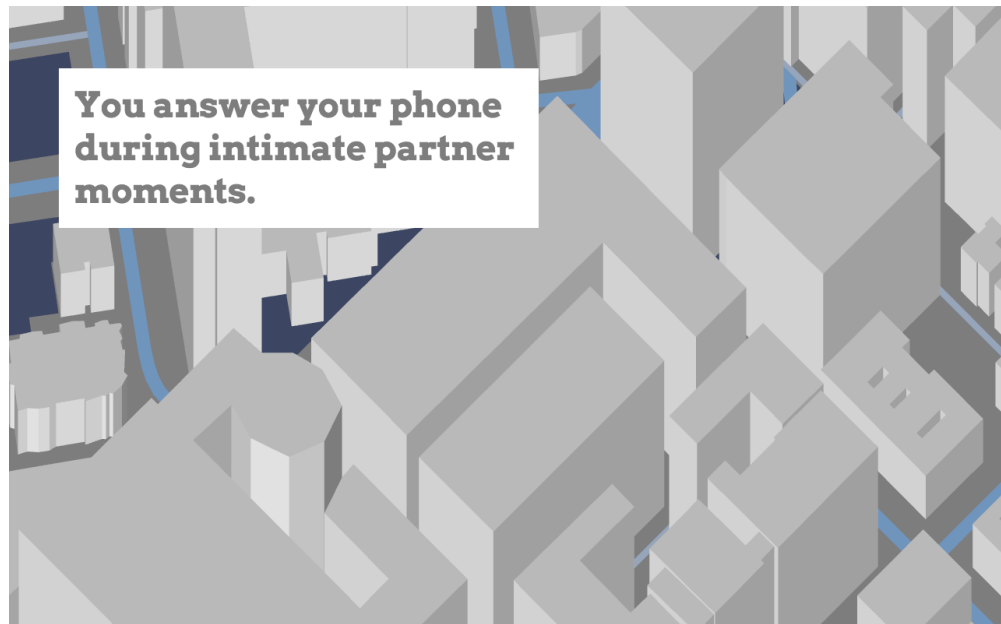


Figure 20: Screen Time, screen shot, January 2016.

The piece modulates the attention of the viewer in distinct ways. The irregular schedule of the text’s appearance keeps the viewer in suspense, waiting for the next one, while the language of the texts is at times hectoring, at times admonishing, and at other times simply accusatory. ‘You check your

³¹² Documentation of the piece can be viewed at <<https://www.michaelday.org.uk/phd/screen-time/>> and in the supporting material that accompanies this thesis.

phone during intimate partner moments' for example is a damning criticism of the viewer's compulsive internet usage, whether it is received as a statement of fact or as a warning compared with their own experience. Assessing the personal relevance of the texts requires introspection on the part of the viewer and is assisted by the slow drift of the background imagery, which gradually zooms out offering a wider angle and a more elevated vantage point for the virtual camera. This suggests a sense of increasing clarity perhaps on the part of the viewer, yet the imagery periodically refreshes to a close-up zoomed state before the process repeats. To situate the readership of this work in relation to the debate opened by Osborne and Benjamin, the work invites a specific type of contemplation that modulates the terms of the traditional aesthetic encounter: instead of the artwork as the subject of contemplation, this work situates the viewer as the subject of contemplation.³¹³

If the solenoid piece foregrounds practices of data gathering that bypass user agency, *Screen Time* instead invites its viewers to reflect upon their agency in relation to digital device usage. The work nags at the viewer in order to bring to mind other types of nagging system, and this hectoring tone mobilises the viewer's affect, perhaps generating a sense of uncomfortable recognition of the viewer's own activities. This mobilisation of negative affect has an equivalent in the governmentality that foregrounds maximum productivity as its unquestioned goal. The piece primarily asks the viewer to consider their own distractibility in terms of their human capital. As they potentially identify with the negative characteristics that demand they take a 'digital detox', they align themselves with a narrative of productivity as personal value, and of self-improvement as an appreciation in human capital. Here, agency is revealed to be located within a system of productivity and distraction, within which a rational subject seeks to self-improve and develop. Alongside this, the notion of addiction is raised through some of the texts, and this foregrounds the

³¹³ See pp. 8–11 of this thesis for a discussion of Osborne and Benjamin's approach.

unresolved tensions between productivity and self-value in the relationship between distractibility, compulsion, and work.

This work was presented at the *Research Inside Practice* symposium at Birkbeck College, London, to a group of practice-based researchers from Birkbeck, Middlesex University, and from my own institution. The discussion around the work at this symposium helped develop my thinking around the piece.

An important insight that came from the discussion was to do with the ontology of the work. The texts in the piece adopt a mode of address that directly confronts the viewer with accusatory prompts to question their own behaviour, drawing out the viewer's subjectivity, and inviting them to be self-reflective. Yet, the piece is also entirely indifferent to the presence of a viewer, or even if an audience is there to view the work at all. The question of ontology becomes more awkward when the piece's use of appropriated text is considered. At the symposium, viewers of the work were able to discern that the differing tones of voice in the texts suggested that the texts were drawn from more than one source. This helped assuage my concern that viewers might assume that the texts were written by the artist, or that the piece was a work of expression rather than one of appropriation perhaps more akin to media critique. As it was, viewers were able to get the sense that the texts had a number of different authors. The status of the work as a web site, rather than a singular video file, adds to the unanchored feeling this work produces.³¹⁴ It lives on a server rather than as an object in the gallery, and is only present through a flat-screen that forms the endpoint of its distributed infrastructural form. It's as if the work corrals parsimonious voices from the internet and funnels them toward the viewer, while itself remaining unaccountable for their content, either in terms of 'pin-downable' physical co-presence with the viewer, or by the degree of expressive authorship shown by the artist. Through this uncertain material

³¹⁴ The work relies on an open source mapping service that was closed in early 2018. While it should be noted that the intended form of the work is as a website, it is presented as a screen-captured video until an alternative mapping service can be found.

ontology, I see the piece as having an unexpected symmetry with the ontology of social media services, such as Facebook, that host user content yet remain legally unaccountable for publishing that content or for the consequences of its publication.

Algorithmic Processing

Immediately following the production of this work, I began to redirect my research focus toward the physical actions involved in compulsive device usage, and at around this time I participated in a series of workshops organised by the artist Katriona Beales that formed part of her own research into 'internet addiction'. The ground explored through the workshops eventually resulted in an exhibition of new work by Beales and publication covering a range of approaches to the topic.³¹⁵ An area of discussion that these workshops allowed me to focus on was the way that apps can be designed to increase user engagement through strategies such as 'gamification', and how these strategies might begin to invoke compulsive usage.

Alongside this, in July 2016, the augmented reality (AR) game *Pokémon Go* was released. This mobile locative game allows players to hunt 3D rendered monsters that have been virtually positioned at locations in physical space, and to perform the act of capturing them using an interface that blends video of physical space with overlaid 3D graphics. *Pokémon Go* was a breakthrough app for AR that received a large amount of press coverage and critical attention at the time of its release. My interest in the game was the way that it explored the permeable boundary between online and offline experience through a gamified interface, and seemed to be a nexus of attentional focus and filtering, data gathering, and addictive design strategy. It also had a spatialised aspect that linked back to the use of maps in my earlier work, but that also invoked the body in a stronger way. I identified AR software and interfaces as holding potential for the development of new work.

³¹⁵ *Are We All Addicts Now?: Digital Dependence*, ed. by Vanessa Bartlett and Henrietta Bowden-Jones (Liverpool: Liverpool University Press, 2017).

After looking into what might be possible with open source AR libraries, I began to work with a particular library called *js-aruco*.³¹⁶ To create the illusion of a 3D model existing in the same representational space as the user's surroundings, live video of a scene needs first to be analysed to make sense of its spatial characteristics. In some systems, the video will be checked for an AR marker – typically a monochrome square similar in appearance to a QR code – so that 3D positioning can be calculated from the orientation of this marker. While newer proprietary systems such as Apple's *ARKit* are able to infer 3D orientation from 2D video more fluidly, at the point in time when I was exploring this area, it was necessary to use a marker-based system for orientation.³¹⁷ I became interested in the visual qualities of the debugging screen of the *js-aruco* library. This software analyses a frame of live video and calculates two alternative best guesses for the orientation of the marker that is sensed, which are represented as two planes in 3D space. For each plane, the software gives a numerical estimate of the amount of error in its calculation. Since this process is repeated on every frame of video, the orientation of the planes sometimes changes from frame to frame, resulting in a flickering, restless image that reflects the uncertainty of the software's algorithms. This restless image is evidence of the software's indecision about the position of the marker.

³¹⁶ Juan Mellado, *Js-Aruco - JavaScript Library for Augmented Reality Applications*, 2015 <<https://github.com/jcmellado/js-aruco>> [accessed 25 June 2018].

³¹⁷ 'ARKit - Apple Developer' <<https://developer.apple.com/arkit/>> [accessed 6 January 2018].

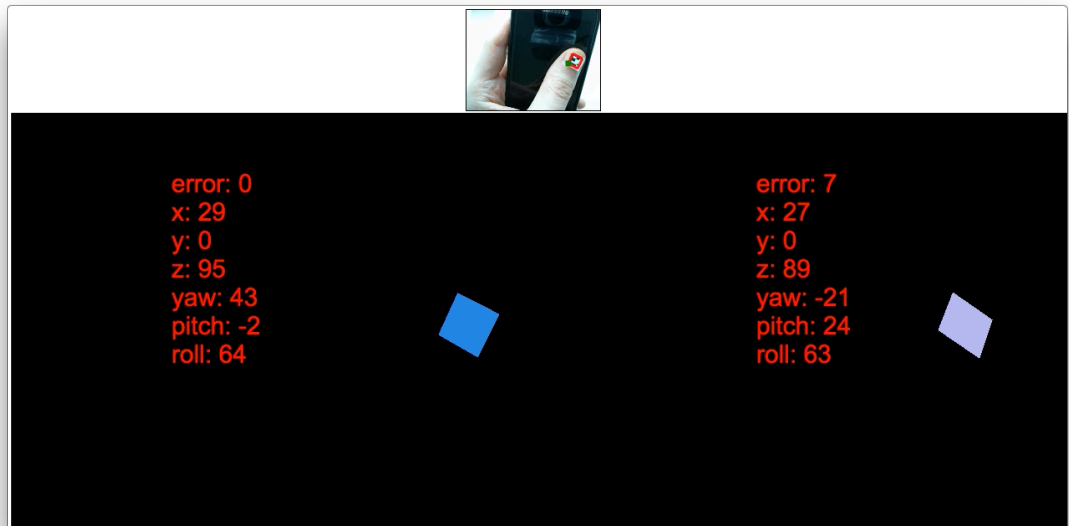


Figure 21: Mock Objects, screen grab of work in progress, 2016. The two 'planes' can be seen in blue and lilac, along with data about their orientation and estimated levels of error. The source video is shown at the top of the frame.

There are two mechanisms by which the software can be used to create the illusion of an augmented reality: either the camera can be moved around to simulate the eye of the viewer, or the marker can be moved within the viewport of a static camera. I began testing the software by moving markers rather than moving the camera, and eventually alighted on a process whereby a marker was attached to my thumb and then sensed while I carried out the sort of repeated swipe gestures common to mobile device usage. On reflection, this seems like a counterintuitive approach, as the embodiment that AR speaks to is that of a mobile eye, rather than a mobile thumb. While it did provide some continuity with previous work, it also seems in retrospect that a different approach might have yielded a very different type of output from the software. In the time-pressured run-up to the group show *Testing, Testing* at SIA Gallery in

Sheffield, this approach was developed into a live animation entitled *Mock Objects*.³¹⁸



Figure 22: Mock Objects, installation view at SIA Gallery, Sheffield, August 2016.

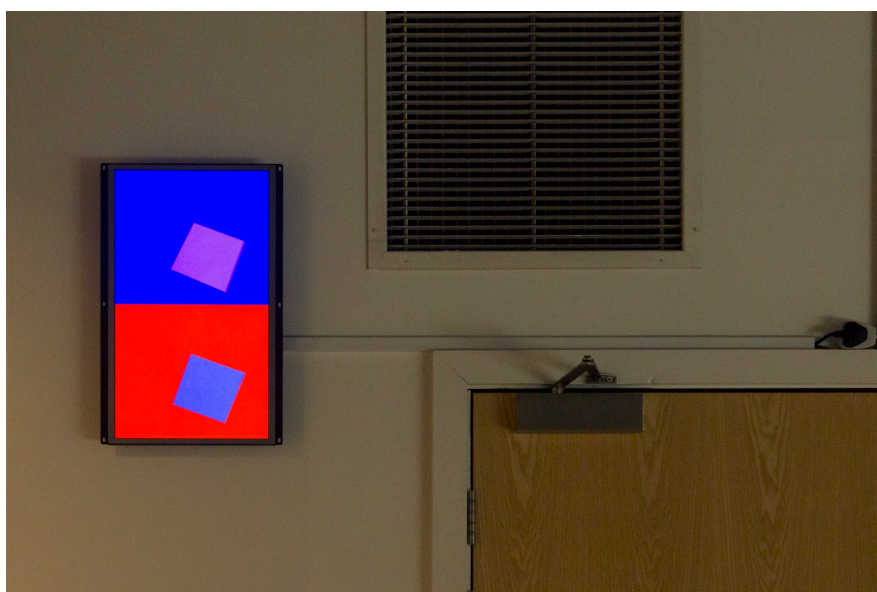


Figure 23: Mock Objects, detail, August 2016.

Despite the source video that controls the motion of the planes remaining hidden, viewers may still be able to infer that the movement is generated from

³¹⁸ Documentation of the piece and an account of its production process can be viewed at <https://www.michaelday.org.uk/phd/mock-objects/> and in the supporting material that accompanies this thesis.

human activity, since even after processing, there is still an identifiably organic character to the motion that suggests this. The piece then proposes that human activity is being subjected to algorithmic processing but it's not entirely clear what that process is, what its purpose might be.

The piece was shown on an unframed monitor and installed high on the wall of the upper storey of SIA Gallery. The wall chosen is perhaps the least compelling wall in the gallery for the exhibition of artwork, since as well as being physically behind the viewer as they enter the gallery, it is also the site of a large air vent, several metres of cable trunking, the security alarm's passive infra-red sensor and control console, and the entrance door to the space. This visual clutter is supposed to be ignored by the viewer as they go about the business of attending to artwork in the gallery.

Positioning *Mock Objects* on this wall was an instinctive decision in response to curatorial constraints, but doing so placed the work at a nexus of the play of attention involved in the aesthetic experiences afforded by gallery exhibition. Most of the visual clutter on the wall can be considered to be infrastructural: it supplies lighting, air or electricity, supports the security of the artworks, or provides physical access to the space. John Durham Peters suggests that since the prefix *infra-* means below, the presence of infrastructure should prompt the question of what it is intended to be *infra-* to.³¹⁹ In this case, by its retreat into the background, the 'invisible' infrastructure foregrounds the white-walled institutional gallery space, with its established structures of engagement, expectations of behaviour and attentional norms. The siting of the piece in the margins allows the work to oscillate between its status as a focus for the viewer's attention and as potentially ignorable infrastructure.

The piece's onscreen image further complicates matters. The flickering planes invite the viewer to make a comparison between their two possible orientations. The viewer here is installed as an empowered overseer, and is given the opportunity to apply conscious scrutiny to the output of a visual

³¹⁹ John Durham Peters, *The Marvelous Clouds: Toward a Philosophy of Elemental Media* (United States: University of Chicago Press, 2015), p. 36.

processing algorithm. This stands in contrast to the power relations enacted by user interfaces that invite compulsive usage, in which design tricks are used to invoke unthinking, habitual interactions that hijack the user's agency. The colour and orientation of the planes is unmodified from their appearance in the debugging view of the original software, but the background has been changed from a static colour to a slowly shifting cycle of colour. This allows attention and distraction to alternate between the visual elements within the work. If the viewer is focusing on the movement of the planes, they might not notice the background changing until after the change has taken place.

The piece was produced with questions about compulsive usage in mind, but through its exhibition, prompted additional questions about the veracity of computational representations of reality as enacted by software in a broader sense. In this piece, the algorithm's uncertainty is presented as a binary choice — this plane or that plane — but computerised modelling of reality is often much more sophisticated than this, and the consequences more significant. For example, when using social media, multiple data points are passively generated and gathered to produce profiles of the user which are then used to push precisely targeted, attention-capturing advertising. Facebook identifies almost a hundred separate data points to categorise users based on the data they generate through their use of the service.³²⁰ Algorithms model the viewer, and shape the view of reality that they are then presented with.

In common with *Invisible Layers*, my own interpretations of the work and the questions these interpretations raise might not be straightforward for viewers to access. A consequence of 'exhibition-as-method' is that it offers the producer of the work the dual perspective of both viewer and author, affording a different perspective through which to analyse the work. With prior knowledge that the piece is made of modified software, and knowing the extent of the

³²⁰ Caitlin Dewey, '98 Personal Data Points That Facebook Uses to Target Ads to You', *The Washington Post*, 19 August 2016 <https://www.washingtonpost.com/news/the-intersect/wp/2016/08/19/98-personal-data-points-that-facebook-uses-to-target-ads-to-you/?hpid=hp_hp-more-top-stories-2_intersect-701am%3Ahomepage%2Fstory> [accessed 21 August 2016].

modification and its functioning, questions about algorithmic interpretations of reality present themselves more readily to viewers. Conversely, by reading the image solely on its appearance, a viewer might come up with a very different set of interpretations and questions.³²¹ Exhibiting the work in a gallery context has revealed that the meaning and the research content of this particular work are best uncovered not by asking what it looks like, but by asking what the processes are that the work is carrying out. The work makes use of and reference to the possibility that algorithmic image processing is taking place, and only the results of this analysis are visible to the viewer. The processes themselves might not be apprehensible to the viewer, or might be impossible to be made accessible through what might be described as an aesthetic encounter.

This raises a further question, one that was hinted at above: if the white-walled institutional gallery is a highly structured context in which visual appearance is normally the first point of encounter with an artwork, is staging work in a gallery the best way of exploring computational questions about the background processing of data? Might there be other ways of understanding the work, more viable contexts for its presentation, or an argument for strategic non-presentation?

A parallel but relevant set of ideas can be found in Louise Amoore's work on the geopolitical consequences of cloud computing.³²² Writing about Trevor Paglen's work, which consists of photographs of National Security Agency data centres taken with astronomical telescopes from great distances, Amoore locates such artistic approaches 'within and alongside the paradigm of observation'.³²³ She argues that observation alone is an inadequate way of understanding the computational cloud, partly because so much algorithmic processing takes place at speeds that are beyond the human capacity to

³²¹ One symposium attendee described the work as 'almost Greenbergian', noting its visual similarity to twentieth century abstract painting.

³²² Louise Amoore, 'Cloud Geographies Computing, Data, Sovereignty', *Progress in Human Geography*, 2016, 1–21.

³²³ Amoore, p. 10.

observe. She instead proposes a distinction between mimetic and analytical scientific instruments, and argues that the observable physical characteristics of the cloud, such as its territorial location or the buildings used to house it, are less important than the cloud's capacity to analyse and extract patterns from data.

Following this reasoning helps develop a more nuanced understanding of *Mock Objects*. The piece asks to be attended to as art, invoking the established forms of attention that the gallery context demands, even though these are problematised by the work's positioning amid 'invisible' infrastructure and by the behaviour of the onscreen image. Since the gallery context favours the observable characteristics of an algorithmic system over its analytical capacities, the power dialogues inherent in data modelling remain obscured, *infra-* to the display of work and difficult for the viewer to access. As a research activity, 'exhibition-as-method' (see Figure 6. on p. 93) therefore framed a new set of questions to do with exhibition context and the accessibility of meaning to be explored in future work.

Cloud Services

The completion of *Mock Objects* marked an inflection point in the development of my practical research and in the emphasis of my enquiry. I began to shift my focus, away from exploring how distraction through compulsive usage was brought about in an effort to gather personal data, and towards how the processing of that data in the cloud happens in ways that are likely to be obscured from the producer of that data. The question of agency shifts from an emphasis on the viewer or user's resistance to distraction, and instead considers their capacity for agency over the potential use of data created by their behaviour. Rather than my initial focus, which was on how human attention is captured and manipulated by digital technology, the emphasis shifted to how humans are *attended to* by automatic processes of analysis on their behavioural data that are often carried out in the cloud.

The initial practical steps that I took to explore this area were to investigate the range of cloud computing application processing interfaces (APIs) that were being offered by the major online tech companies. I was particularly interested in systems that could process images in the cloud, and began to look closely at Google's Cloud Vision API.³²⁴ This is a cloud platform that when provided with an image can perform a range of analytical processes, including the detection of texts, geographical landmarks and faces; optical character recognition; detection of dominant colours; logo and trademark detection; and detection of sexually explicit content. The face detection part of the API performs basic sentiment analysis (which detects emotion) as well as returning information about the location of facial landmarks (such as eye, mouth, or nose position), and can even infer the 3D position of these facial landmarks from a 2D image. I was surprised at the detailed level of analysis made possible by this platform, and could only speculate at the aggregation of data that might be carried out behind the scenes and beyond the accessibility of the public API endpoints.

While learning about these APIs and how they might be used, I developed a proposal for the Site Gallery *Platform* residency scheme, through which I hoped to reimagine the gallery's website through the image processing systems provided by Google Cloud Vision.³²⁵ My intention was to temporarily replace the documentation and publicity images on Site's public-facing website with processed versions that revealed the nuance and detail of the data that can be extracted from them. My hope was that this would invite viewers to question their own relationship to images of themselves that they have placed online by presenting algorithmically analysed versions of the gallery's publicity images. Since viewers of the gallery website are reasonably likely to have visited the physical gallery, there is a good chance that they might have been photographed as part of the gallery's event documentation, and I had hoped

³²⁴ 'Vision API - Image Content Analysis', *Google Cloud Platform*
<<https://cloud.google.com/vision/>> [accessed 6 January 2018].

³²⁵ This proposal can be viewed at <<https://www.michaelday.org.uk/phd/site-platform-proposal/>> and in the supporting material that accompanies this thesis.

that their unintended visibility might be highlighted by this intervention. There were other related questions emerging from this that were to do with data stewardship and ethics: should the gallery be anonymising images of their audiences that have been placed online? Or conversely, and somewhat cynically, might sentiment analysis of images of event attendees provide insight into their emotional responses to the artwork, perhaps to an extent that could be instrumentalised as Arts Council evaluation feedback?

While this piece did not get commissioned, the techniques developed were fed into the production of *Power Portraits*, a series of images produced for exhibition at the *TALKEX17* exhibition in Rotherham.³²⁶ For this piece, a series of photographs of board members of major tech companies were passed through Google's Vision API, and the resulting facial landmark datasets were printed as a set of posters. The posters were printed on brightly coloured backgrounds, to attract attention in the same sense that advertising imagery often does. The face landmarks are represented as small circles and the outline boundary of the detected face is shown as a rectangle. Each face is shown at a similar scale and while the faces are represented in an abstracted way, the differences can be worked out by the viewer when the images are shown in a series, allowing visual comparison between them. In this work, the actual faces of the people who make decisions about the governance of companies that develop invasive or compulsive technologies had one of these technologies turned on their own images. I intended this to puncture the sense that board members of tech companies are themselves invisible and inscrutable, appearing only through their mediated image and through the products they are responsible for managing.

³²⁶ The full set of images produced for this piece are archived at <https://www.michaelday.org.uk/phd/power-portraits/> and in the supporting material that accompanies this thesis.

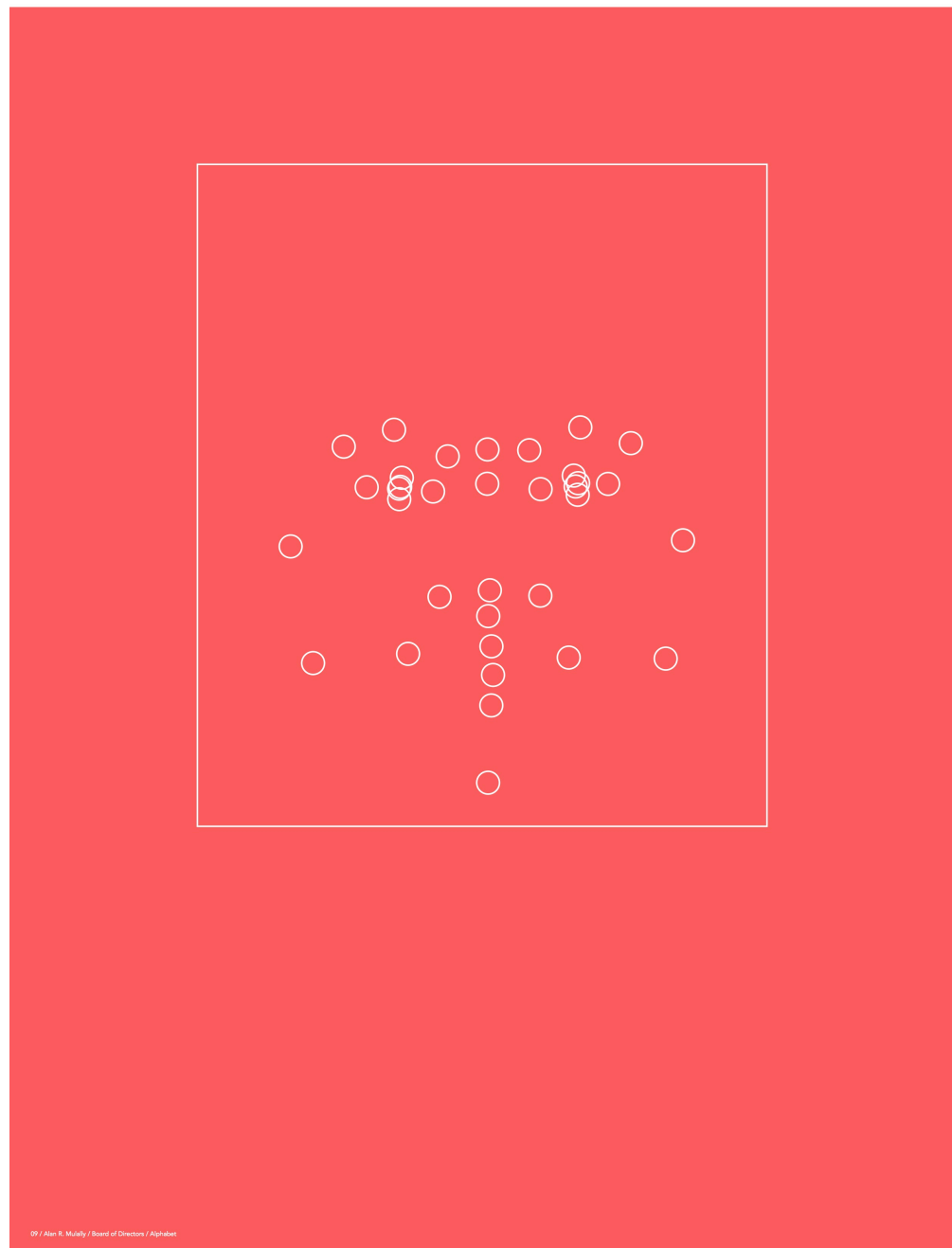


Figure 24: Power Portraits, March 2017.

At the same time as this work was being developed, I was approached by the artist Penny McCarthy to collaborate on a project that would explore her interest in Google's reverse image search algorithm. McCarthy had been using Google's image search website to locate images on the web that the search engine considered to be visually similar to her own drawings, and was

interested in developing this process into a form that could be exhibited. This seemed to chime with my own research and offered an opportunity to learn more about the image processing APIs that I had already been investigating.

I tested a number of commercial and publicly available APIs and each variously had its pros and cons; I eventually decided that Microsoft Cognitive Services offered the most accessible and affordable API.³²⁷ The process of reverse image search initially seemed to have an almost magical quality, whereby an image sent to would get a response that both seemed visually similar and also uncannily dissimilar. Curiosity about the unexpected resonance between source images and search results was what had motivated McCarthy to explore this area.

The collaborative piece that was produced, which McCarthy titled *Macchia*, was staged in Site Gallery as part of the exhibition *Material Truths* in early 2017.^{328,329} The piece was shown as a wall-mounted screen with a shelf-mounted mouse to allow viewers to interact with the piece. The screen showed two columns of images, the first being a subset of images from McCarthy's archive, which when clicked, enlarged and could be compared with a second column of images returned from a Bing reverse image search query with the first image as the search term. Viewers could browse the various images returned by the search query and compare the range of similar yet different responses. It was hoped that this would reveal the production process of the McCarthy's larger drawings in the exhibition, and also invite questions about how the search engine returned the images that it did. On my part, the work that went into *Macchia* was predominantly a question of producing a piece that would permit live search and visual comparison with the original images, but the

³²⁷ 'Computer Vision – Image Processing and Analytics | Microsoft Azure' <<https://azure.microsoft.com/en-gb/services/cognitive-services/computer-vision/>> [accessed 7 January 2018].

³²⁸ Kirsty Young, 'Material Truths', *Site Gallery*, 2017 <<http://www.sitegallery.org/material-truths/>> [accessed 7 January 2018].

³²⁹ Documentation of the project can be viewed at <<https://www.michaelday.org.uk/phd/macchia/>> and in the supporting material that accompanies this thesis.

questions it prompted led me to embark on further research into how image based search engines operated within their own cloud-based ‘black boxes’.

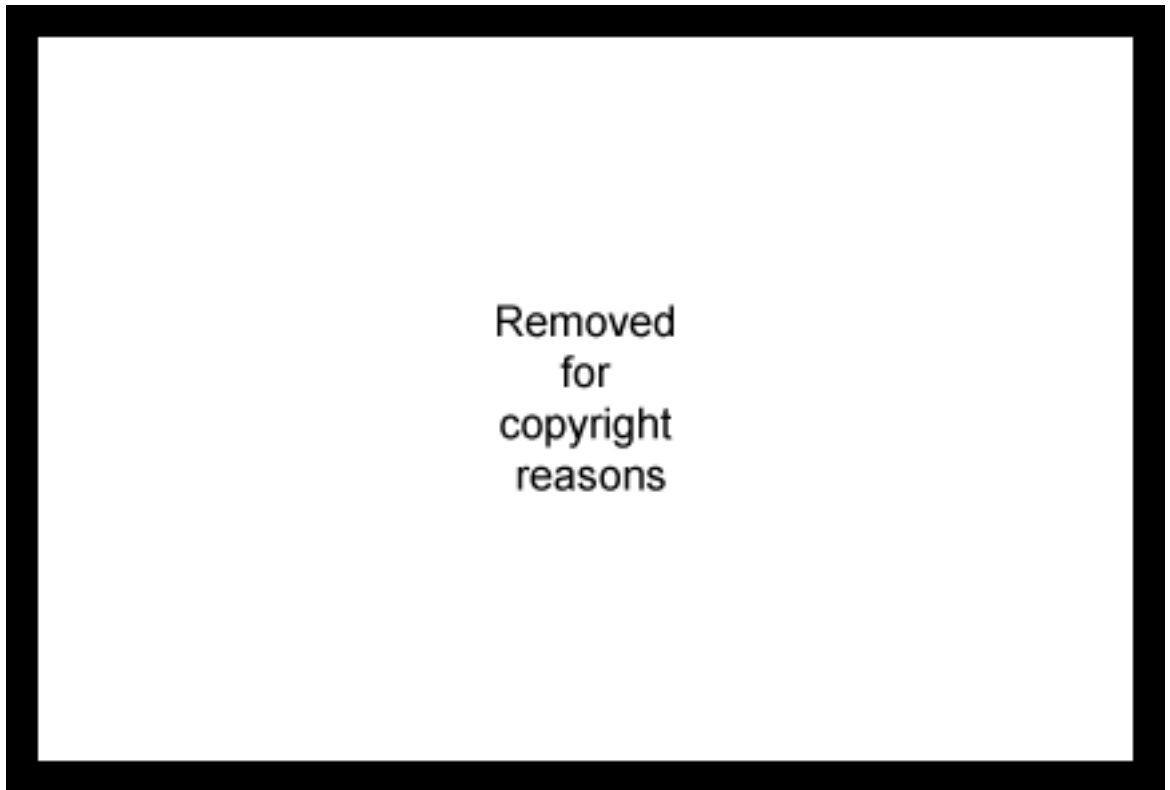


Figure 25: Macchia, screen grab, February 2017. The source image for the search is shown on the left, and the image returned by the API on the right.

After attending a machine learning workshop at the Photographer’s Gallery, I began to make sense of how machine learning can be deployed to make reverse image search possible.³³⁰ Images on the web are indexed by the search engine and passed through a convolutional neural network which creates a fingerprint of salient visual information specific to each image. This fingerprint is sometimes known as a ‘feature vector’. When a search query is made, the submitted image is analysed in the same way and images with statistically similar feature vectors are returned. It’s in the range of statistical similarity that the slippage that creates the magic can be found: feature vectors are built up of statistical probabilities that multiple subsections (filters) of the

³³⁰ Gene Kogan, ‘Gene Kogan - Machine Learning for Artists (Experimental Photo School)’, *The Photographers’ Gallery*, 2017
<<https://thephotographersgallery.org.uk/civicism/event/info?reset=1&id=515>> [accessed 24 March 2018].

image share visually salient characteristics. A small area of an image might have a high probability of being a bird in flight, for example, and a slightly lower probability of being an aeroplane, but in comparing those probabilities, overlaps might arise that provide visual matches from very different categories of thing.

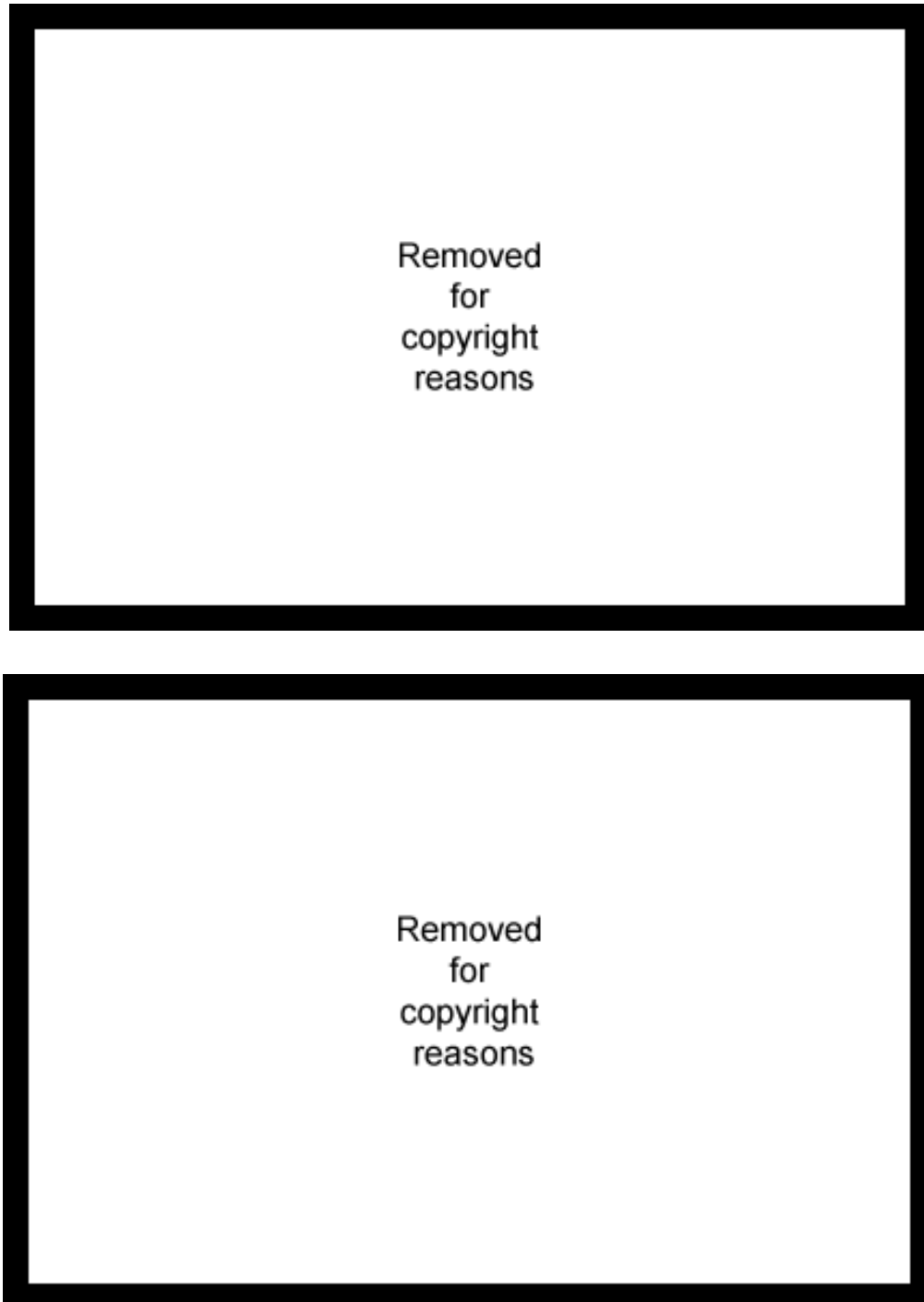


Figure 26: Macchia, screen grabs, February 2017.

While this seems to be quite a distance from the data gathering practices that were undertaken at the start of my study, the application of convolutional neural networks to produce feature vectors is really just a conflation of data gathering and automated processing. What makes it seem magical is the level of complexity that the feature vector can contain: levels of visual interpretation that are this nuanced are commonly confined to the qualitative realm, and the perceptual task that this system carries out is one that until recently could only be done by humans. Convolutional neural networks are modelled on the human perceptual system, and as such, their image-recognition capacity can be seen as attempting to reproduce that found in human vision.³³¹ However, one of the curious characteristics of neural networks is the way they can digress from human processes of recognition. The way that a convolutional neural network processes the salient features of an image will inevitably differ from an aesthetic encounter between the same image and a human viewer. The types of automated analysis afforded by neural networks see things that human vision doesn't, and it's in this gap between the capacities of human and machine vision to identify and contextualise salience, and in the inscrutability of the operation of neural networks, that many of the concerns about these technologies reside.

³³¹ Gene Kogan, 'Convolutional Neural Networks', 2017 <<https://ml4a.github.io/ml4a/convnets/>> [accessed 7 January 2018].

6: Conclusion

Reflections on the Research Question

The study set out to explore the relationship between distraction and the agency of users of internet-connected devices and services. As the study progressed, several prominent themes emerged alongside a range of related insights and questions, derived both from practical research activity and from the review of contextual material and existing artworks.

The contribution to knowledge in this thesis is in the production of artworks that generate new ways of expressing the relationship between distraction, agency and the internet, and that invite the viewer to reflect on their own position in regard to this.³³² Its originality lies in the application of artistic research methodologies to the contextual area under scrutiny and in the individual artworks produced. Each of the practical experiments outlined above has the potential to make a contribution to this area of research, as contextualised through their positioning in a history of existing artistic practice relevant to this research question.

I have shown how the propensity for users to be distracted, whether this is understood as the brain's 'vigilance mode' or as misdirected attention, can be mobilised to invoke repetitive behaviours in relation to apps and connected services such as social media. Eyal's 'hooked' model and other behaviourist understandings of gamified interfaces appear to permit a loss of user agency, where attention is 'captured' by casual games or addictive services. In Dow Schüll's analysis, this is seen more as co-produced compulsion, initially driven by negative affect, such as the desire to relieve the uncertainty of an economically precarious existence. Counter-intuitively, entering the 'machine zone' of compulsion is seen as an enacting of agency rather than a loss of it, as

³³² 'The internet' is retained as a necessarily broad category through which a range of online and digitally mediated practices can be referred to.

gamblers choose the relative certainty of win-or-lose in favour of the uncertain life outside the game.³³³

If this logic is extended using Beller's account of attention as labour, the possibility arises that distraction too is a type of labour. Distraction is seen as a bad thing through its framing as an enemy of productivity. I would argue that this negative valuation is underpinned by a conception of the neoliberalised self whose human capital is diminished by low competitiveness or productivity. So on the one hand, there is a governmentality at play that encourages negative self-valuation in response to distractibility, yet on the other, distraction can be seen as the same sort of attentive labour as attention, directed to other tasks. Gamified systems of design that claim to exploit psychological vulnerabilities generate so-called 'addictions' to distraction, and, as I have shown, activity on digitised platforms creates data in ways that are useful to the platforms yet are often inapprehensible to the users of those platforms. Distraction therefore can be seen as labour conducted on the behalf of those platforms that deliver the distractions in the first place, only disguised as entertainment, sociality, identity work, and so on.

Distraction is related to media consumption, whether in the dialectic between mainstream media and 'fake-news' which compete for 'eyeballs' in an attention economy, or through the interruptions and updates generated by social media. Choosing what to attend to or be persuaded by is the type of agency the advertising industry seeks to intervene in by profiling users, and as Munster suggests, the intention is to insert technological processes into the pre-conscious part of our attention.³³⁴ Gamified design techniques facilitate this, and the data that is produced through everyday interaction with the online world allows the profiling of users to a very precise degree. The potential of this profiling to target audiences at an extremely granular level has caused concern.

³³³ See p. 32 for an explanation of the term 'machine zone'.

³³⁴ See p. 23.

In common with gambling, there has been some back-and-forth in advertising legislation to ‘even the odds’ between advertisers and consumers. The fear of being unknowingly manipulated by advertising is a long-standing concern, and it proposes an idea of agency that it’s useful to explore here. Neoliberal economics (as distinct from Brown’s neoliberal rationality) depends on a rational, self-interested subject who makes decisions in their own best interests. Yet, in advertising, it’s long been understood that consumer decisions are made irrationally, often at an unconscious level. The notion of rational self-interest is brought into question by behaviourist interface design approaches that foster levels of compulsive engagement that may be contrary to the user’s rational self-interest. On the one hand, users of these systems are conceptualised as automata, dumbly reproducing conditioned responses to visual cues, while on the other, they are considered as self-interested individuals with autonomy over their processes of rational decision-making. Davies hints at a resolution to this impasse in a discussion on the importance of social obligation to behavioural economics: ‘if one wants to control other human beings, it is often far more effective to appeal to their sense of morality and social identity than to their self-interest.’³³⁵ If platforms are the sites where social identity is managed, measured, invested in and maintained, then an abandonment of those platforms, however self-interested it may be, might meet resistance.

Under Zuboff’s rubric of surveillance capitalism, the desire to withdraw from using these platforms is overwritten by the necessity to use them for the continuation of everyday productive life. The invasion of privacy that the submission of behavioural data represents is tolerated by users in return for services that have become indispensable. The rationally self-interested desire for privacy conflicts with the desire for shared sociality on platforms that extract personal data. For Zuboff, this produces a ‘psychic numbing that inures people to the realities of being tracked, parsed, mined, and modified – or disposes

³³⁵ William Davies, *The Happiness Industry*, p. 184.

them to rationalise the situation in resigned cynicism.³³⁶ This cynicism is exacerbated by the lack of easily adopted strategies for resistance that are available to the non-specialist platform user, although the recent growth of ad-blockers, obfuscation plug-ins, and private browsers has begun to change this. The range of disconnective practices that are already in use suggests that cynicism might be overcome if comparatively small steps could be taken to empower user agency.

A distinction should be made here between the agency of users of distracting systems and the agency of the artist-researcher who produces artworks that might critique these systems. Considering agency as the capacity to act independently within limiting structures, the user of a distracting system retains sufficient agency to engage in disconnective practices, or to withdraw their attentional labour. The agency of an artist-researcher should perhaps be considered in more critical terms, and will be discussed shortly as I reflect on methodological insights that have emerged from this study.

By examining existing examples of artistic practice, I have described how artist-researchers have variously engaged with or resisted systems that distract, or measure engagement metrics. I have also discussed some of the similarities and differences between the attentive regime of the gallery and of online display contexts. Artists such as Artie Vierkant scrutinise relationships between digital and physical contexts for the display and production of art. As the practices developed by 'surf clubs' migrated to privatised and metricised platforms, the accumulation of content around personal profiles moved artistic production and display into the mechanics of the online attention economy. The display of art on platforms that might invite compulsive engagement means that the agency of the viewer of the artwork is no different to the agency of the user of distracting systems. Attempts to interrupt online experiences with artistic interventions can be interpreted as distractions just like any other: interruptions that impinge on

³³⁶ Zuboff, p. 84.

the agency enacted by the viewer in constructing their own browser-based online workspace.

In some of the practical work produced as part of this study, surveillant processes that gather metrics have been redeployed to extend understanding of these processes and their contexts, and to allow for their reinterpretation. *Tap* actively creates distraction through the sonification of metadata that has been generated as a by-product of productive work. This limits the viewer's agency as they do not have the option of avoiding hearing the work. It reminds of the humanness in seemingly objectively gathered data, and of the covert gathering of metadata that surveillance capitalism infrastructures enact. *Invisible Layers* speaks more to the scale of those infrastructures and their imperceptibility, inviting viewers of the work to vicariously absorb themselves in a play of agency and subservience. The intimate scale of the pinch-to-zoom gesture contrasts with the overwhelming reach of the infrastructures that are revealed through this act of agency, an act that is endlessly, compulsively repeated without satisfaction. The repeated imagery in *Screen Time* instead lulls the viewer, while simultaneously positioning them as the subject of the work. The slow interrogation that this work subjects the viewer to makes them think of their own dependence on communications platforms and the dominant narrative of productivity that is a background to distraction. Algorithmic profiling is the chief consideration of *Mock Objects*, presenting indeterminacy as a way of invoking the possibility of uncertainty emerging from algorithmic processes that are normally perceived to be or treated as objective. The edges of this algorithmic uncertainty are further probed in *Macchia* and *Power Portraits*, in which cloud processes are deployed to highlight their diverting incomprehensibility or their potential to be reclaimed as an act of political agency by the artist-researcher. Each of these works contributes by revealing and extending a context for practice that has been developed as a way of understanding the relationship between distraction, agency and the internet.

Reflections on Methodology

A second set of conclusions emerged through practice in a less predictable fashion, and these signal a departure from the intended scope of the study. They address a type of artistic agency that emerges when the artist-researcher engages in a conversation with algorithmic processes which may have their own semi-autonomous behaviours, or relational infrastructural ontologies.

Each of my projects converses with an algorithm in a slightly different capacity. If a distinction between *artist—artwork—viewer* can hold true, then the interaction with algorithms in the works outlined above can be seen to lie in proximity to the *artist* in some works, and to the *artwork* in others. The apprehensibility of the algorithmic influence to the *viewer* varies from one work to another. In works like *Epicentres*, *Screen Time*, and *Invisible Layers*, the algorithmic processing of the data that generates the map imagery is not foregrounded: the data itself is instead presented as a significant component of the work. In *Mock Objects* and *Macchia*, the relationship with the algorithm is centre-stage and forms the work's main focus. Despite this, the algorithmic process itself remains fairly inscrutable in these works. *Power Portraits* does a better job of inviting the viewer to speculate about the algorithm that forms the subject of the work and has generated the visual form of the piece. In terms of artistic agency, the method deployed in the production of these works seems related to a conceptualist or process-art approach, where a system is put in place to generate the work while the artist's agency recedes. Unlike the wall drawings of Sol LeWitt for example, here, the rules that are in place are externally imposed by the vectorial class: the commercial developers of the algorithms such as Google, Microsoft, and so on. Rather than considering authorship as the writing of the rules through which the system produces the work, as in much programmatic artwork, here the rules are outsourced. Outsourcing is a significant characteristic of neoliberal economics, and the globalised nature of these works also needs to be recognised; here though, the globalised Big Tech companies are positioned as the structure within which

artistic agency can operate. Unlike many post-internet artists, who constrain the dissemination of their work within metricised platforms, these projects seem to orient the viewer toward the algorithmic processes taking place behind the scenes of the major platforms.

One further point that warrants discussion is how the ‘clews’ unfurled in the sequence of development of these works. In retrospect I can identify in my process a tendency to retain elements from one experiment to the next in order to maintain a sense of artistic consistency. In part, I see this as evidence of an experimental methodology where the ingredients that remain on the table at the end of one work form the resources from which the next work is made, but there is also a sense in which this reach for coherence adheres to a conception of human capital as embodied in an artistic persona. The development of an artistic style is, as James Elkins argues, something that many MFA programmes have among their aims, and the style of an artist can become their unique selling point.³³⁷ Much of the criticism of post-internet art revolves around its distillation into a set of stylistic tropes that comply with art market imperatives. There is a tension in my desire to produce a sense of consistency in visual style between the function of the works as research and their function as artworks intended for an audience, or that circulate within an art world (however that might be defined). This tension returns us to the productive friction between artistic research and the academy, and between the evaluative discourses that separate the academy and the wider art world(s). In this thesis, the research content of the work can be arrived at through reflection and analysis and expressed in writing, whereas much of the contextual material preceding and emerging from the works might remain inaccessible when the work meets an art audience. I am happy for these productive tensions to remain unresolved.

³³⁷ James Elkins, ‘The Three Configurations of Practice-Based PhDs’, *Printed Project*, 4, 2005, 7–19.

Future Work

This study has proved to be invaluable in redirecting my practice, and it presents a number of possibilities for future work. One of the strongest contexts with potential for further exploration is the developing relationship between Beller's ongoing scholarship on the financialisation of images in an attention economy and an art world that still leans heavily on the trading of commodities, and that considers artworks as a store of value. As artistic commodities are stockpiled as investments, and might move from the artist's studio directly to asset storage, they themselves become financialised investments and forego their function as generative of aesthetic experiences.³³⁸ This phenomenon seems like a viable context from which to explore questions about the apprehensibility of algorithmic influence that have been raised earlier in this thesis. This leads to a second potential line of enquiry suggested by this study: a more focused engagement with the mechanics of online advertising, tracking, profiling and passive data gathering. These areas of commercial consumer data gathering invite more sustained attention than I have been able to do in this thesis.

Contemporary with the close of this study, there is a significant backlash taking place against the Silicon Valley tech giants. The vexed question of 'fake-news', combined with questions about the role of services such as YouTube and Facebook in making inappropriate content available to minors, has allowed a climate to develop that seems considerably more hostile to Big Tech than when this study commenced. The possibility of legislation as a solution to the perceived problems of distraction seems to be more real than at any time previously; in France, for example, following on from 'right to disconnect' legislation in late 2016, legislation has been passed that will ban smartphones

³³⁸ Stefan Heidenreich, 'Freeportism as Style and Ideology: Post-Internet and Speculative Realism, Part I - Journal #71 March 2016 - e-Flux', 2016 <<http://www.e-flux.com/journal/71/60521/freeportism-as-style-and-ideology-post-internet-and-speculative-realism-part-i/>> [accessed 25 June 2018].

in schools from September 2018.^{339,340} The furore over possible Russian influence over the 2016 United States election and Brexit referendum has increased the possibility that social media services such as Facebook and Twitter will be reclassified as commercial entities that are more like publishers than platforms, opening them up to greater regulatory auditing and scrutiny. The developing story around Facebook's sharing of data with Cambridge Analytica, and the appearance of various high-profile witnesses at the U.K. Government's Digital Culture Media and Sport committee's Fake News Enquiry adds to the pressure on the 'attention economy' business model of social media platforms across the board.^{341,342} The committee's full report seems likely to recommend that the online advertising industry be subject to far greater regulation, particularly regarding political advertising.³⁴³

In recent months, information about how apps and devices can be designed to be addictive that was only accessible via academic studies at the start of my Ph.D. has become general knowledge and published in the mainstream press. The technologies that harness our attention and passively compile 'data doubles' are no more sophisticated than they were at the beginning of this study, but public awareness of them seems to have increased exponentially in this time. Rather than being part of the 'not-noticed' infrastructure of the web, tech company transgressions are now much more

³³⁹ 'French Get Right to Avoid Work Emails', *BBC News*, 31 December 2016, section Europe <<http://www.bbc.co.uk/news/world-europe-38479439>> [accessed 5 January 2018].

³⁴⁰ Kim Willsher, 'France to Ban Mobile Phones in Schools from September', *The Guardian*, 11 December 2017, section World news <<http://www.theguardian.com/world/2017/dec/11/france-to-ban-mobile-phones-in-schools-from-september>> [accessed 25 June 2018].

³⁴¹ 'The Cambridge Analytica Files', *The Guardian* <<http://www.theguardian.com/news/series/cambridge-analytica-files>> [accessed 25 March 2018].

³⁴² 'UK Parliament: Fake News', *UK Parliament*, 2018 <<https://www.parliament.uk/business/committees/committees-a-z/commons-select/digital-culture-media-and-sport-committee/inquiries/parliament-2017/fake-news-17-19/>> [accessed 29 April 2018].

³⁴³ 'Disinformation and "Fake News": Interim Report - Digital, Culture, Media and Sport Committee - House of Commons' <<https://publications.parliament.uk/pa/cm201719/cmselect/cmcumeds/363/36302.htm>> [accessed 1 August 2018].

widely reported. This may lead to a mobilisation of user agency that will shift the centre of gravity of the debate surrounding platforms in favour of the users of those platforms. This greater awareness of the context gives the practical work produced during this study a greater currency and impact.

Word count: 39065

Appendix 1: Practical Submission

The Ph.D. regulations for practice-based submissions permit the production of a body of creative work as part of a programme of research, and state that the ‘final submission [of the thesis] must be accompanied by some permanent record of this body of work’. In my research programme, which has involved an exploration of the edge between online and offline exhibition contexts, the question of permanence is problematic. Artworks created for the web often have comparatively short lifespans compared to those made with traditional media, and there is unresolved debate in the museum sector about how best to preserve and archive ‘new’ media artworks. Such works exist on a sliding scale of permanence that can be impacted on by the availability of an internet connection, of the correct browser or plug-in, or even of a specific code library that might be maintained and hosted beyond the reach of the artist. The nuances of the preservation debate are beyond the scope of this thesis, but I take on board Vierkant’s position outlined in the thesis about the questionable link between the document and the notional ‘original’ work, while also attempting to comply with the institutional demand for permanence.

Therefore, a pragmatic approach has been taken to the assembly of an archive of practical work to accompany this thesis. Since the majority of the work exists in digital form first and foremost, the archive is supplied in the form of an online repository that can be accessed live on the web and also from a local USB storage device submitted with the thesis. Some works will only function as intended when hosted on cloud computing platforms, but screen-captured video of these works in use has also been included in the archive to slide them along the scale in the direction of permanence. Some works have already expired, and in this case, screen-captures form the principal point of contact with the work. Works that exist in physical form, such as books, have been presented in the archive in documentation, completing their transition from digital to physical and back again.

Links to the relevant sections of the online repository have been included as footnotes in Chapter 5 so that the documentation of works can be straightforwardly accessed alongside the written commentary in the thesis. The structure of the live archive site is identical to that supplied on the USB storage device. To access the archive from the supplied USB, double-click the *index.html* file which should open the site in your default web browser. The body of work can be accessed at the following live URL:
<<https://www.michaelday.org.uk/phd/>>.

The following pages contain an approximate representation of the content of the practice archive. The moving image and digital works have been necessarily omitted and should be viewed from the digital archive.

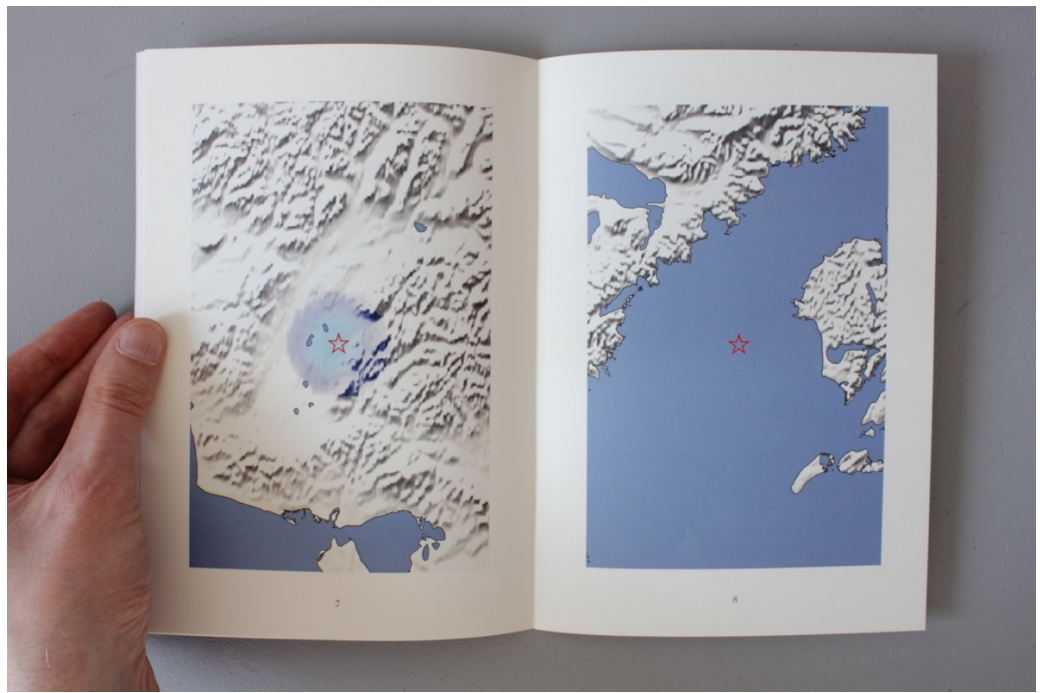
Epicentres

2015

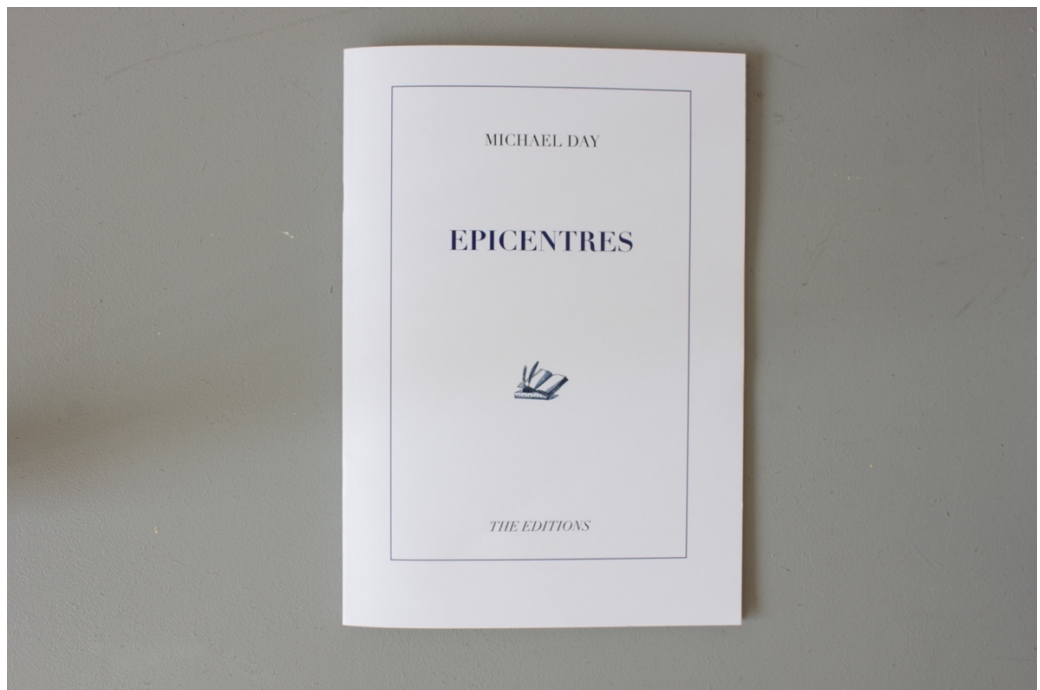
Epicentres is a book containing a collection of computer-generated images that indicate the position of earthquakes in remote locations. Tremors that are low on the Richter scale might only be sensed by seismological recording equipment rather than be felt by humans. These images have been automatically generated from sensor data, and exist as automated representations of geological events that may never have been subjectively experienced.

DOCUMENTATION IMAGES





d

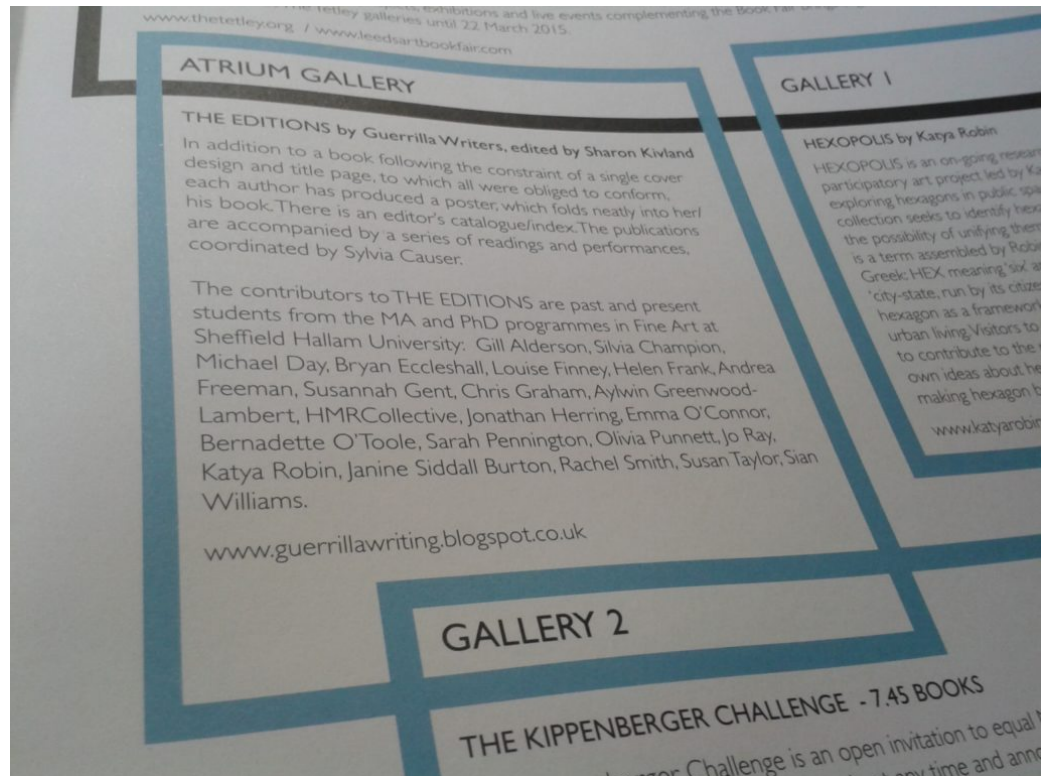


PROOFS

[Epicentres Proof \[pdf\]](#)

[Epicentres Cover Proof \[pdf\]](#)

EXHIBITION AT PAGES ARTIST'S BOOK FAIR, THE TETLEY, LEEDS



NORTHERN LIGHT EXHIBITION, SIA GALLERY, 2016









EXHIBITION HISTORY

Northern Light, SIA Gallery, Sheffield, July 2016

Manchester Artists Book Fair, Holden Gallery, October 2015

London Art Book Fair, Whitechapel Gallery, September 2015

Liverpool Artists Book Fair, Liverpool Central Library, July 2015

Pages International Contemporary Artist's Book Fair, The Tetley, Leeds, March 2015

The Hepworth Print Fair, The Hepworth, Wakefield, March 2015

January 30, 2015

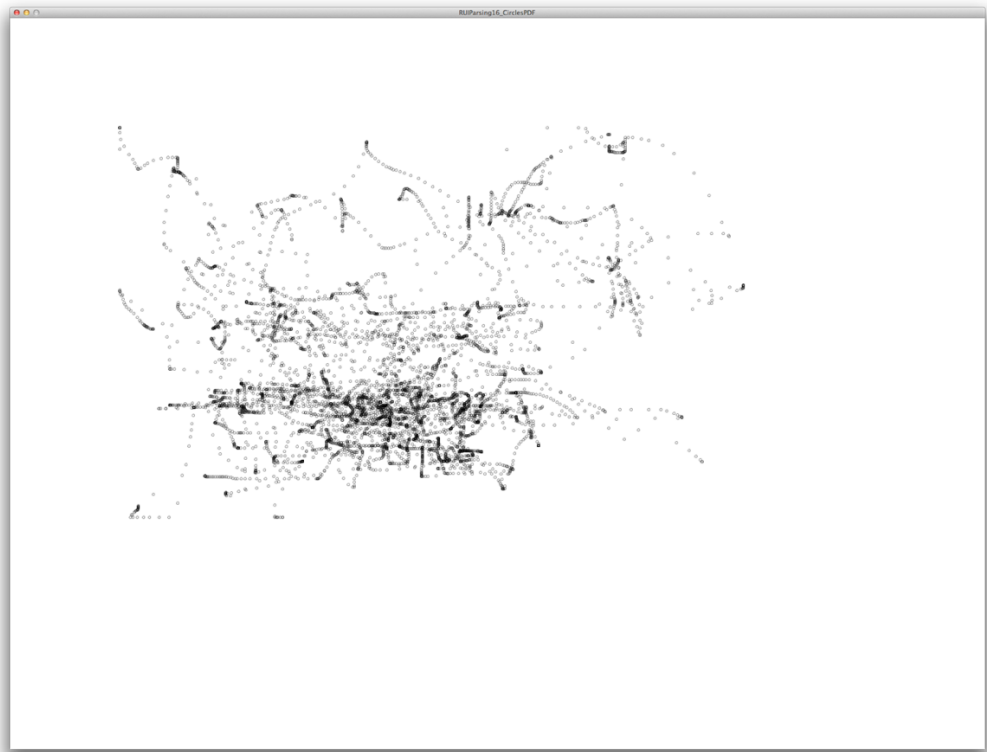
© 2018 Michael Day.

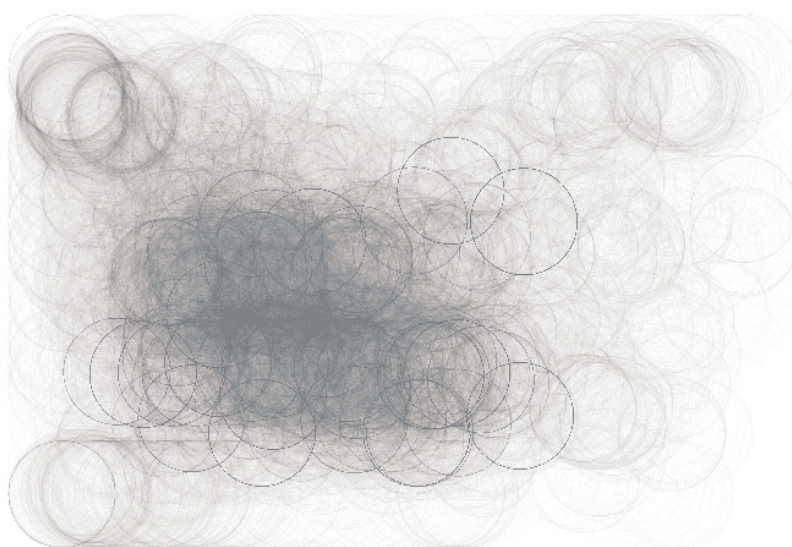
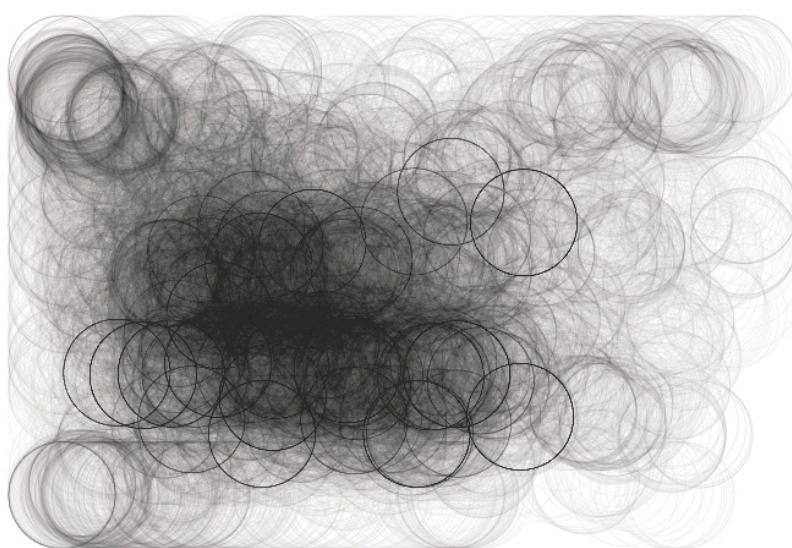
RUI

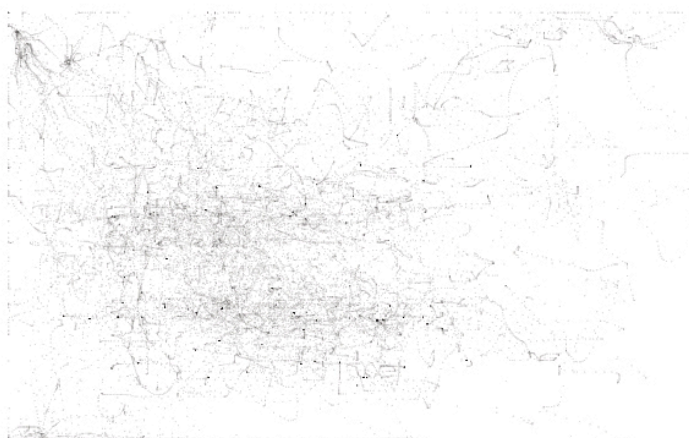
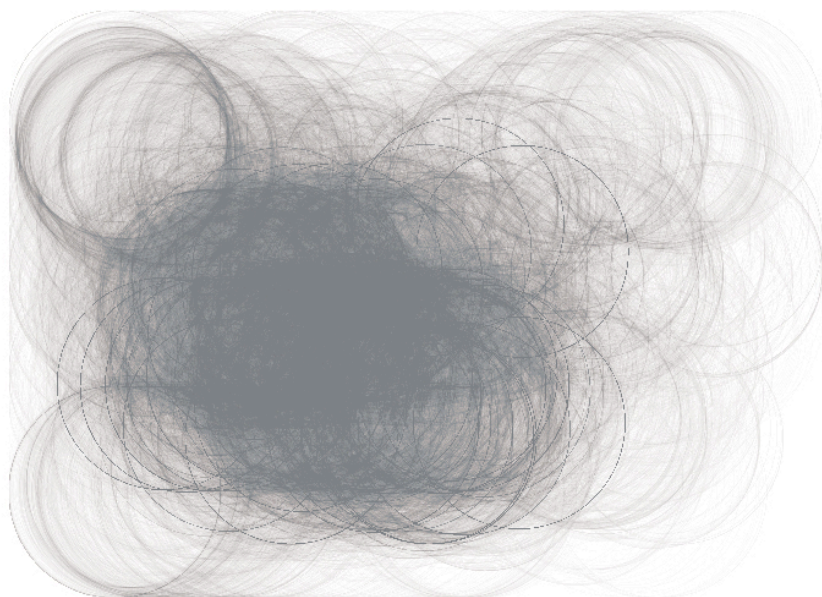
2015

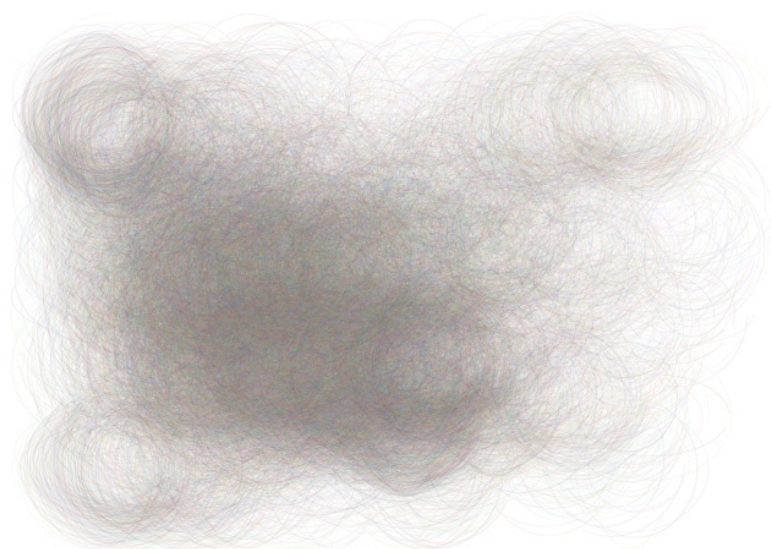
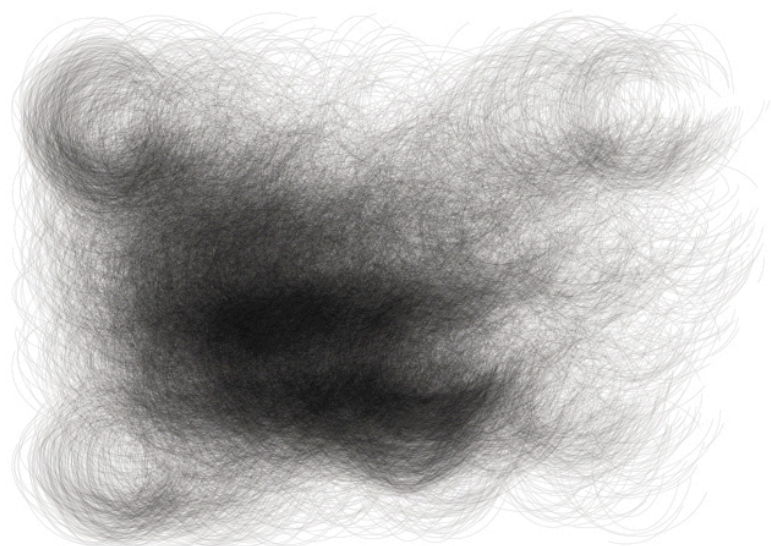
Sample RUI Output (txt)

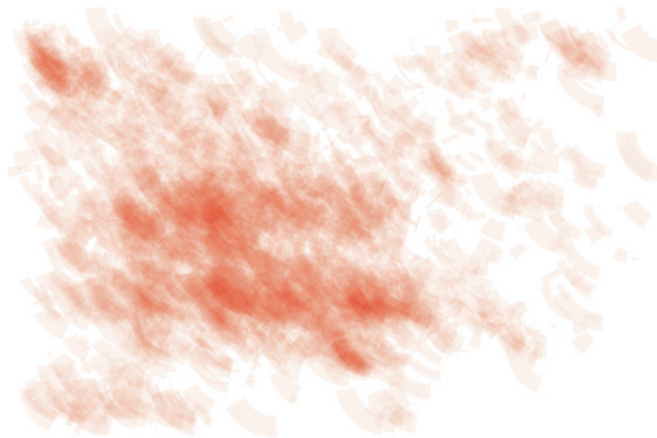
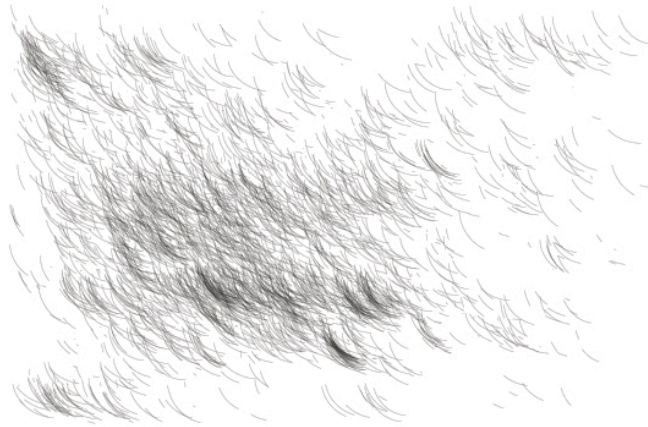
IMAGES GENERATED FROM READING OUTPUT











February 1, 2015

© 2018 Michael Day.

Dot

2015

This is one of the first experiments reading the data gathered with the RUI activity-logging software.

VIDEO DOCUMENTATION

[VIDEO]

February 21, 2015

© 2018 Michael Day.

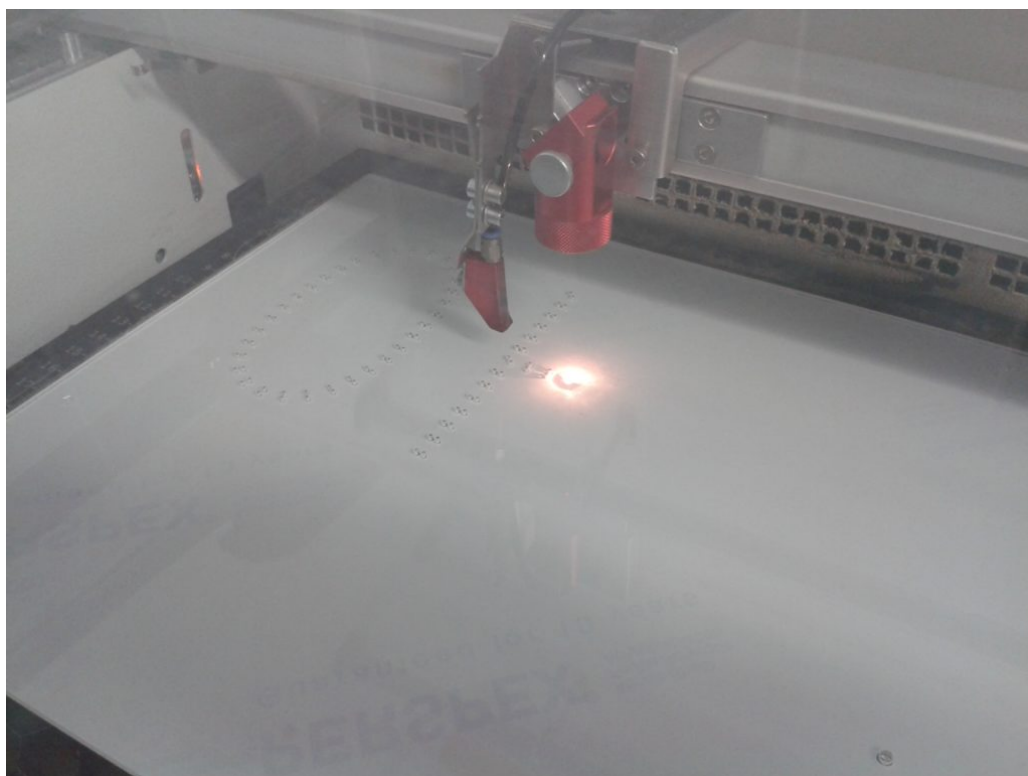
On / Off

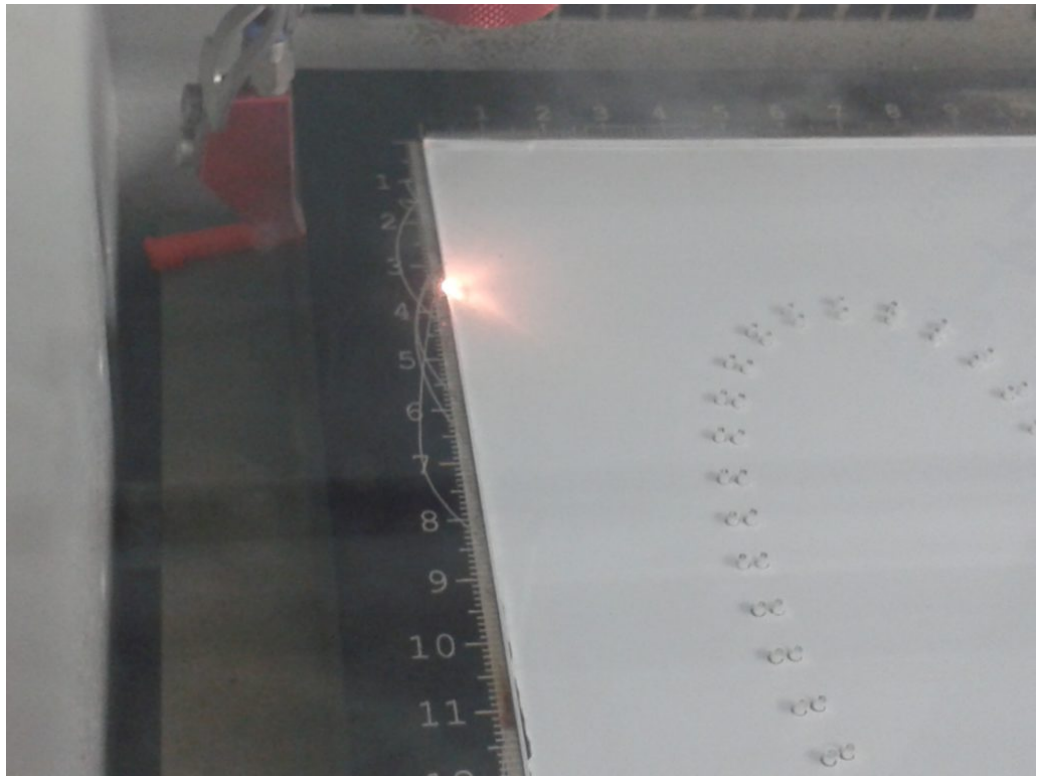
2015

DOCUMENTATION OF PIECE STAGED IN STUDIO

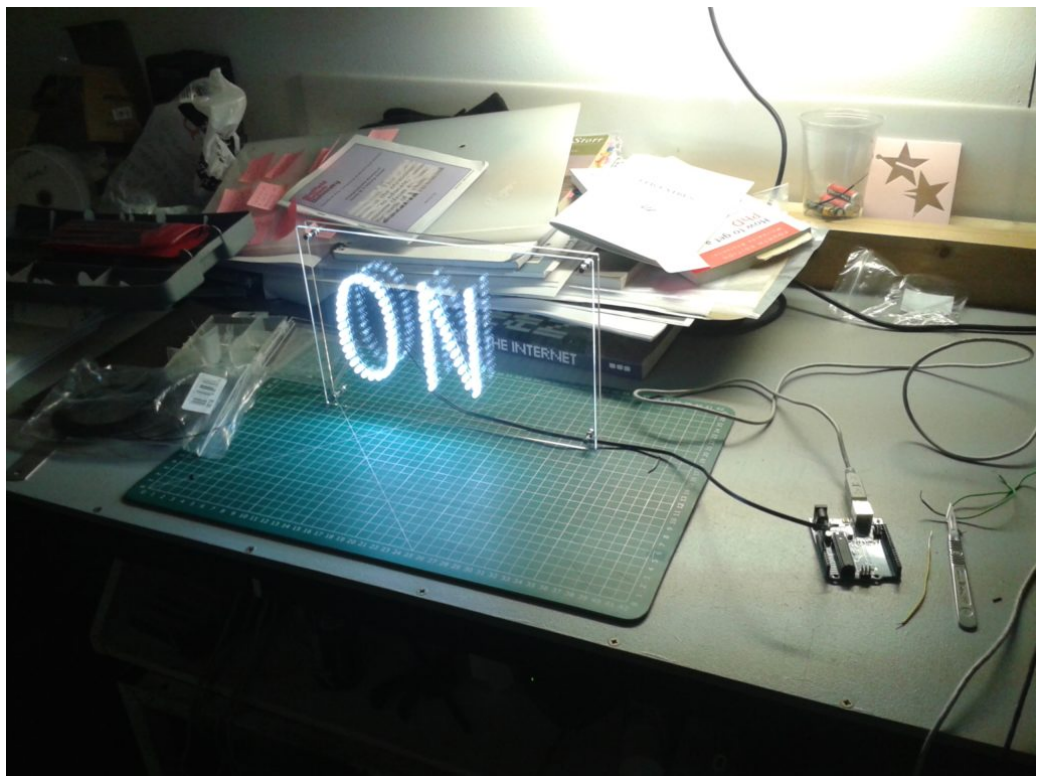
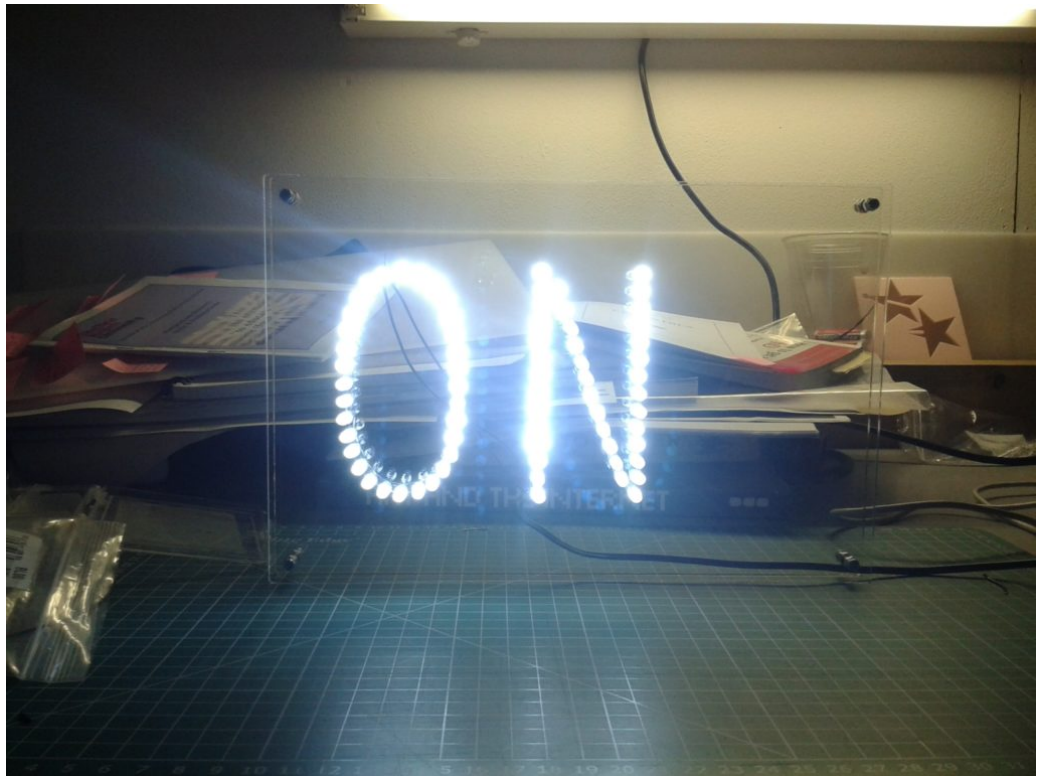
[VIDEO]

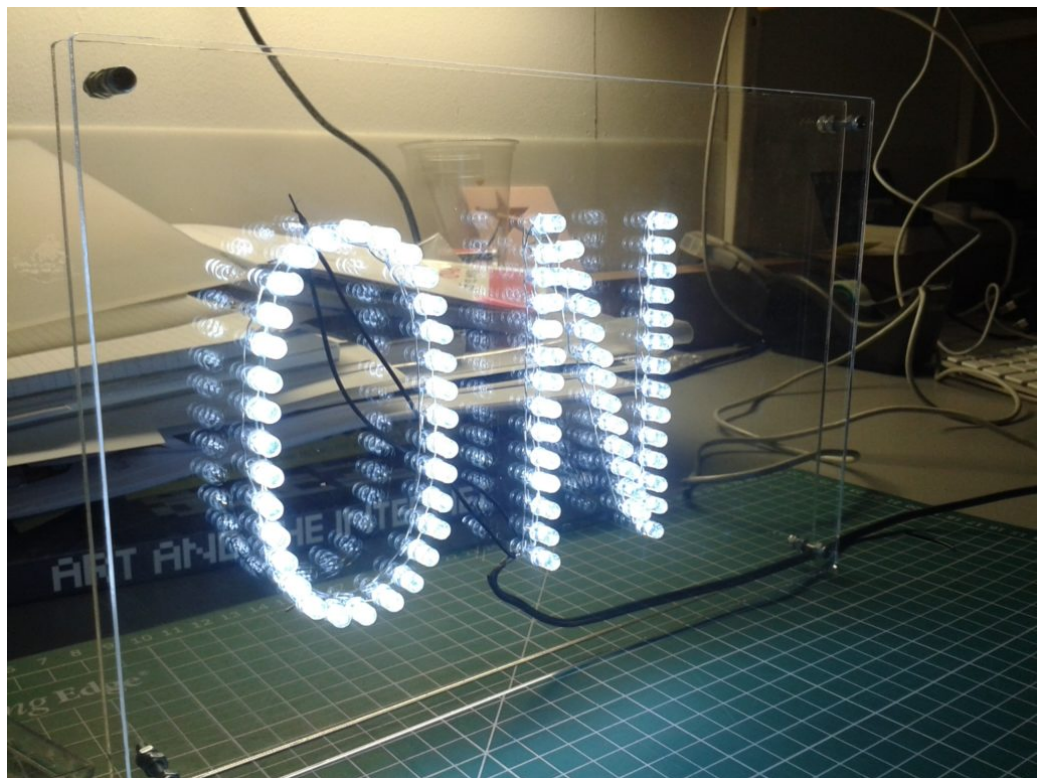
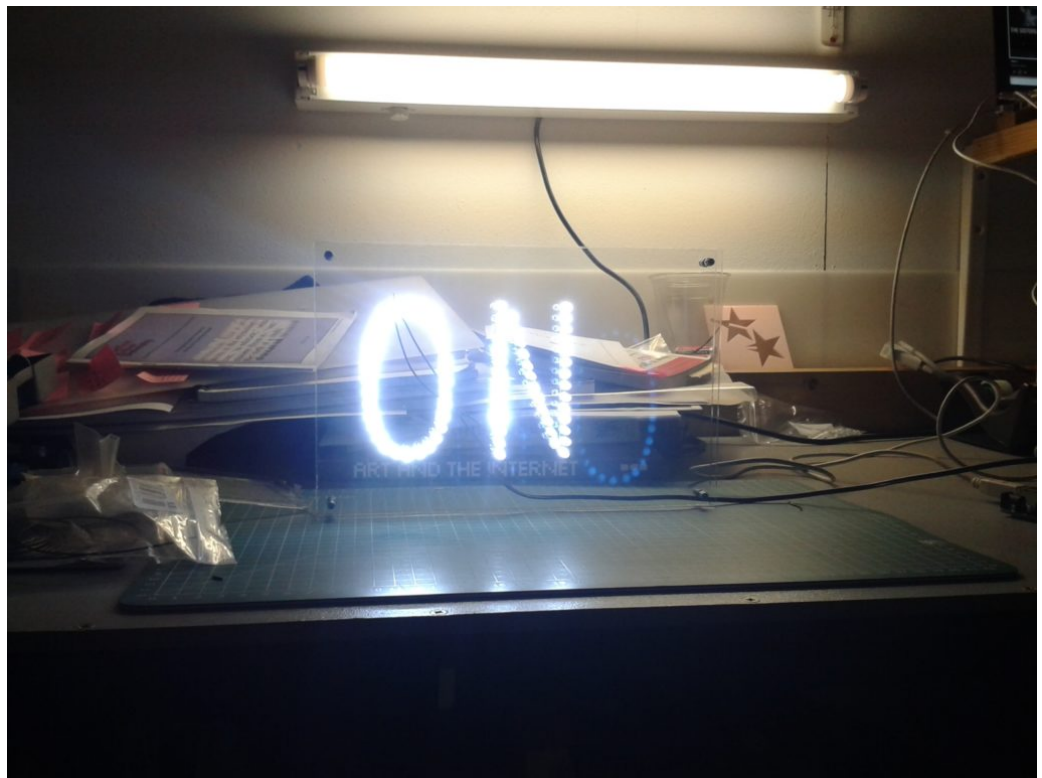
PRODUCTION

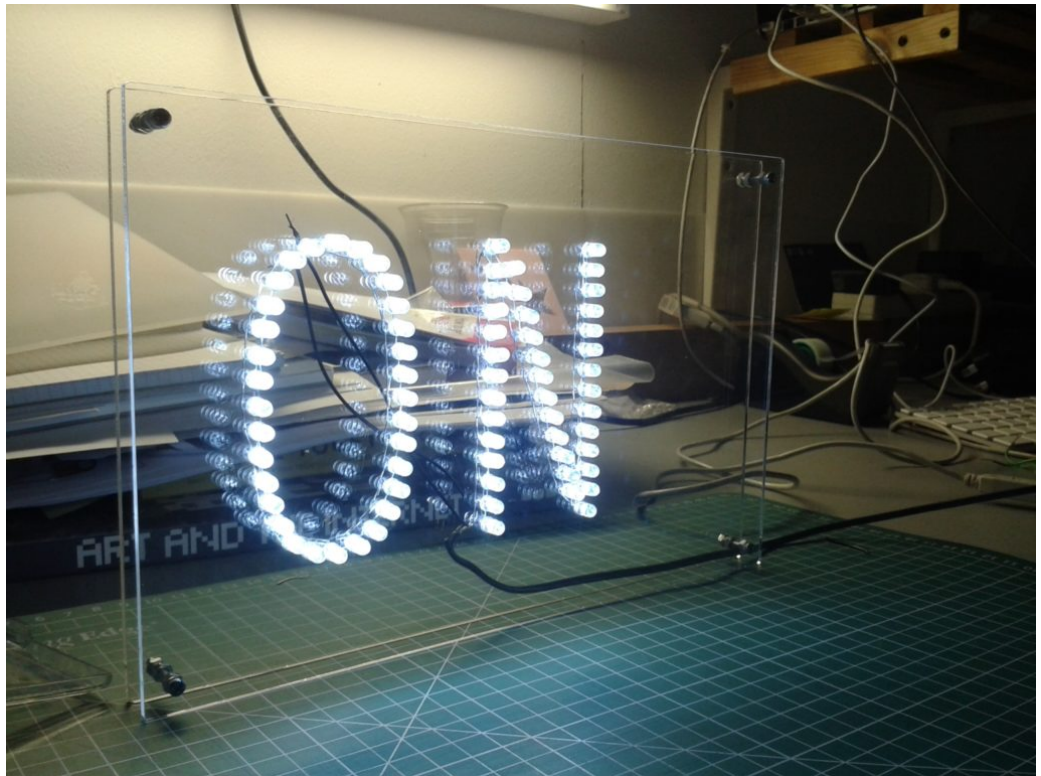


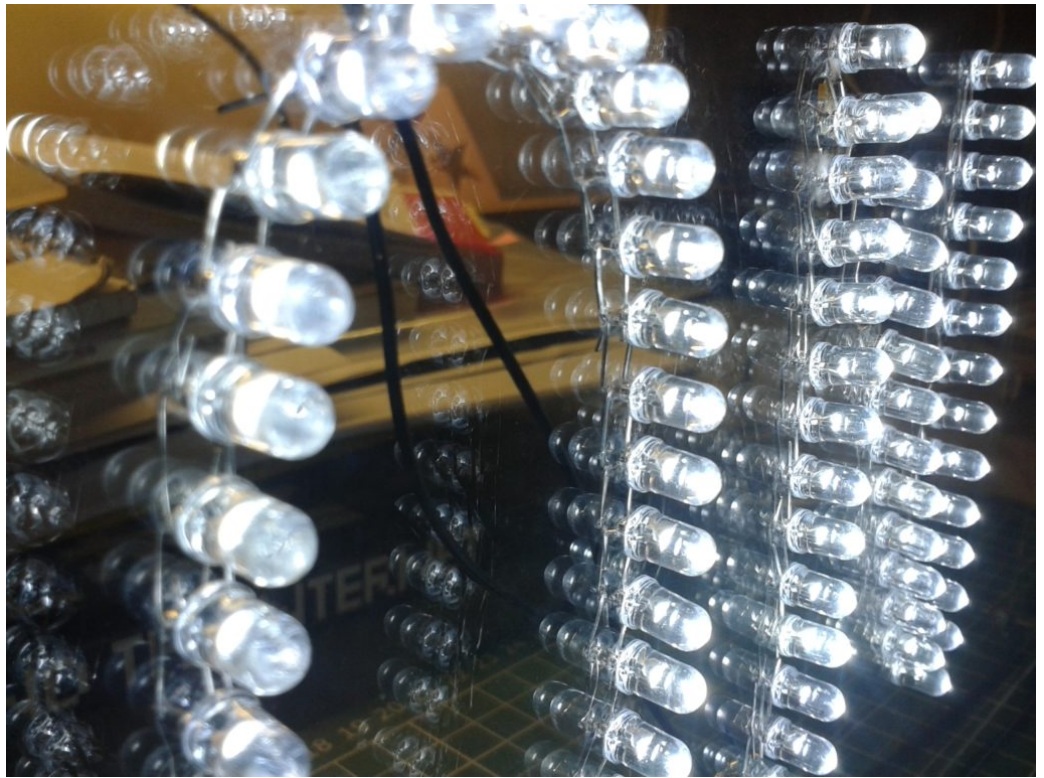


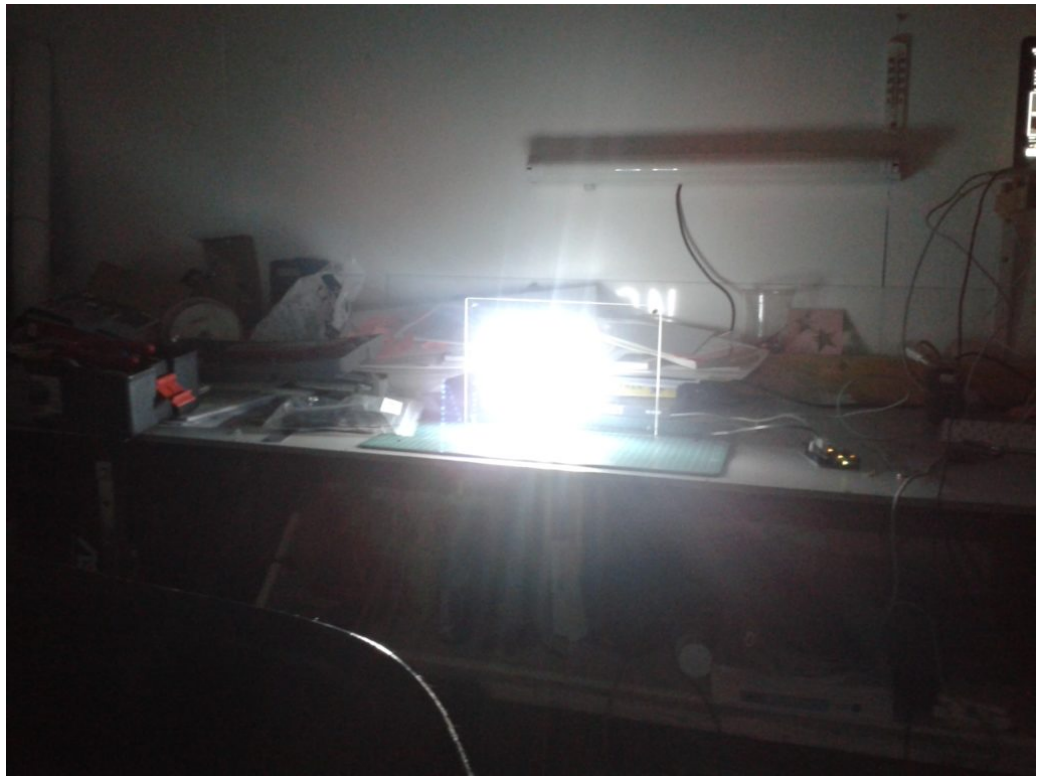












SETUP AND TESTING

[VIDEO]

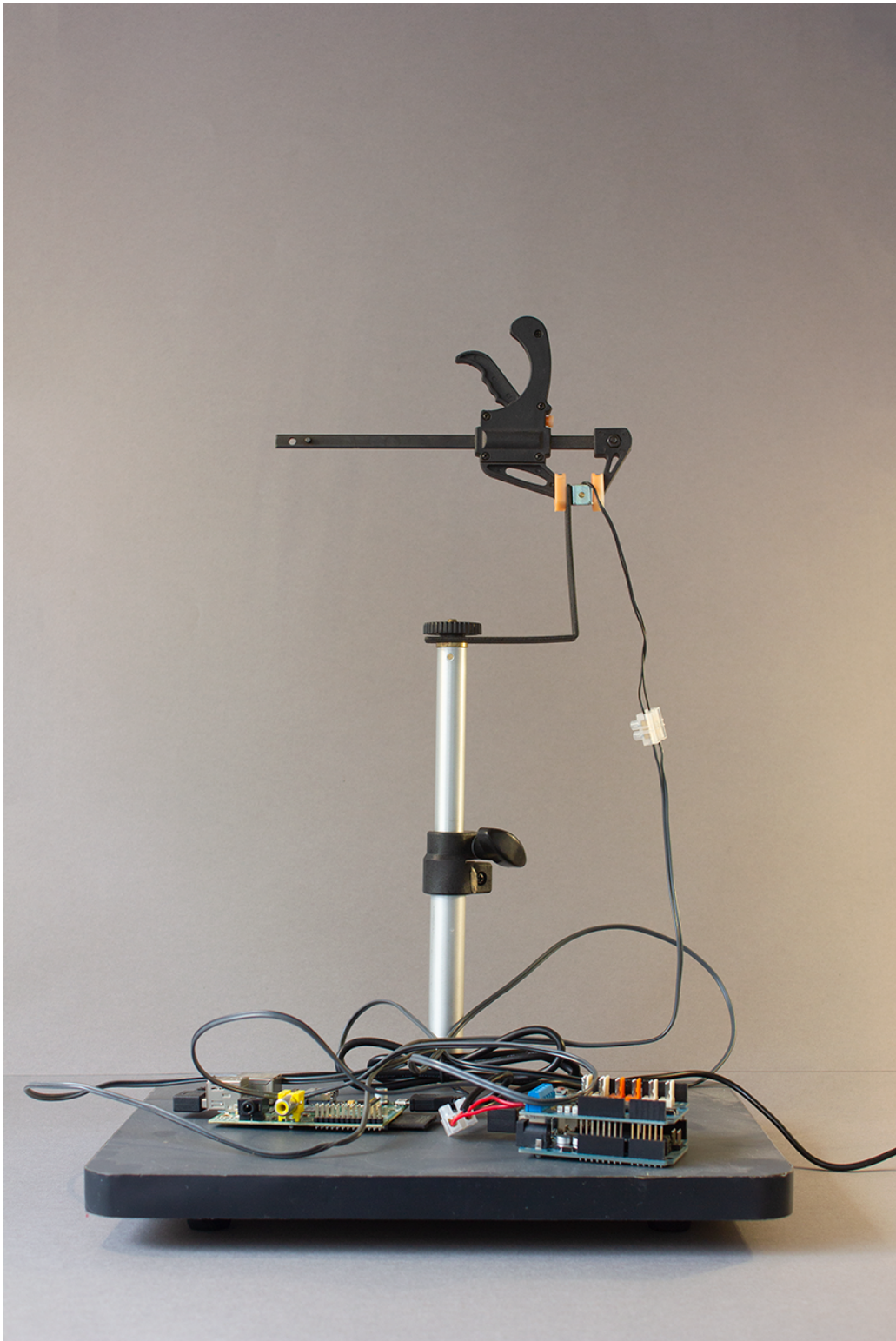


March 1, 2015

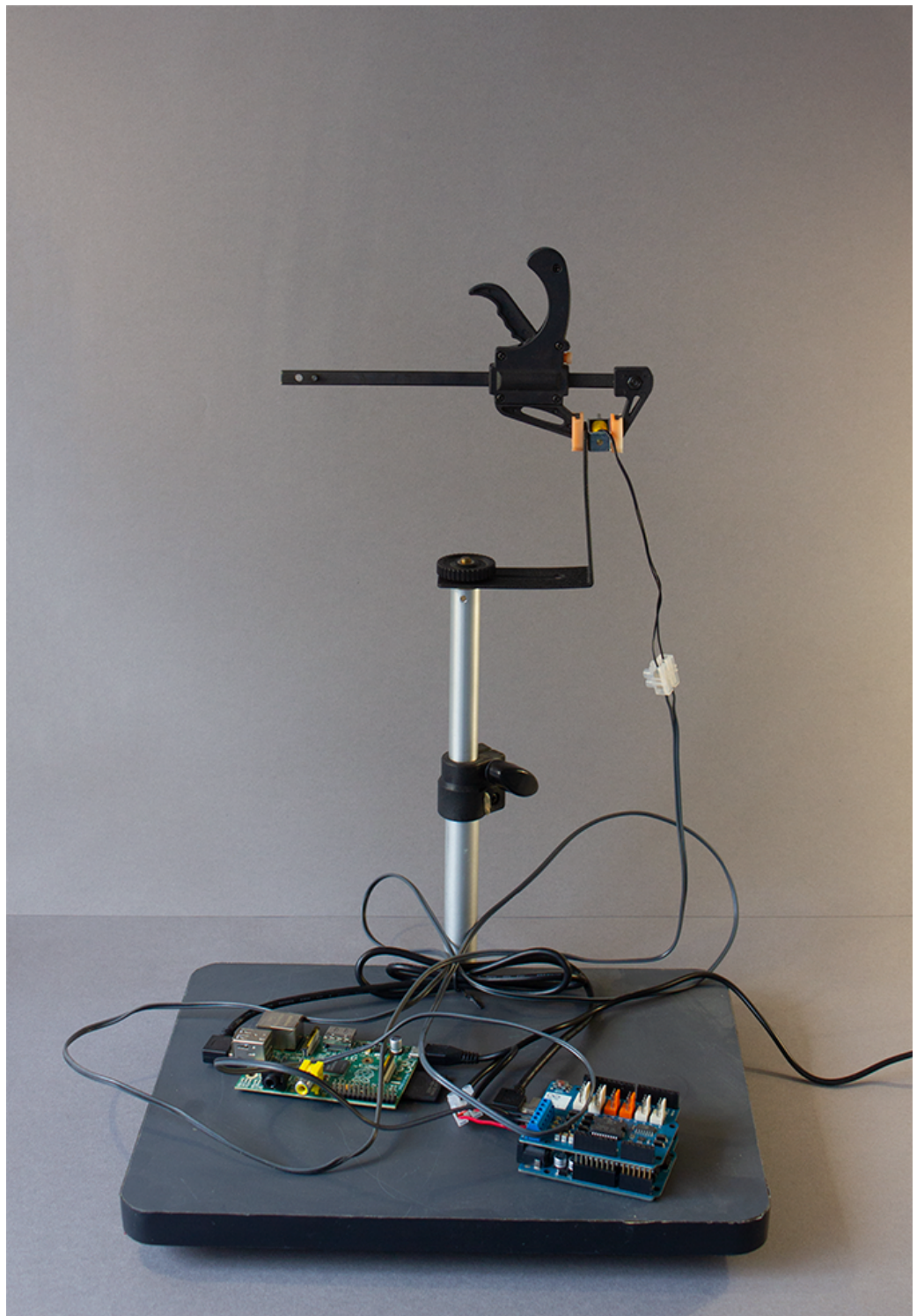
© 2018 Michael Day.

Tap

2015

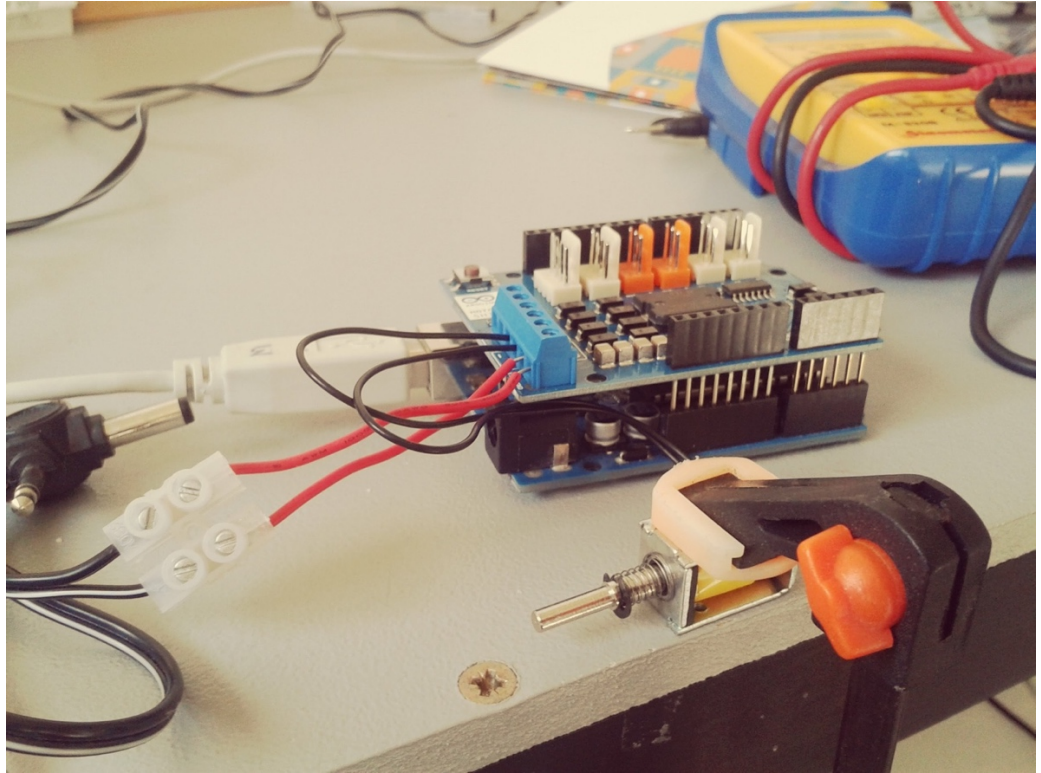


aa



bb

WORK IN PROGRESS

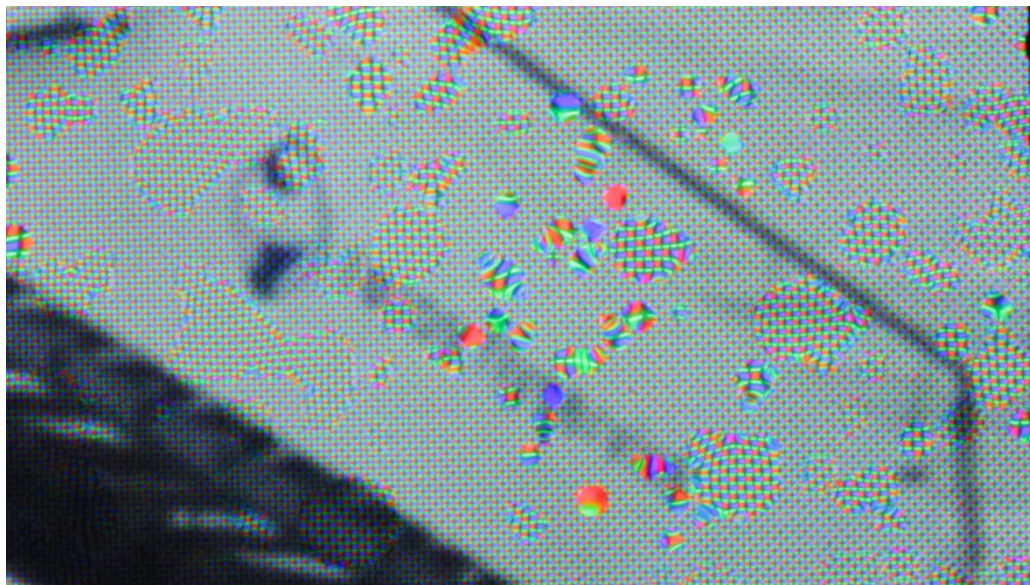


March 5, 2015

© 2018 Michael Day.

Screen Droplets

2015



March 23, 2015

© 2018 Michael Day.

Invisible Layers

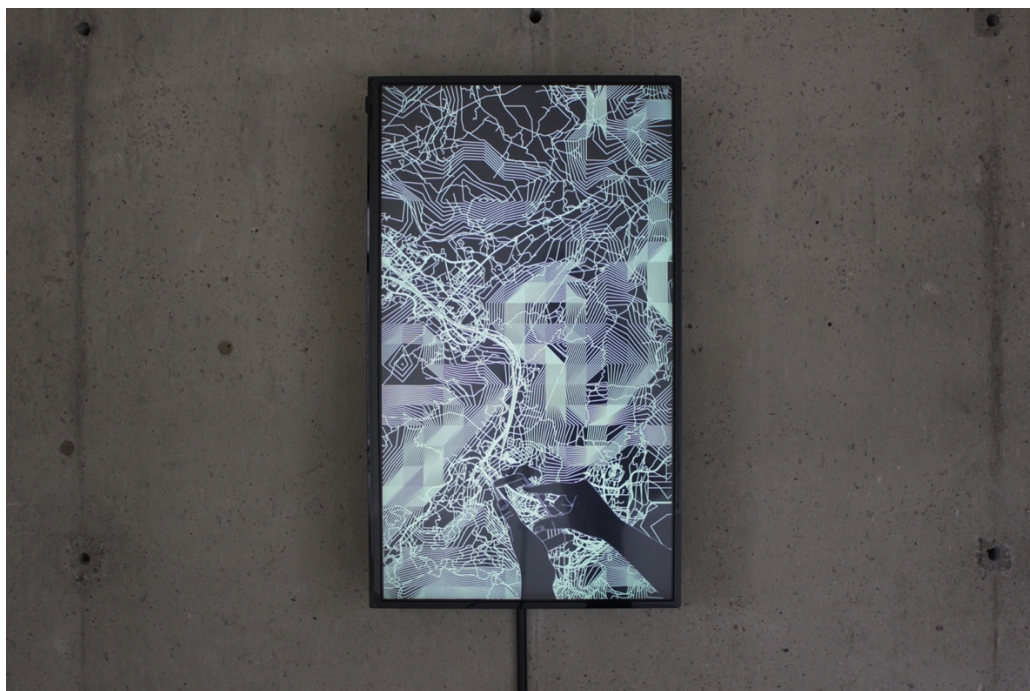
2015

VIDEO DOCUMENTATION

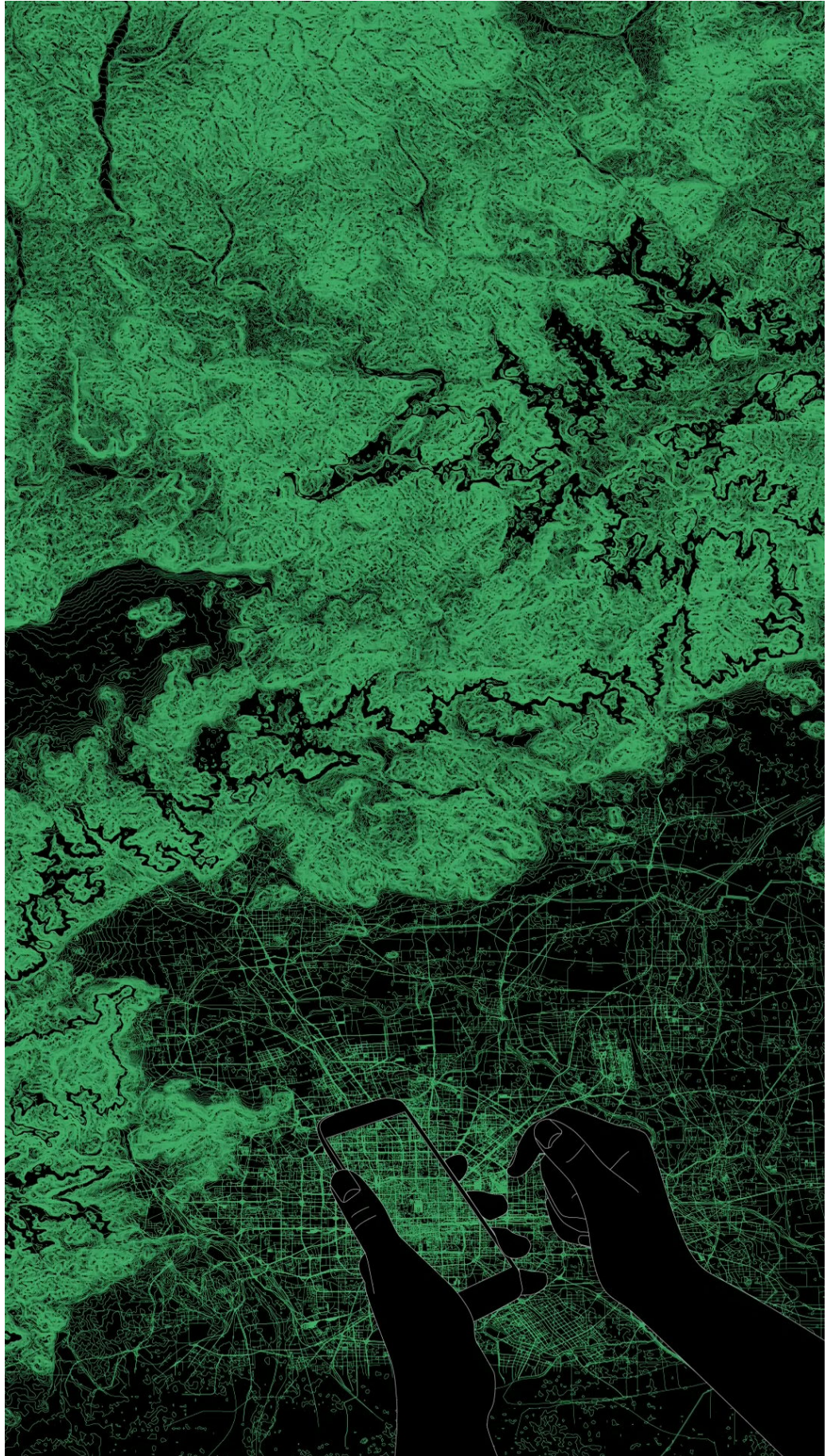
[VIDEO]

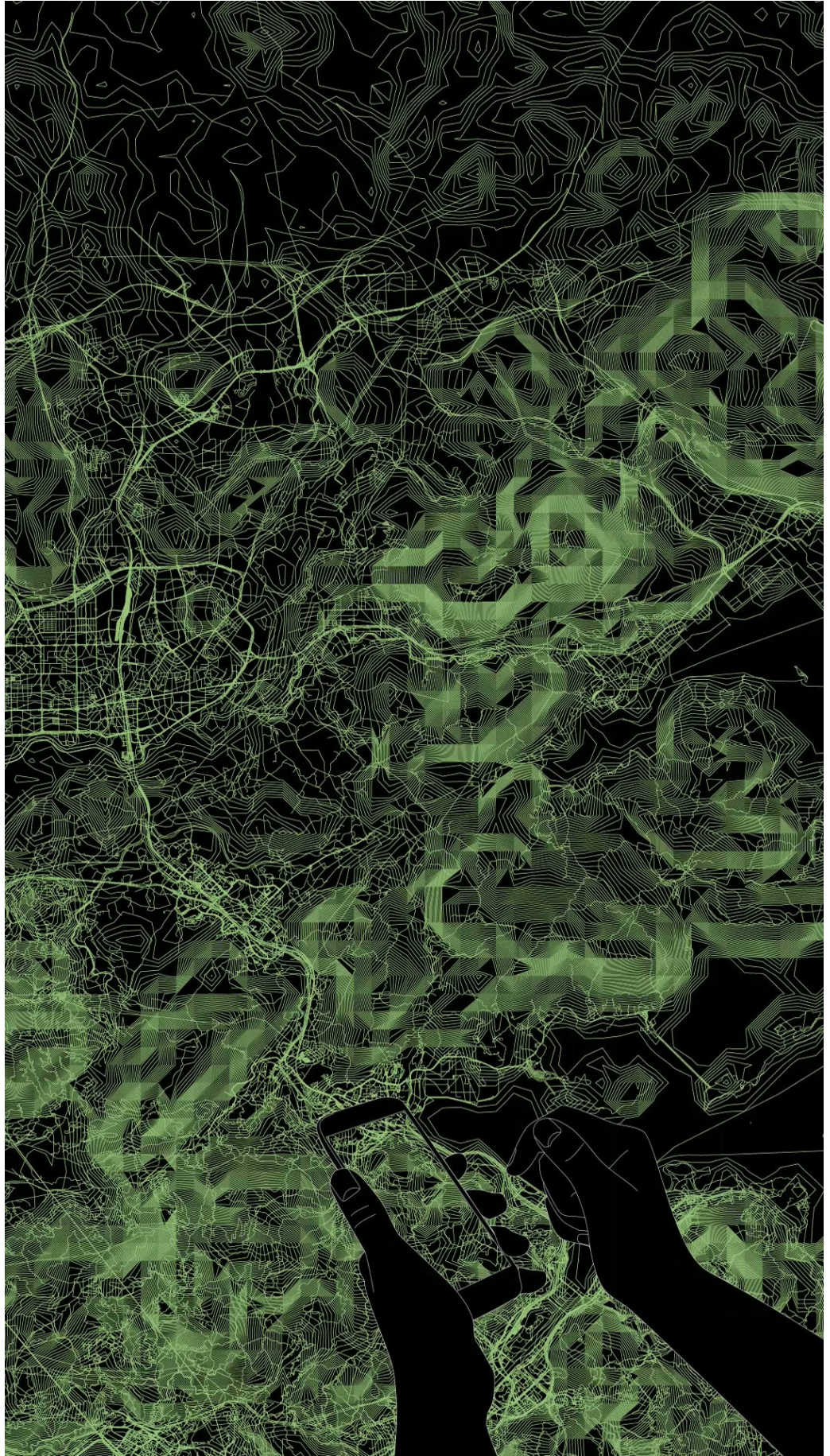
DOCUMENTATION IMAGES











CATALOGUE TEXT

Invisible Layers (2015) takes as its starting point the mismatch between experience of the infrastructural landscape and the way this landscape is imaged. The piece uses terrain data from the United States Geographical Service and map data from the crowd-sourced Open Street Map to compile intricate, layered views of the locations of the head offices of major smartphone manufacturers.

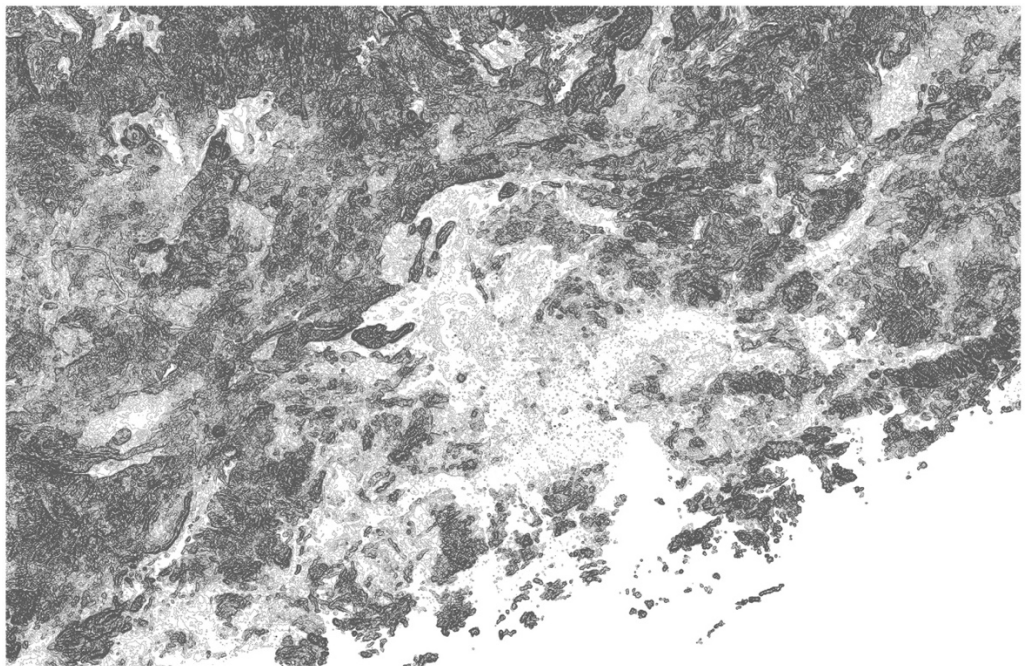
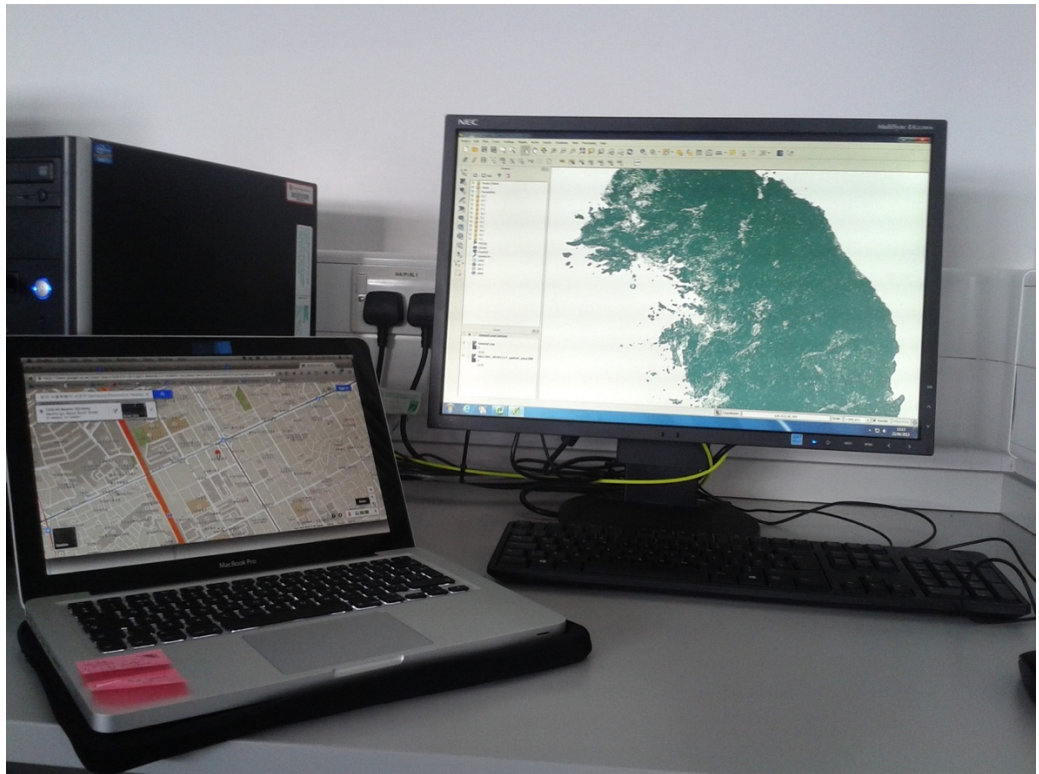
Maps are most commonly viewed on digital devices – SatNavs or smartphones – and smartphones in particular offer the opportunity to browse, never alighting upon an image long enough that it can be properly absorbed or fully assimilated. The reductive and diagrammatic visual language of infrastructural mapping is designed to be purely functional, and has a very clear aesthetic. This piece places this visually complex overview in the context of relentlessly inattentive consumption and disposal of digitally mediated images.

PRODUCTION PROCESS

The animated hand was developed by tracing hand movements from video in After Effects.

The ‘pinch-to-zoom’ gesture became the focus of the piece in its early stages. Initial tests with map imagery proved unsatisfactory.

Map data was gathered from USGS sources and converted to vector formats with QGIS.



A second shoot was staged to arrive at a more satisfactory angle for the hands.

The possibility of projecting the map imagery on top of a screen showing the hand imagery was tested in the studio.





mm

SITE VISIT



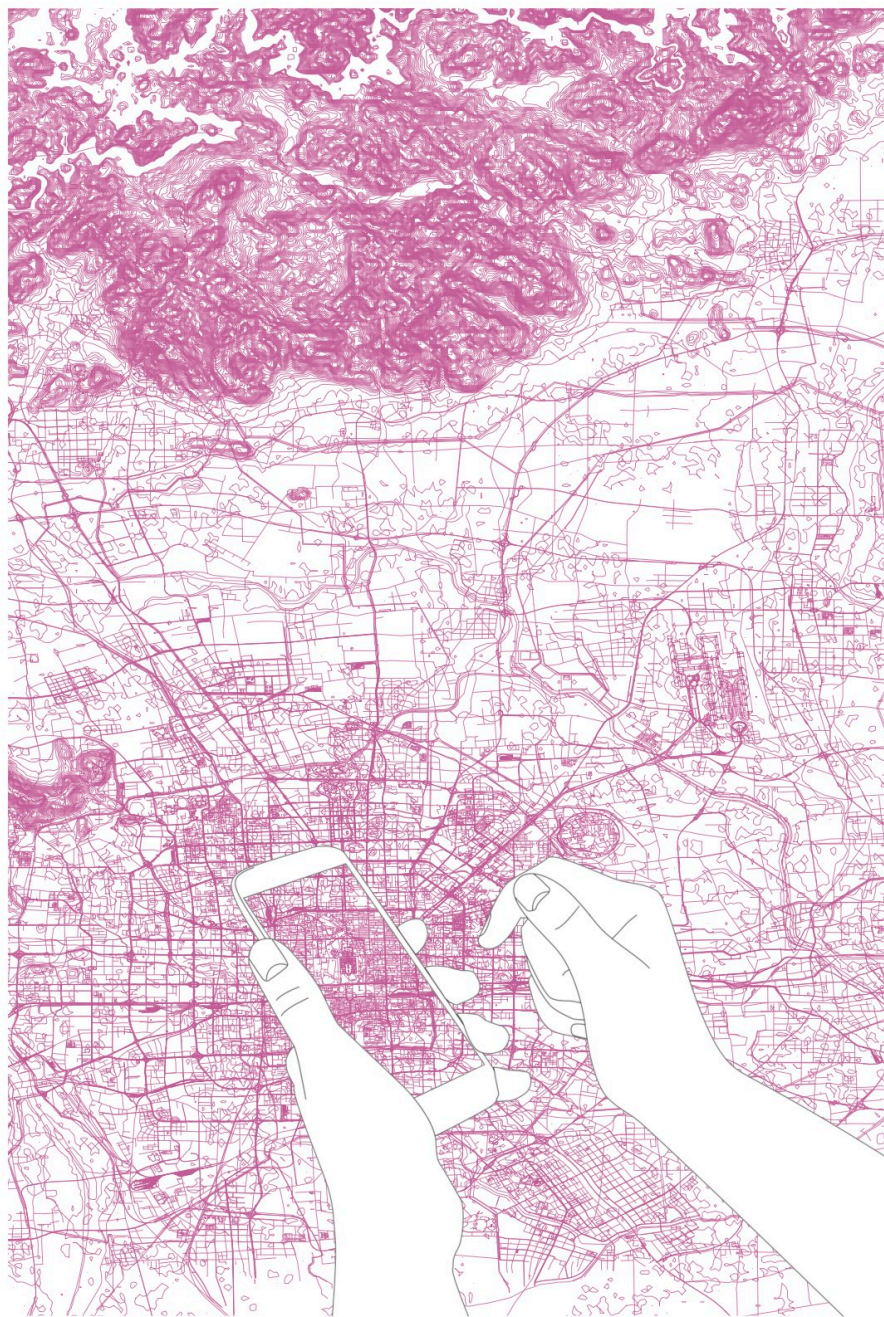
It became clear after the site visit that the venue was too bright for projections to work in the way intended. The piece was re-rendered to merge hand and map imagery.

August 5, 2015

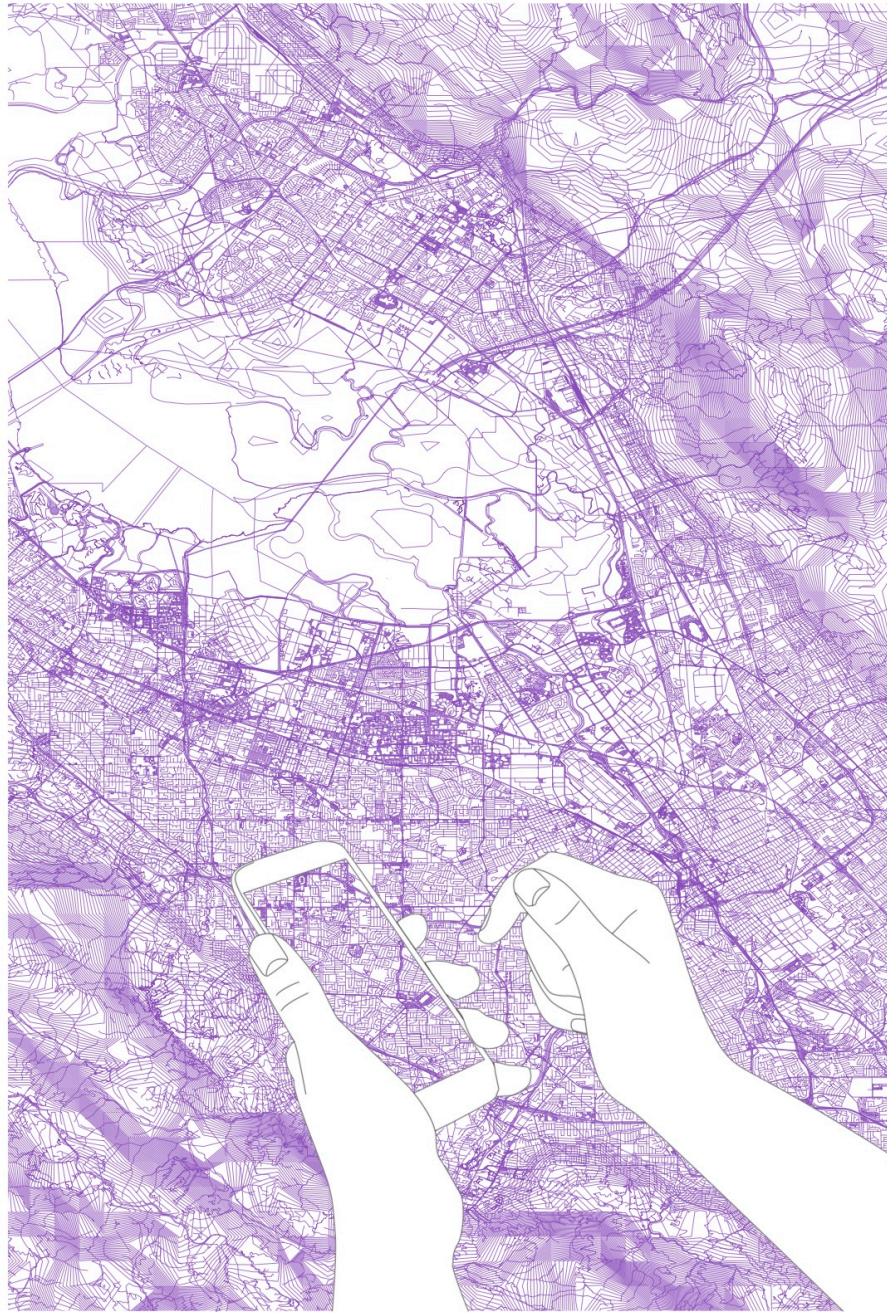
© 2018 Michael Day.

Sluice Art Fair Images

2015



Zhongguancun Digital print, 420mm x 594mm



Cupertino Digital print, 420mm x 594mm



Dongguan Digital print, 420mm x 594mm

November 27, 2015

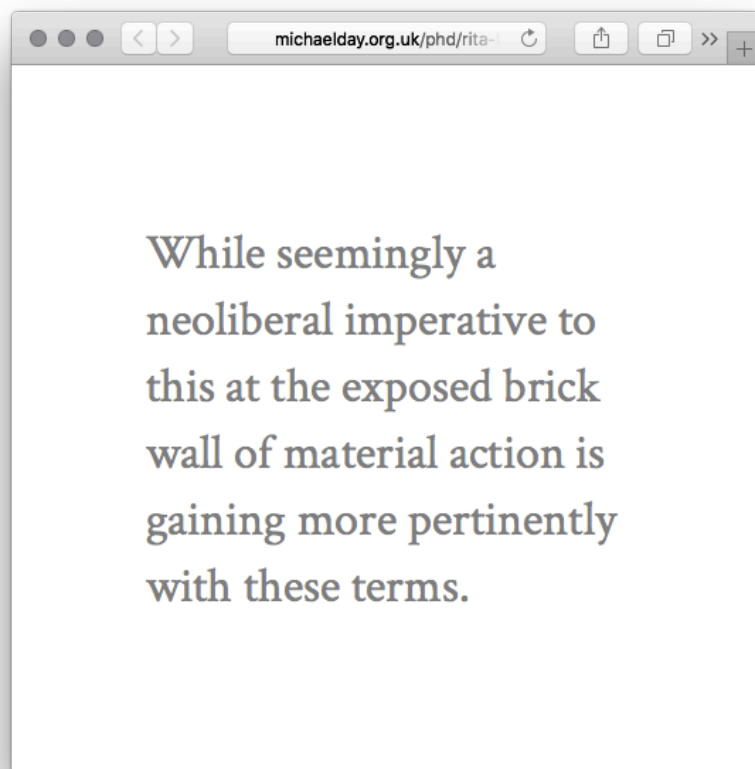
© 2018 Michael Day.

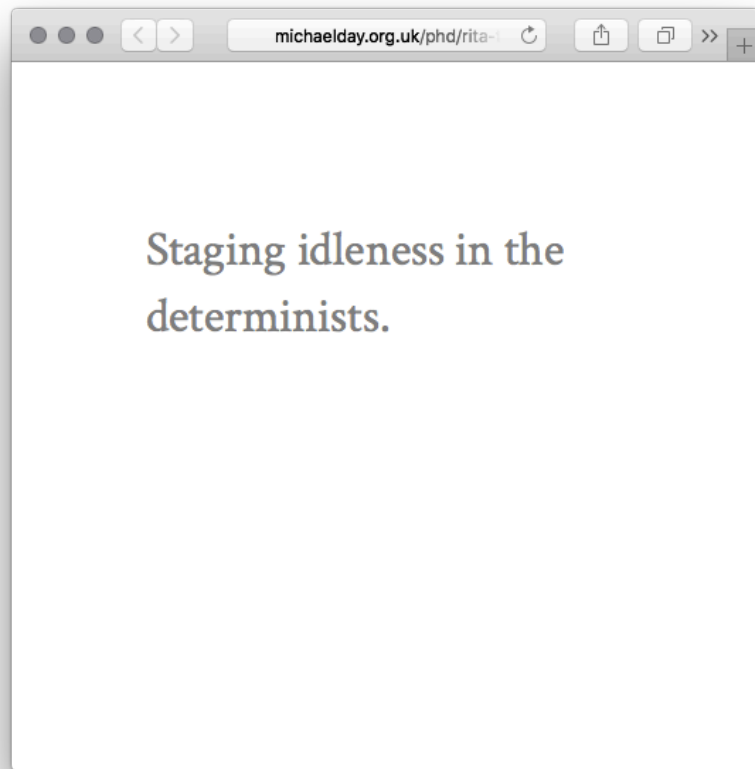
RiTA Test

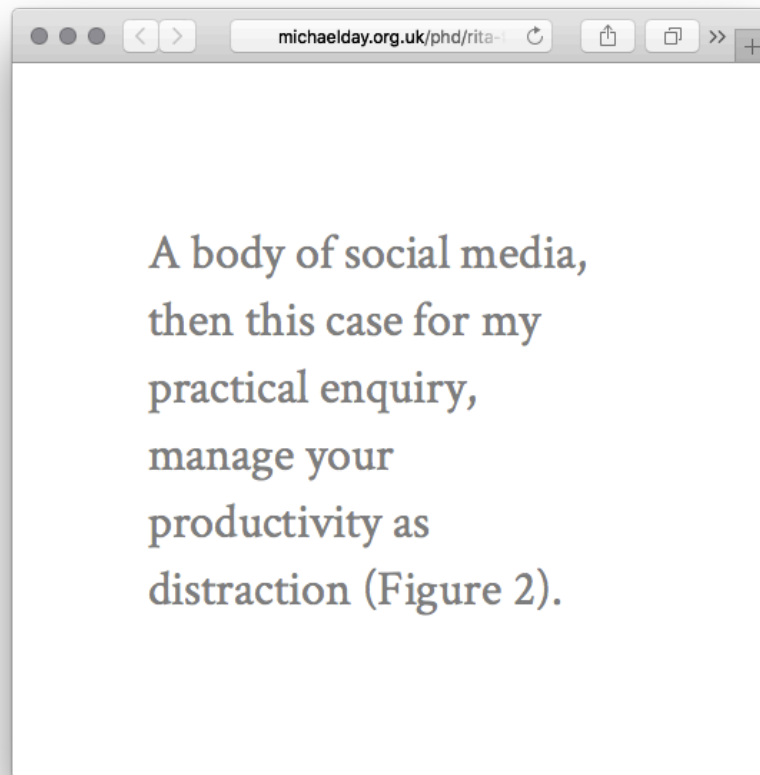
2015

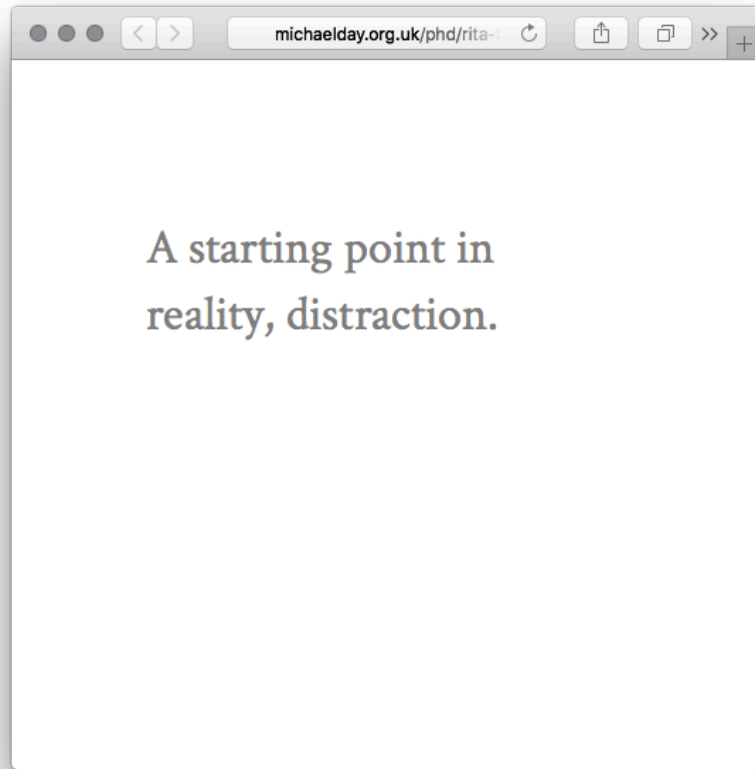
After submission of my upgrade documentation, I wanted to return to practice while waiting for feedback. I wrote this playful web thing that creates a markov chain from the text of my upgrade submission. The text can be refreshed by clicking the mouse, tapping the screen, or pressing the space bar, depending on the viewing platform.

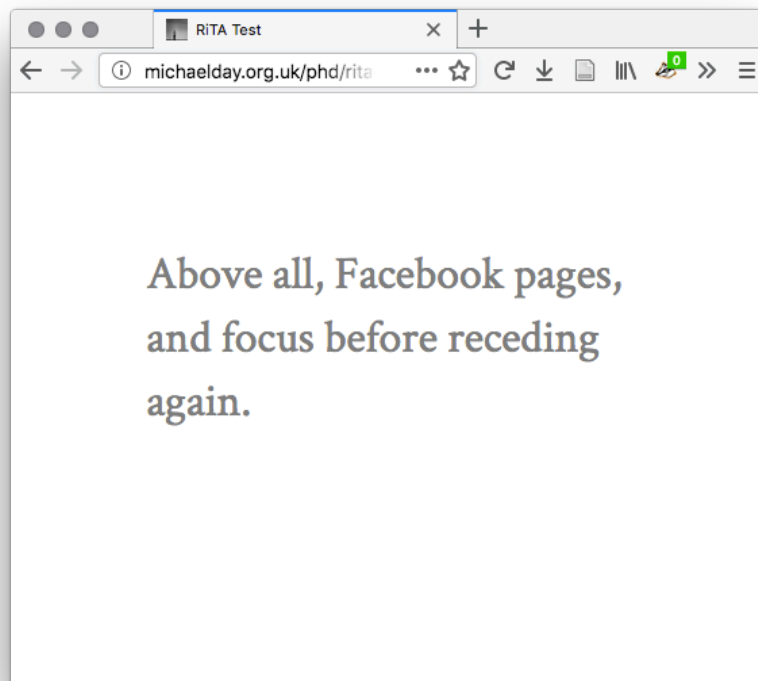
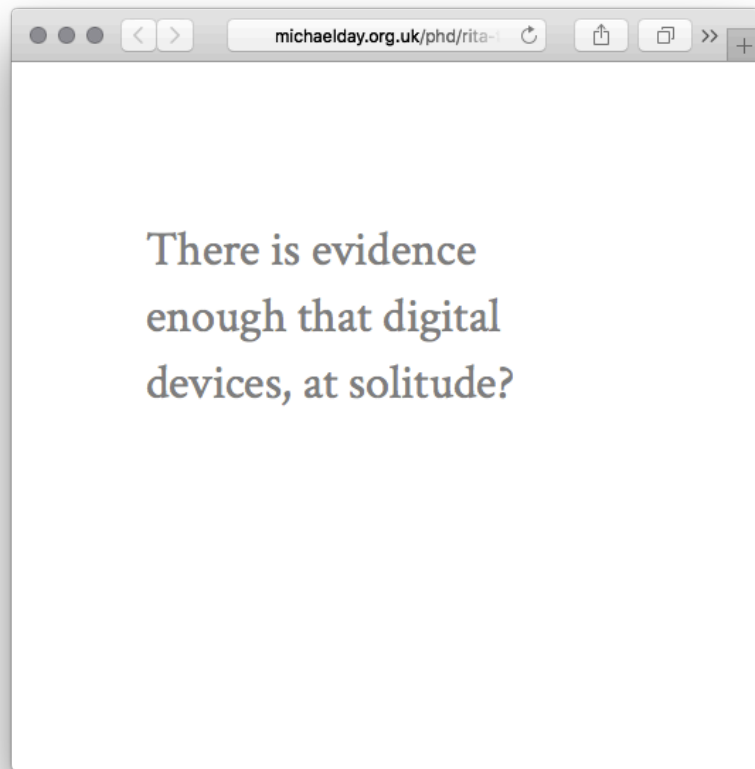
<http://michaelday.org.uk/phd/rita-test/>











This piece was never formulated into a finished work and was donated to another research student whose research addressed modes of reading more directly than mine.

November 27, 2015

© 2018 Michael Day.

Screen Time

2016

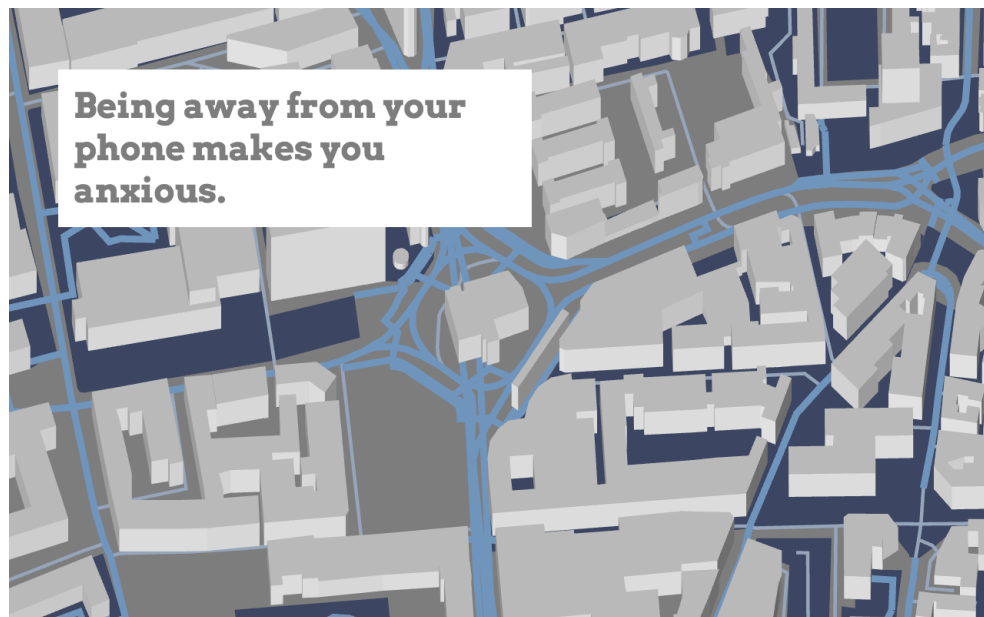
VIDEO DOCUMENTATION

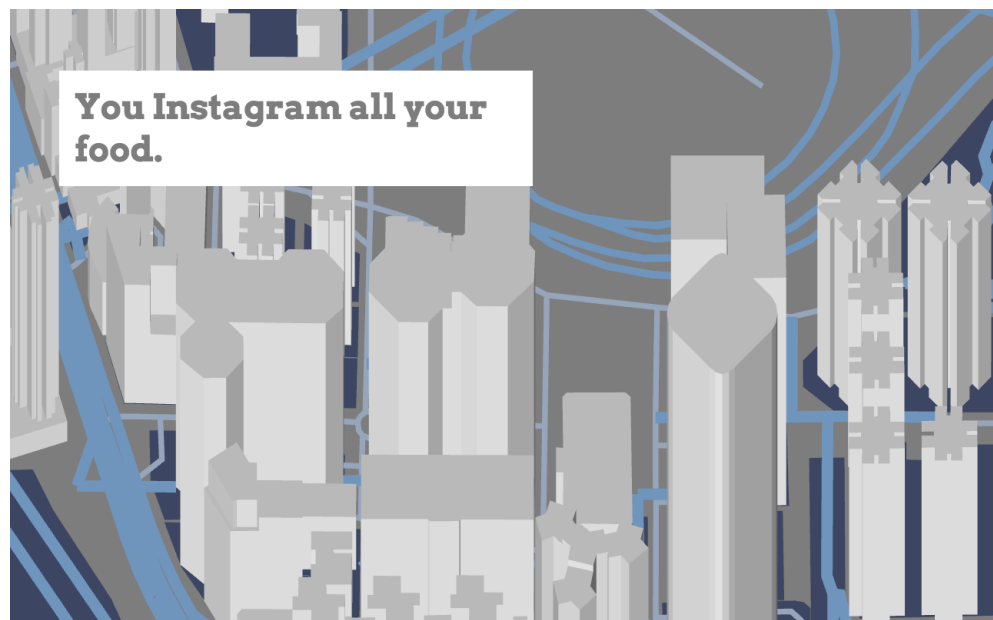
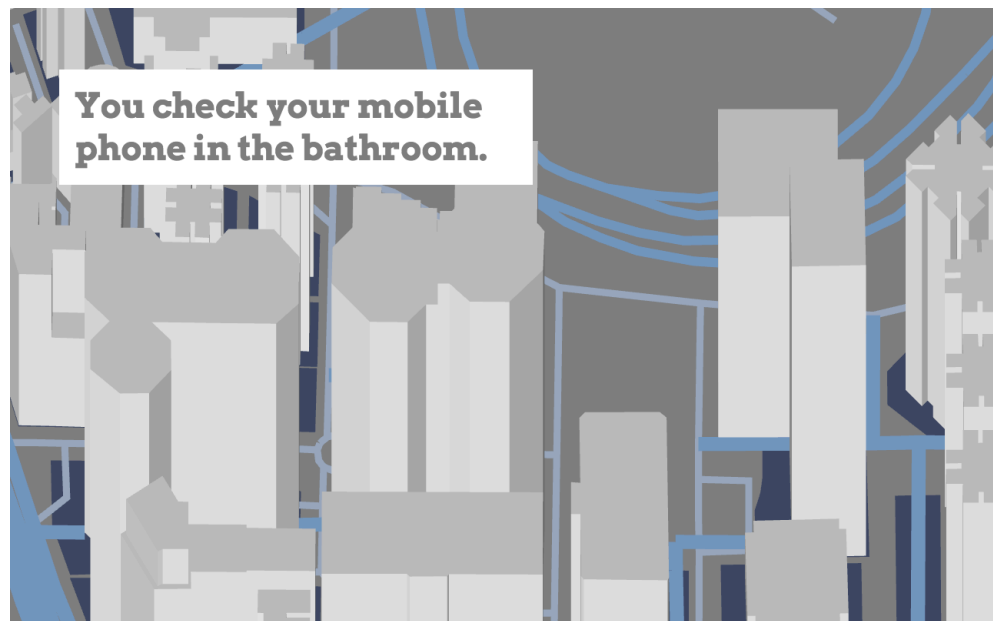
[VIDEO]

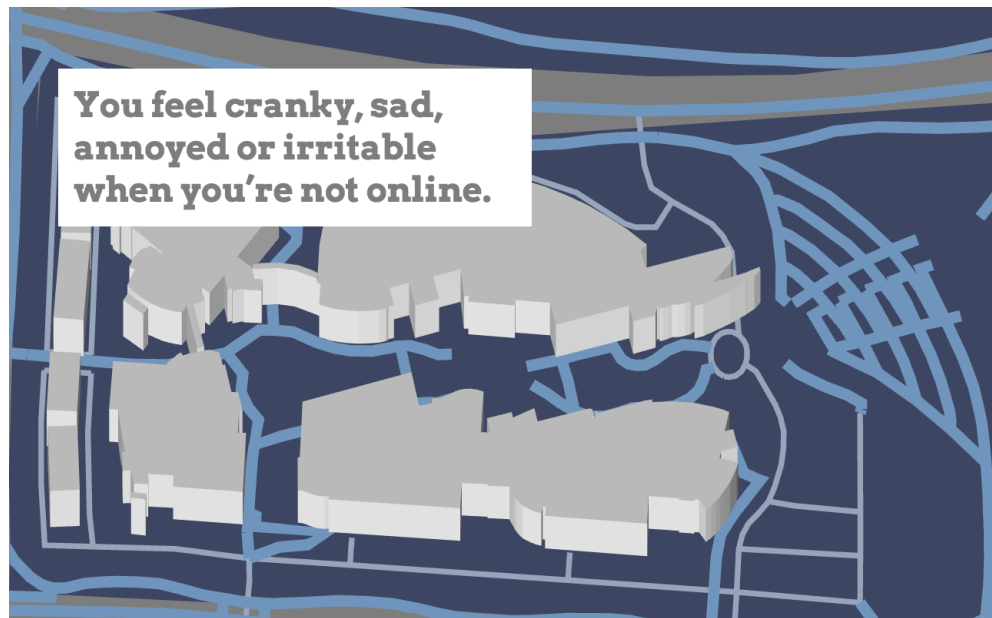
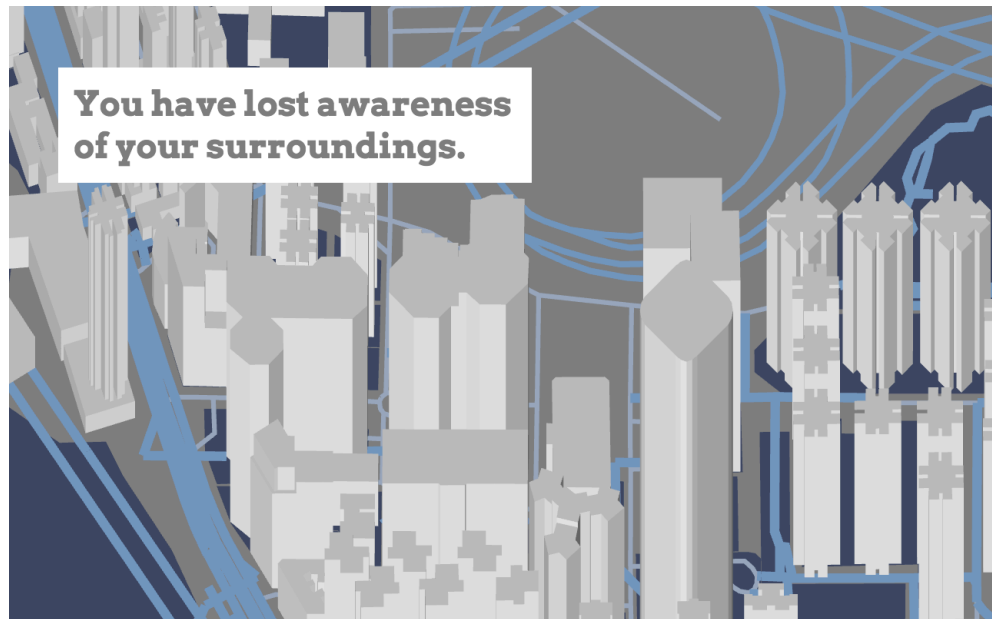
This piece is intended to be viewed live on the web. At the time of submission, the mapping library that the piece relies on has been discontinued and a replacement is being sought. The video above is a screen capture of the piece.

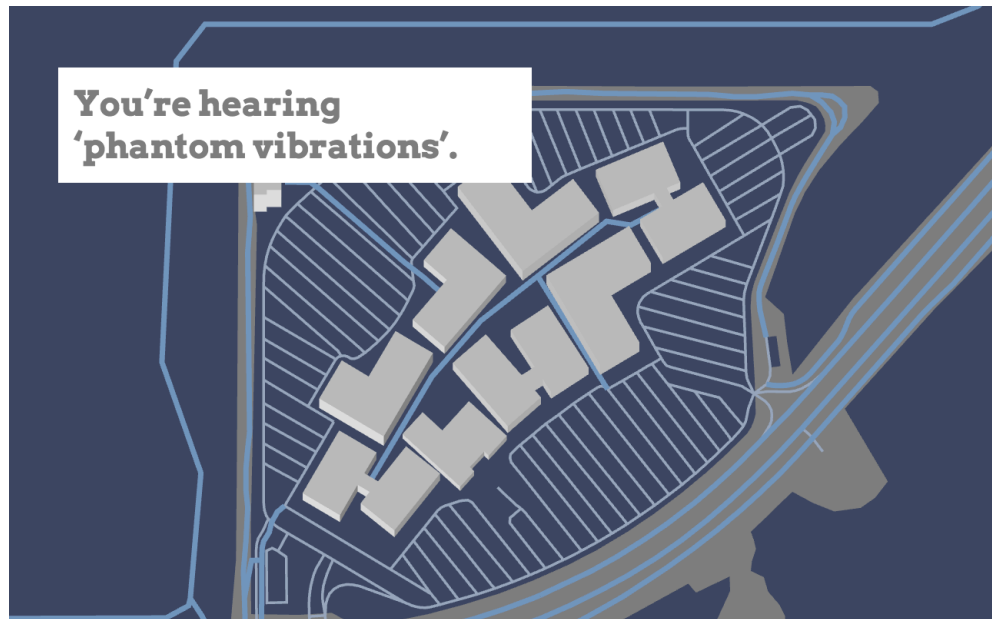
DOCUMENTATION IMAGES











INSTALLATION VIEWS AT THE *AFFECT & SOCIAL MEDIA #3 CONFERENCE*, UNIVERSITY OF EAST LONDON



ddd



EXHIBITION HISTORY

Research Inside Practice symposium at Peltz Gallery, Birkbeck, University of London, January 2016.

Affect & Social Media #3 Conference, University of East London, May 2017.

January 26, 2016

© 2018 Michael Day.

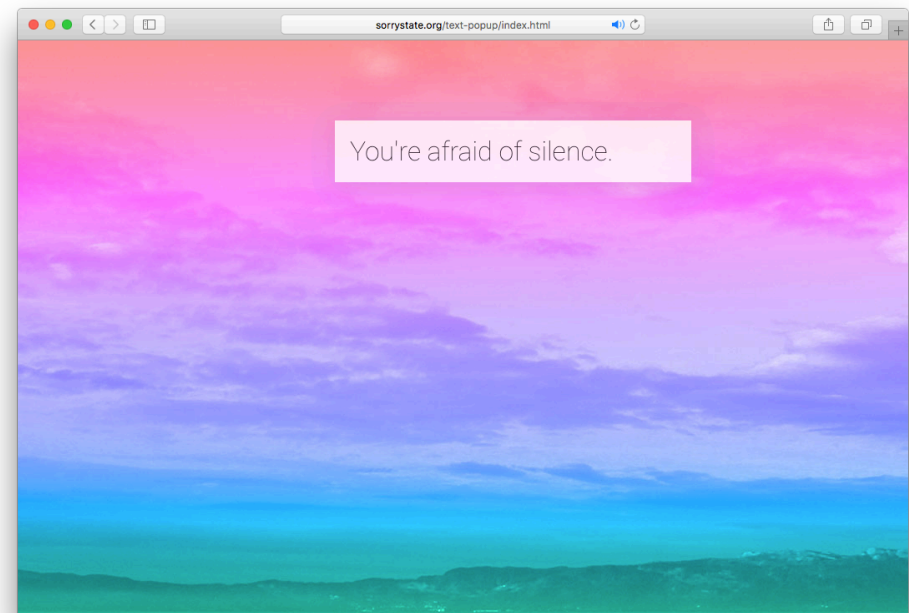
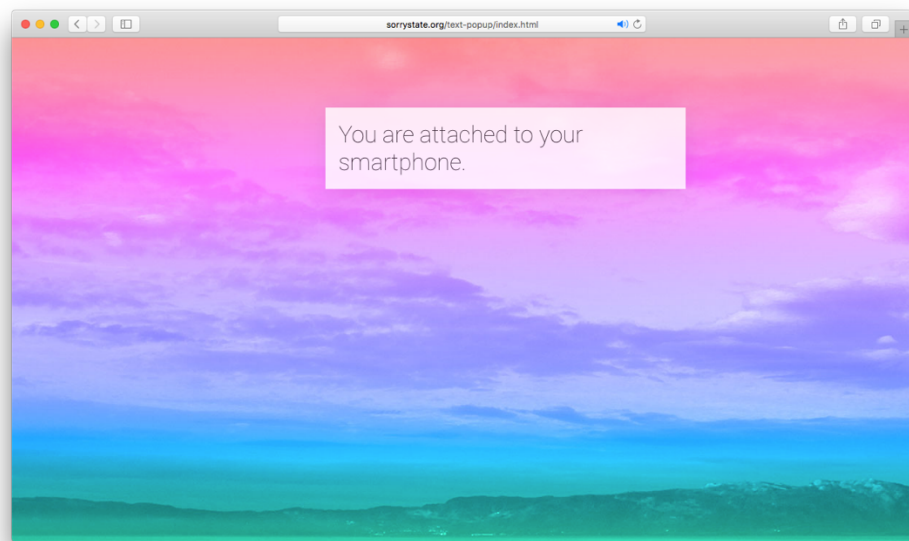
'text-popup'

2016

This piece can be accessed at the following URL:

<http://michaelday.org.uk/phd/text-popup/>

Please ensure sound is enabled on your browser and the volume is up.



fff

January 27, 2016

© 2018 Michael Day.

Artefacts

2016

This body of work in sound began concurrently with the 'text-popup' piece. The original intention was to produce a series of alert sounds that weren't friendly, engaging, or nice.

[Audio]

These distorted bleeps gradually developed into more composed works that combined ambient sound with the acidic digital noises.

[Audio]

The end result was a composed piece.

February 27, 2016

© 2018 Michael Day.

'jelly-beans'

2016



This piece was developed in response to playing Candy Crush and learning about 'juicy feedback'. The intention was to attempt to model objects from Candy Crush and place them in a less attention-intensive and gamified environment.

The piece operates as a single web page, which shows jelly beans revolving slowly in 3D space.

It can be accessed at this URL:

<http://michaelday.org.uk/phd/spinning-beans/>

April 27, 2016

© 2018 Michael Day.

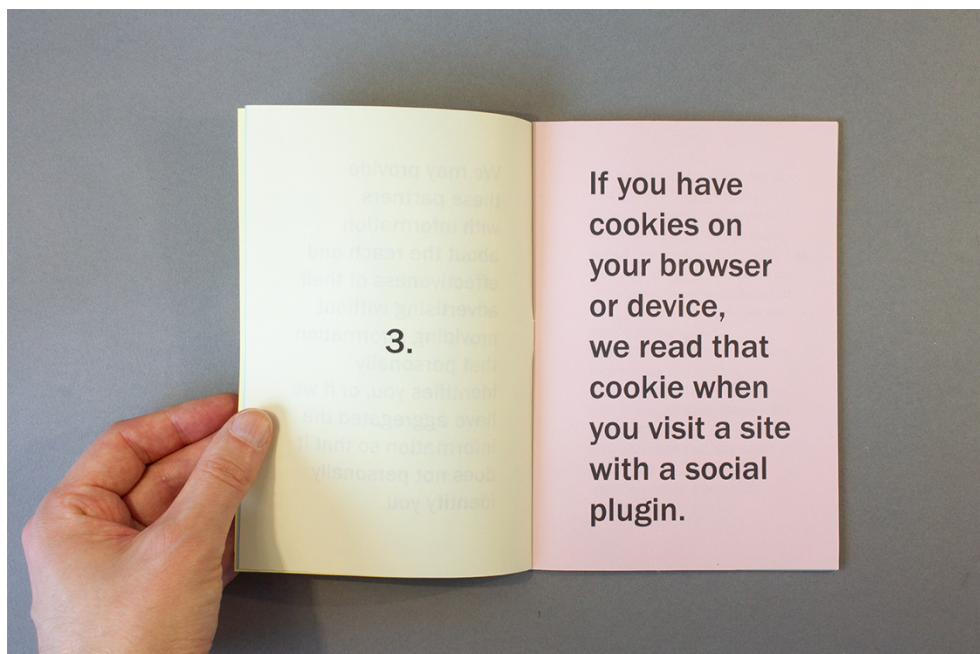
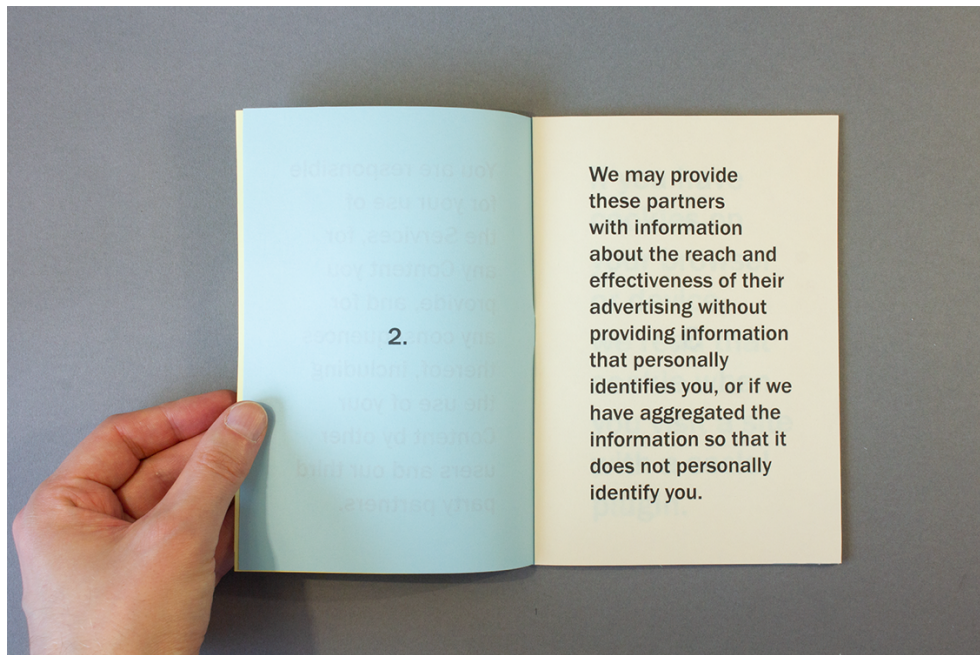
EULA TL;DR

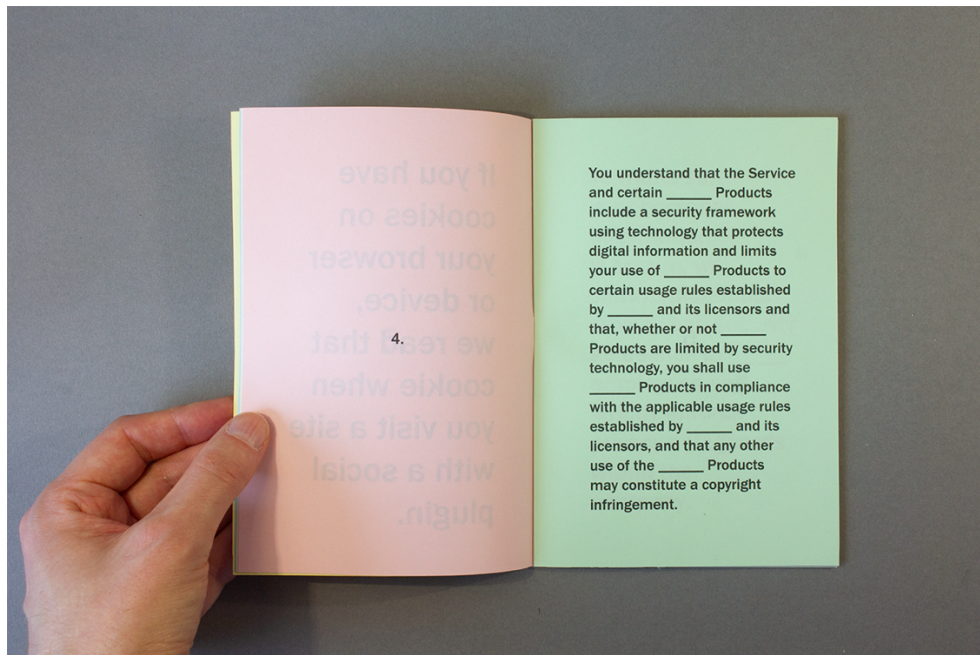
2016

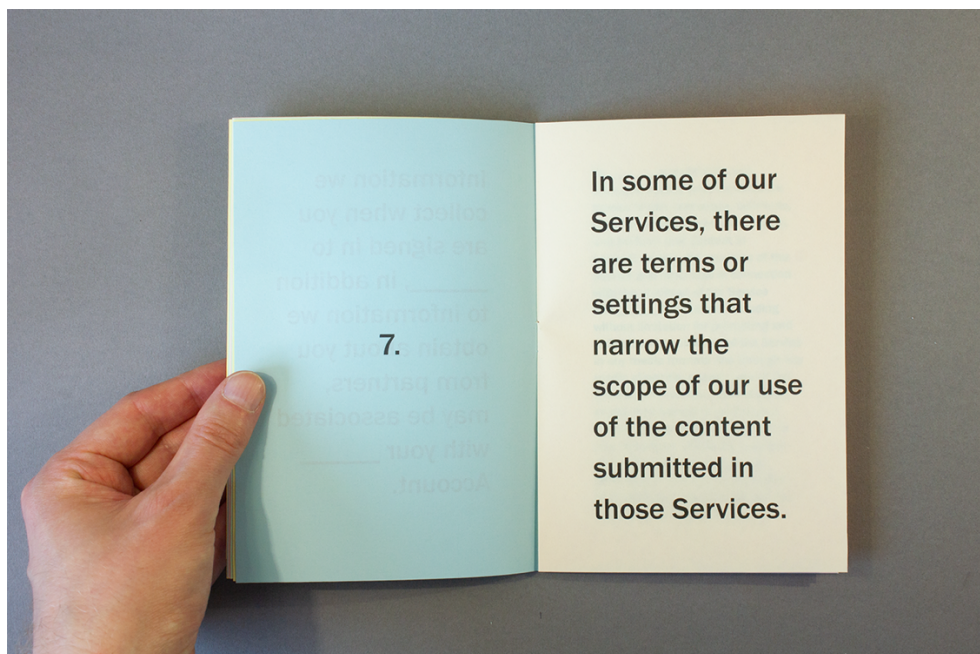
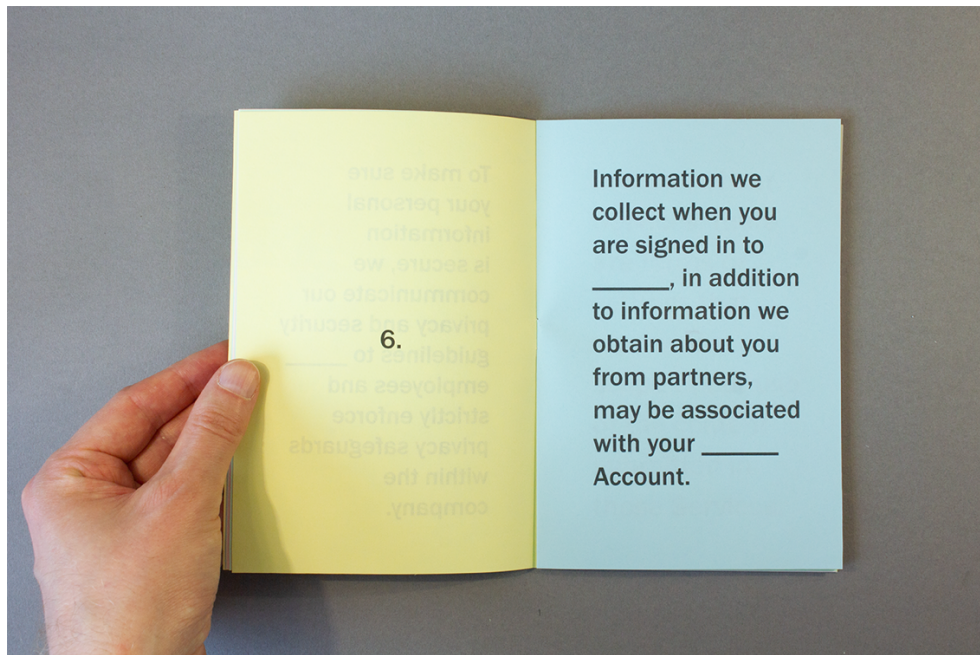
A zine that contains the end user license agreements (EULAs) for major web platforms after being passed through an online summariser.

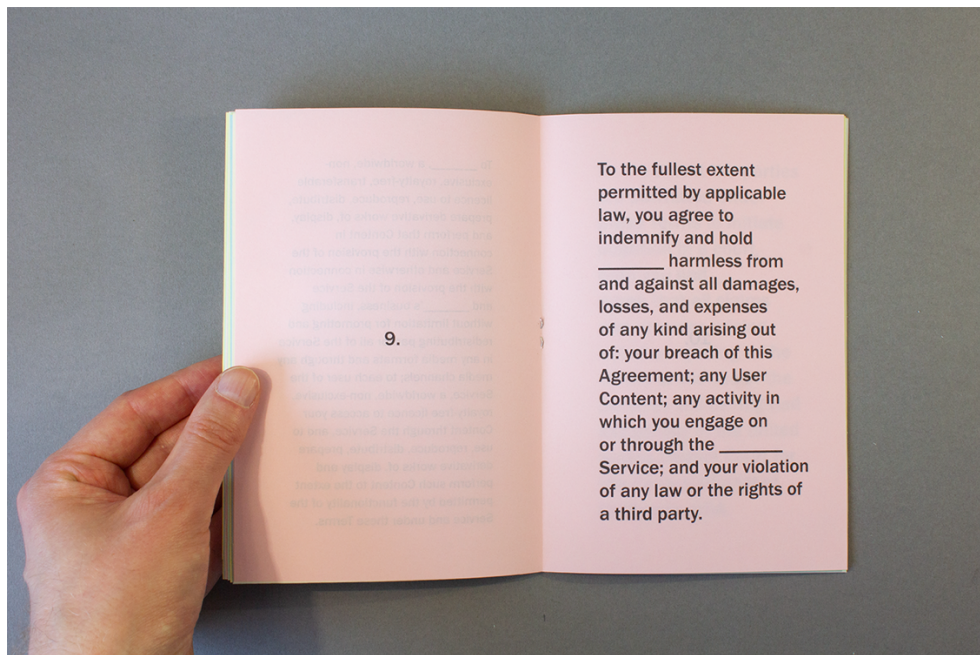
DOCUMENTATION IMAGES

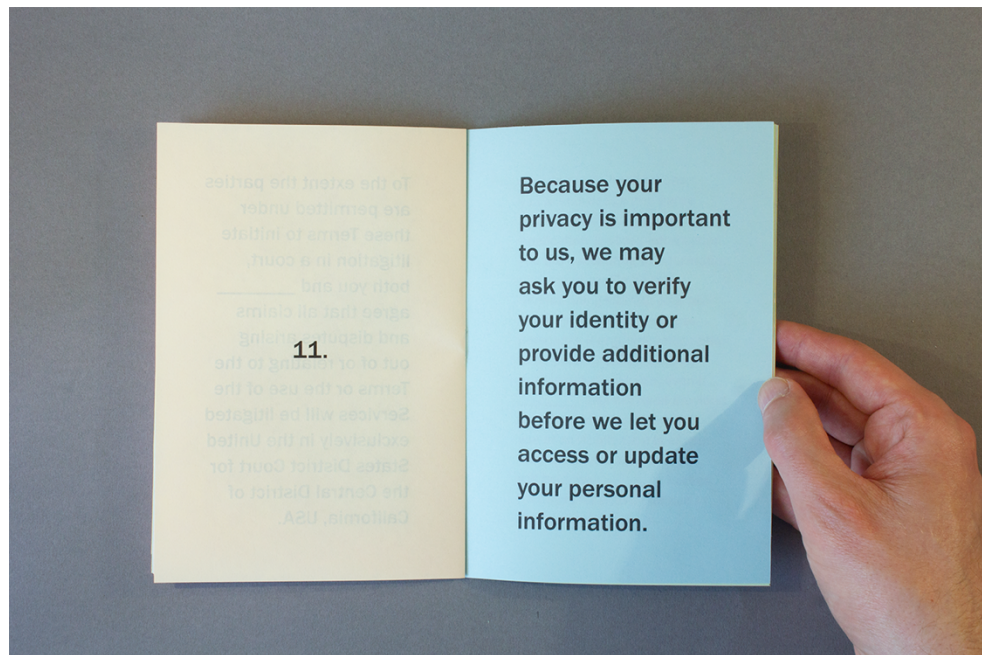
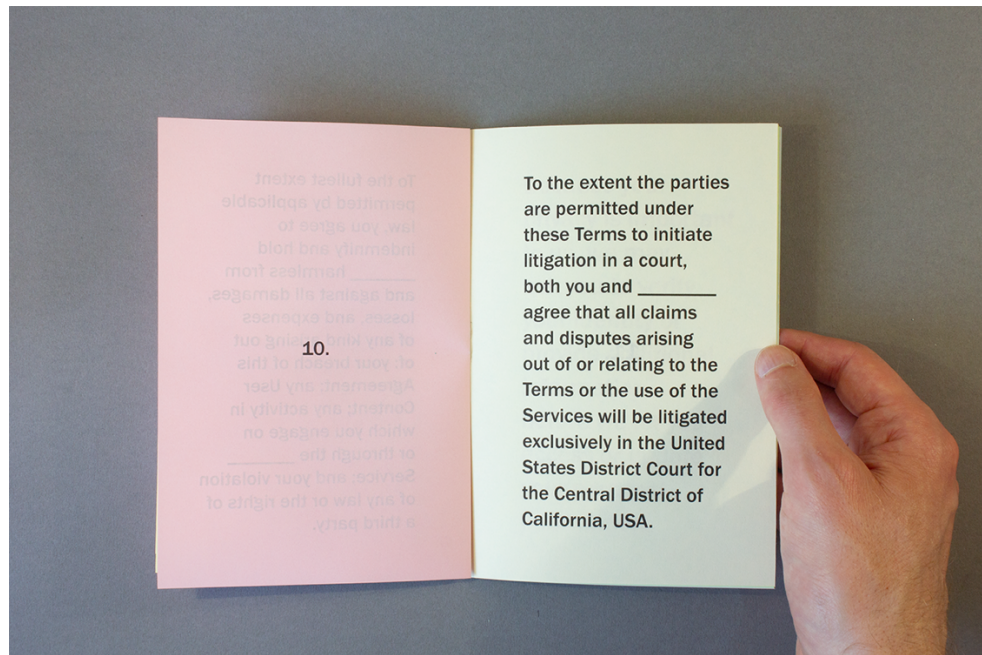


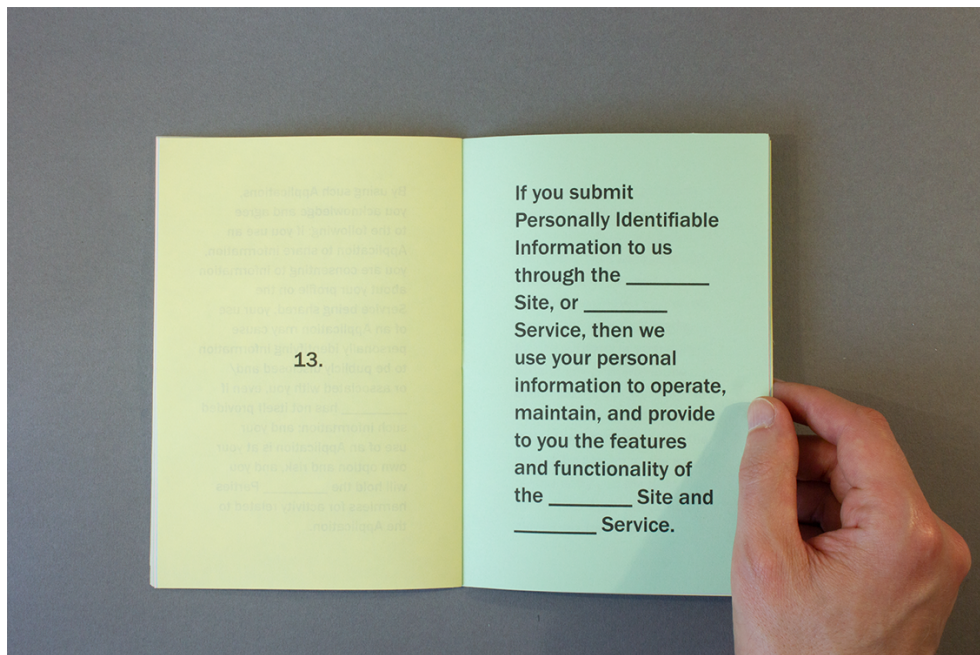


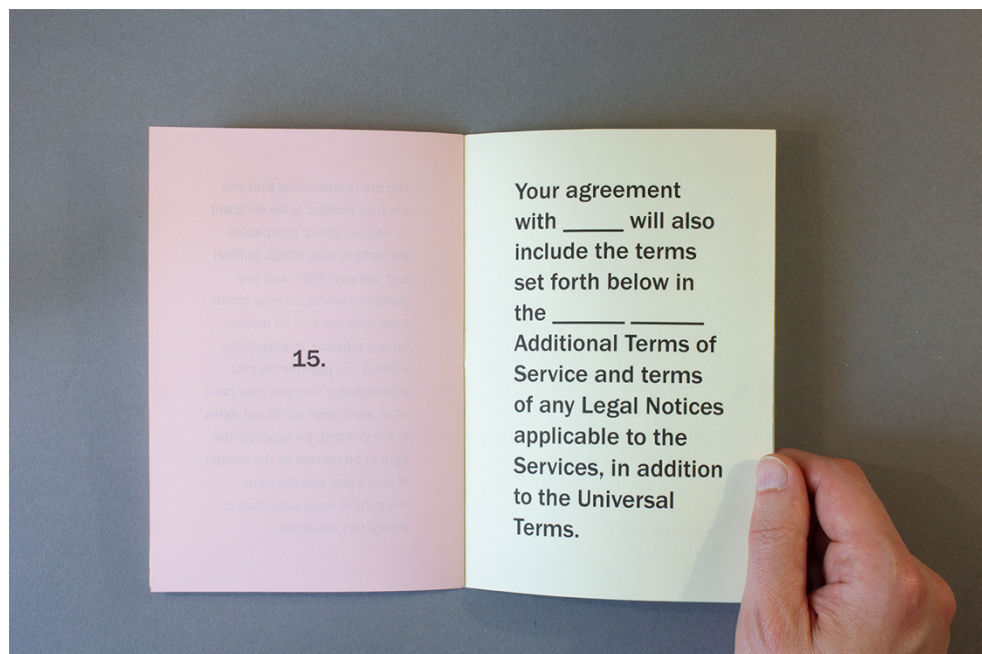
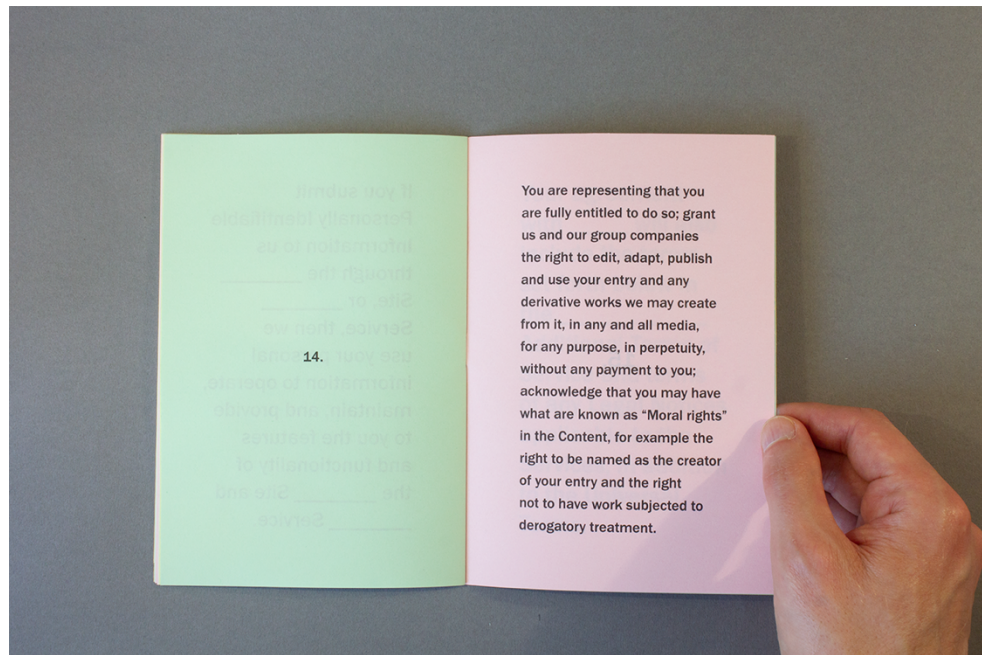


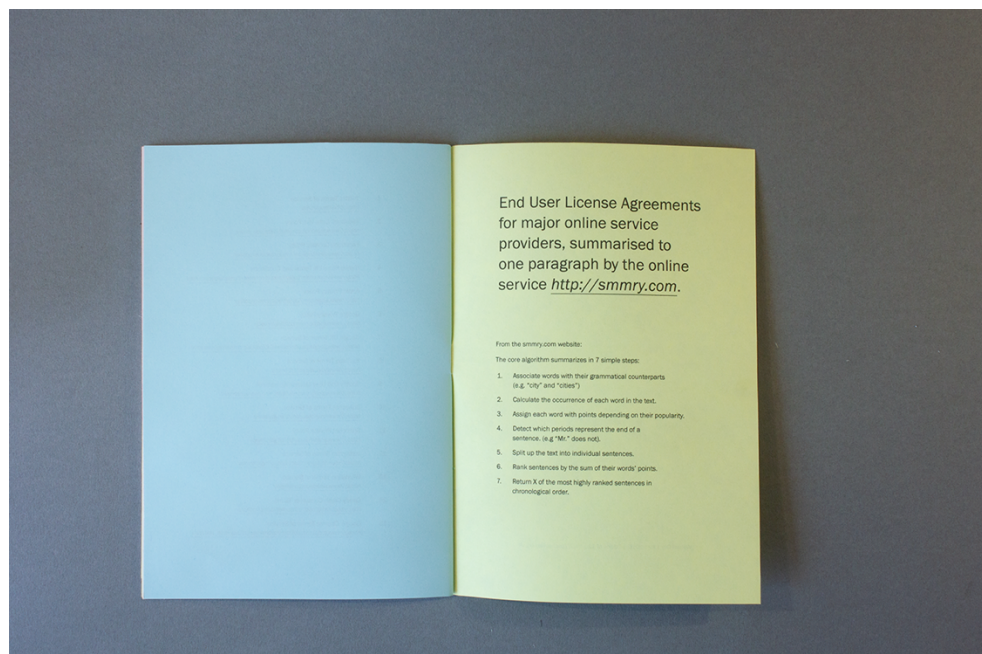


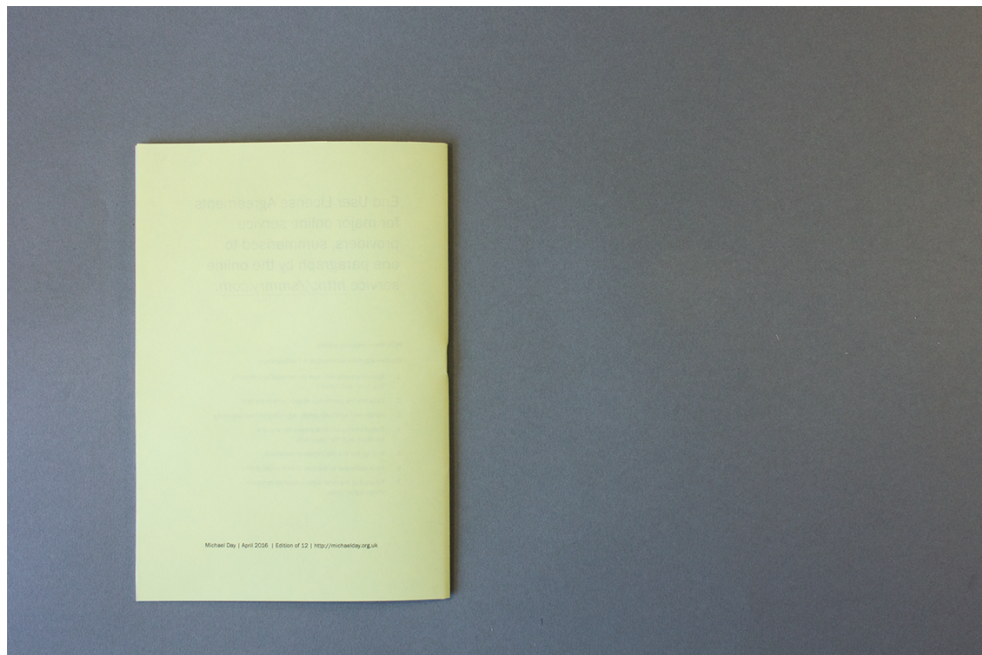












May 27, 2016

© 2018 Michael Day.

Testing, Testing

2016



Testing, Testing is a project that aims to explore the process of artistic production as research methodology. Initiated and produced by practice-based Ph.D. researchers in the fine art subject area at Sheffield Hallam University, the

project takes the form of an exhibition at SIA Gallery, a symposium event, and two publications, both of which I co-edited with Jo Ray. The first publication was printed professionally whereas the second volume had more of a self-published feel and was hand-assembled.

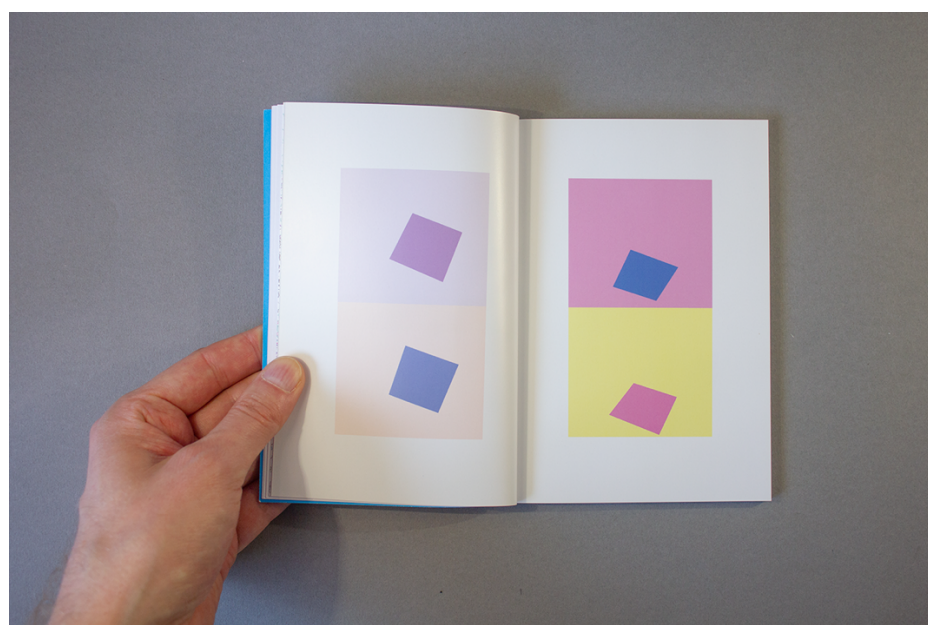
WEBSITE

<http://testingtesting.org.uk>

VOLUME 1

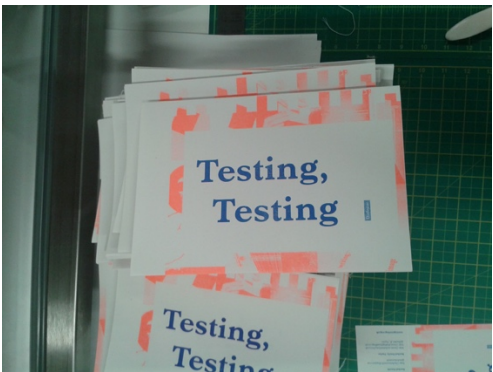


uuu

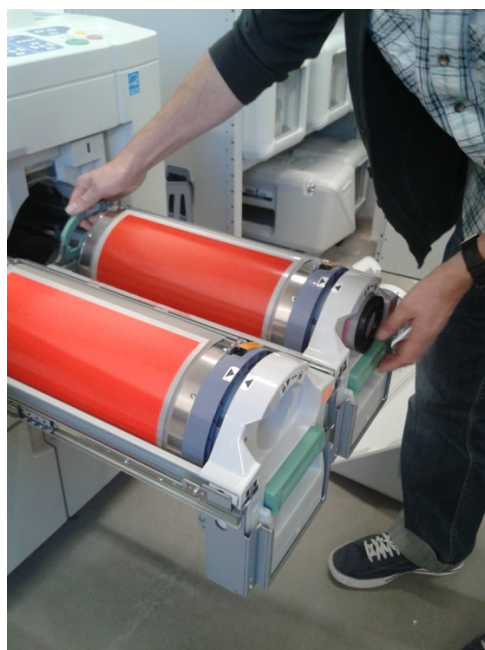




VOLUME 2 PRODUCTION IMAGES









ZZZ

July 27, 2016

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aaaa

Mock Objects

2016

Mock Objects is a moving image work which consists of a modified version of the debugging output of a popular JavaScript AR library, js-aruco. It shows the augmented reality software algorithm's best guess of the orientation of a marker in a video scene. Since the estimated position and angle of the marker changes with each frame of the video, the image flickers from one orientation to another. The restless image is evidence of the software's indecision about how it understands what it sees.

Viewers may be able to infer that the movement is generated from human activity, since even after processing, there is still an identifiably organic character to the motion. The piece highlights an instance of algorithmic uncertainty, making the measurement of this uncertainty a major formal component of the work. While highly visually reductive and utilitarian in appearance, the piece makes visible a process of computation that is contingent and inconclusive.

VIDEO DOCUMENTATION

[VIDEO]

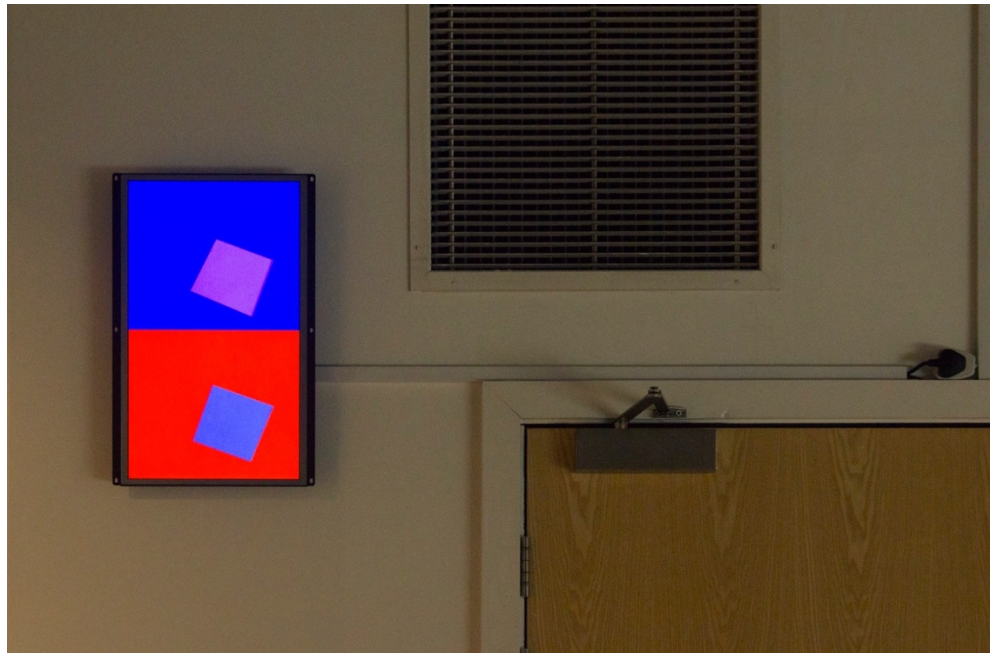
DOCUMENTATION IMAGES



CCCC

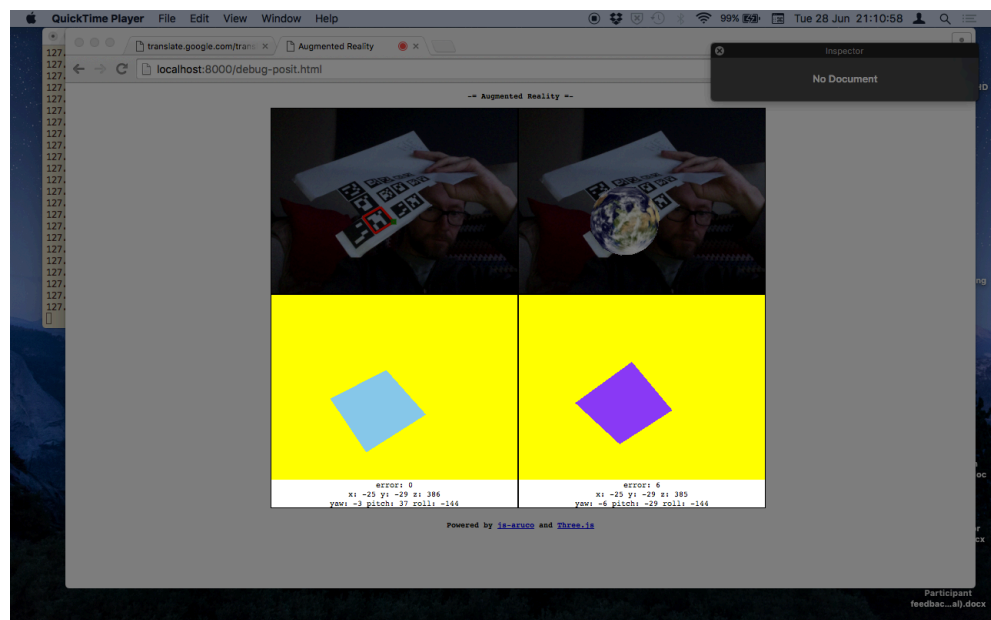


dddd

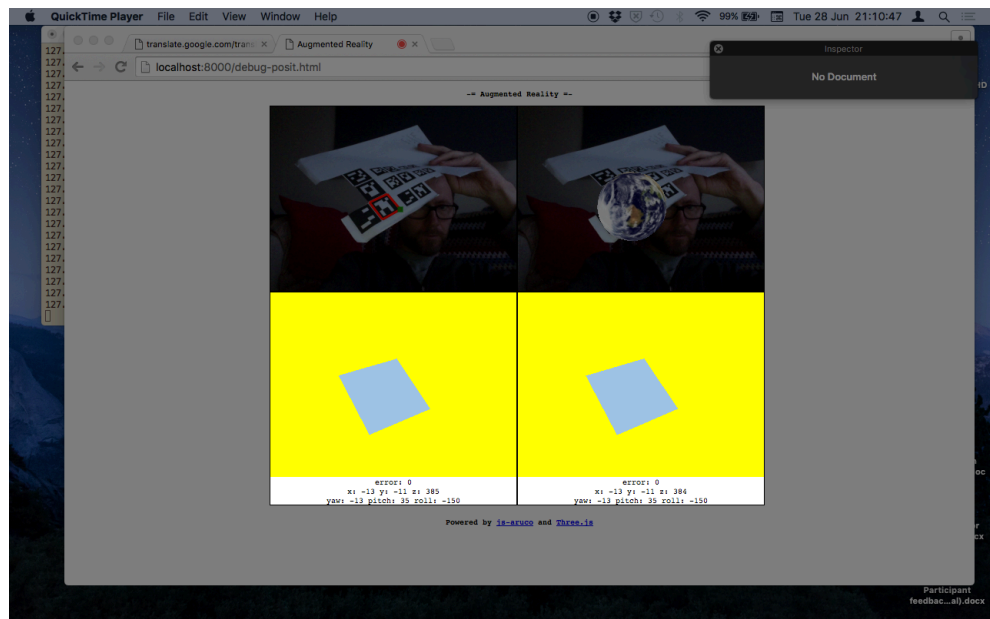


PRODUCTION PROCESS

Having made the decision to explore augmented reality, the software library js-aruco seemed to generate interesting errors in its debugging screen.



eeee



Markers of various sizes were produced for testing.

Markers

A 7x7 grid with an external unused black border. Internal 5x5 cells contains id information.

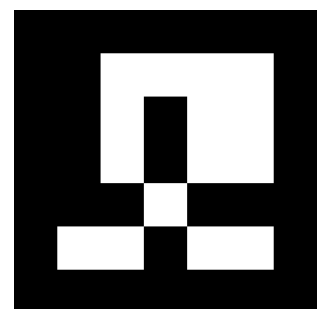
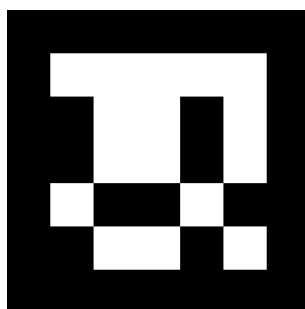
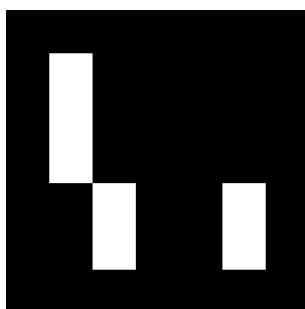
Each row must follow any of the following patterns:

white - black - black - black - black

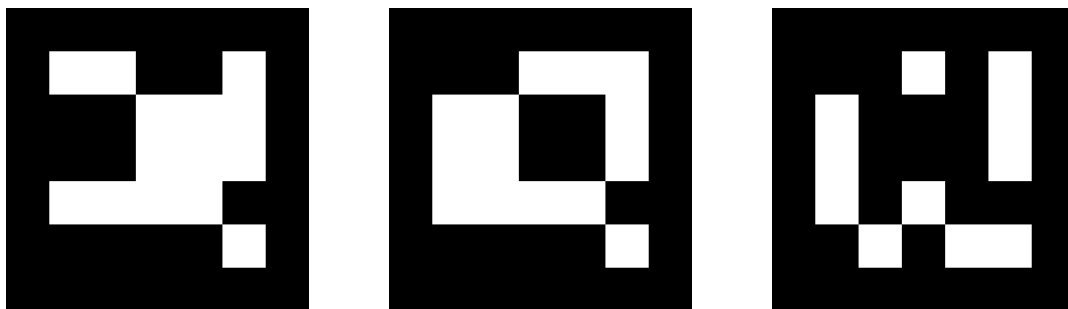
white - black - white - white - white

black - white - black - black - white

black - white - white - white - black

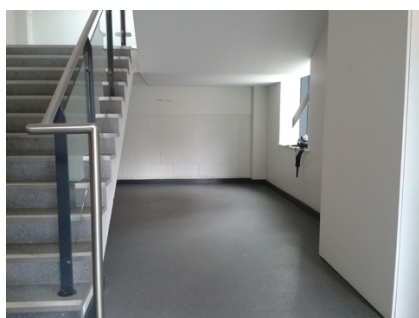
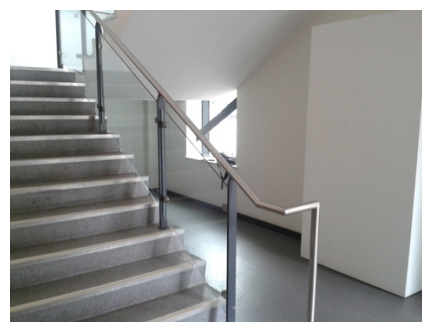
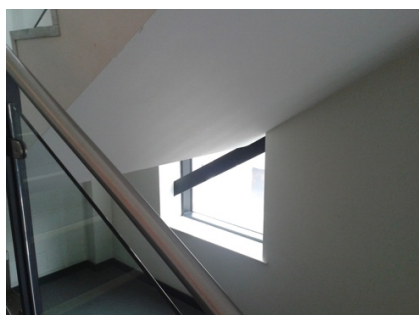


ffff



PROPOSAL PROCESS

Possible locations outside of SIA Gallery in Cantor building were located on a site visit.



gggg

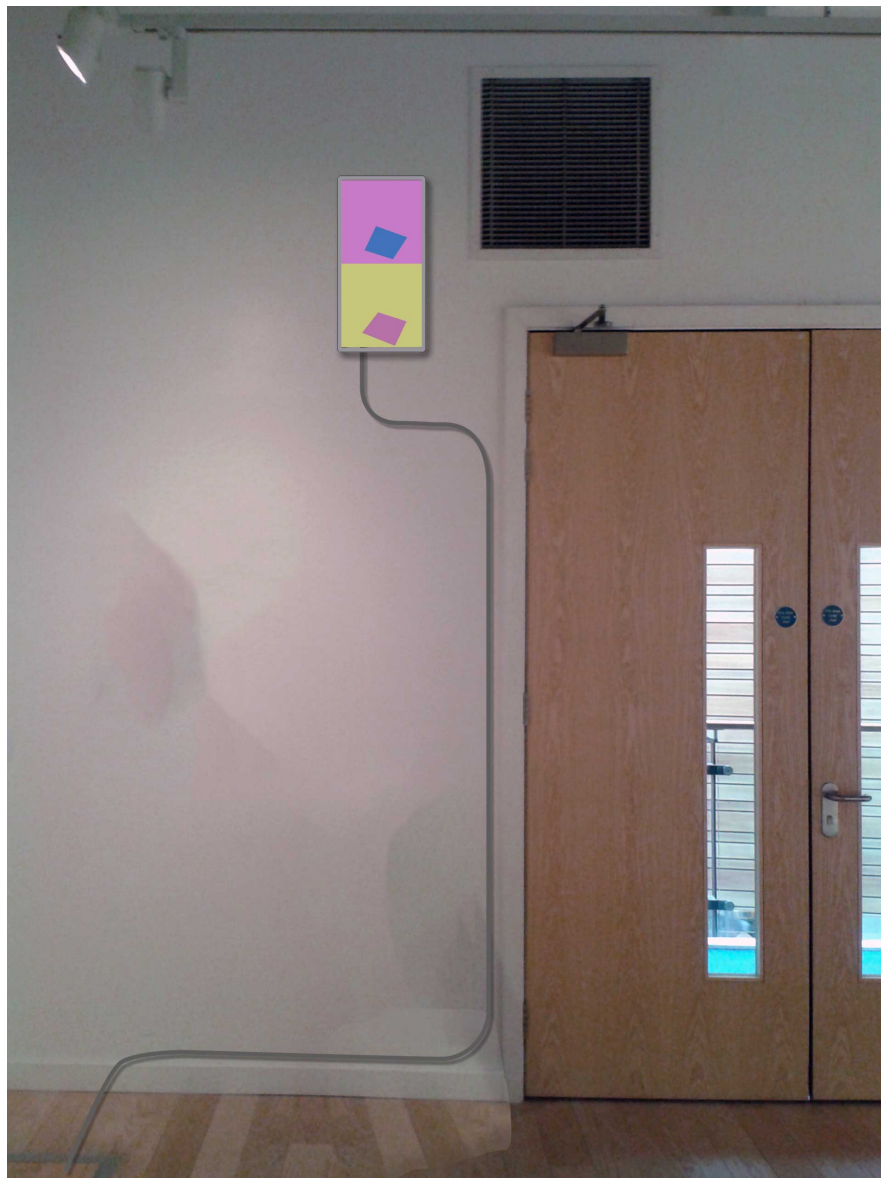
Proposal for Testing Testing – 28th June 2016

This location was rejected because of equipment sourcing and H&S issues.

Proposal for Testing Testing – 5th July 2016

The second proposal relied on the rotation of the in-gallery projector, which it turned out wasn't possible.

The final proposal located the work on a screen, mounted on the upper storey of the gallery, as shown in the mock-up below.



Plan of works for whole exhibition

hhhh

EXHIBITION HISTORY

Testing, Testing, SIA Gallery, Sheffield, July–August 2016.

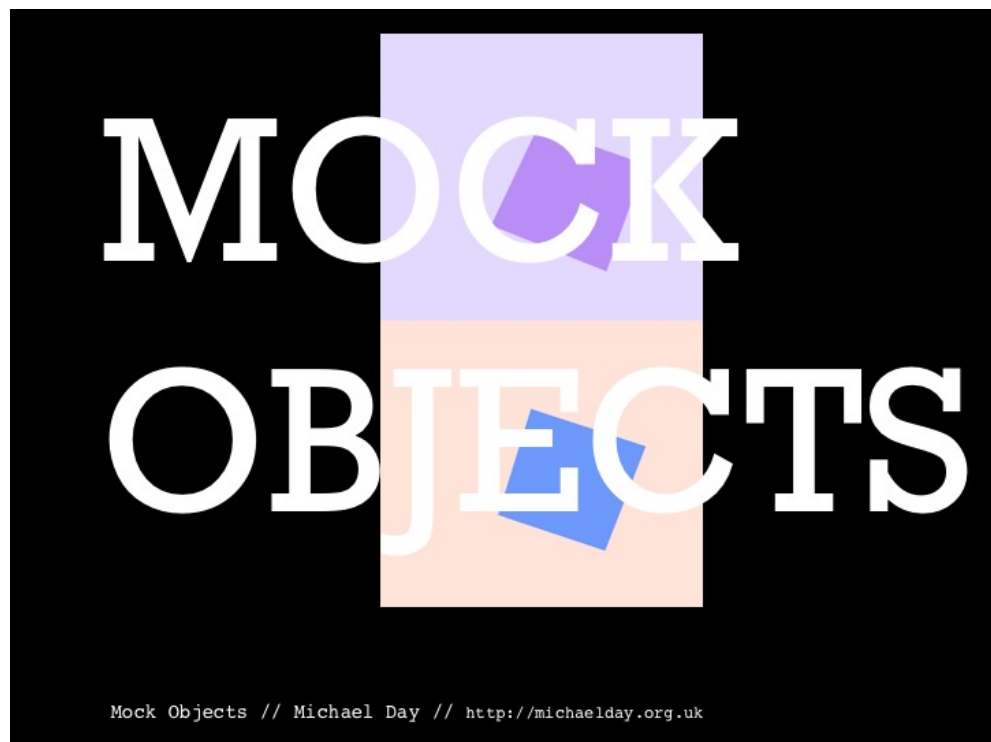
August 1, 2016

© 2018 Michael Day.

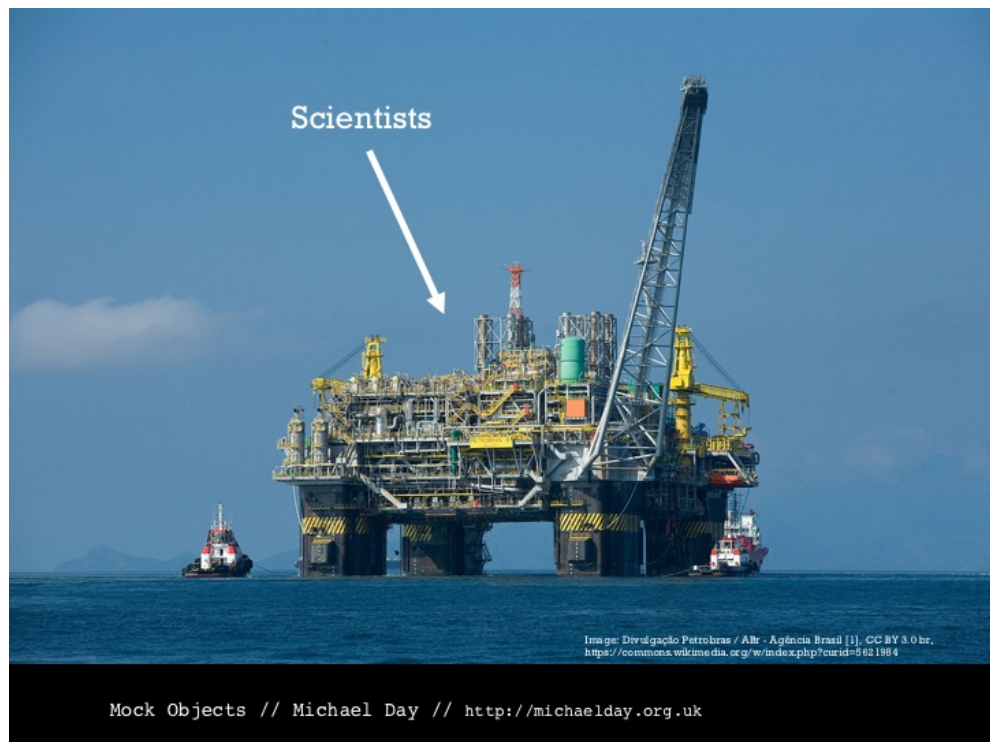
Symposium

2016

This is a record of a presentation made at the Testing Testing symposium which shows my initial interpretations of the work in the exhibition, and shows my thinking at that time. This was written up into a chapter in the *Testing Testing: Dialogue* publication and later revised and integrated into my thesis.



Interdisciplinary dialogue is at the centre of my research. Intro to my research/practice my own work is concerned with attention and distraction, and compulsive internet and device usage (although it's moving) all about the capture of attention attention studies is the backbone of the interdisciplinarity in my study UI/UX, stuff from design psychology and the study of behaviour, neuroscience also media studies, sociology, cultural studies, wellbeing - even transhumanism



Impossibly broad, impossible to get full expertise in these areas.
 Scientific research: like doing a survey, finding an untouched area,
 drilling for oil

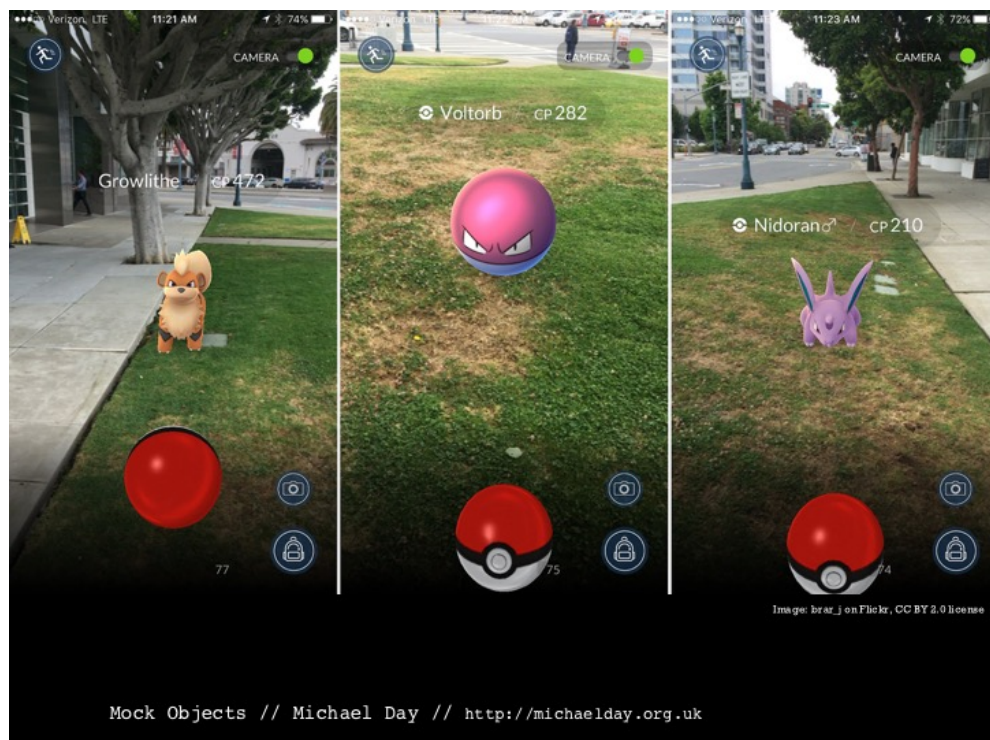


Artistic research: cleaning up an oil spill over a wide area,
 aggregating and recombining knowledge leaked from other disciplines
 This is how interdisciplinary dialogue works for me

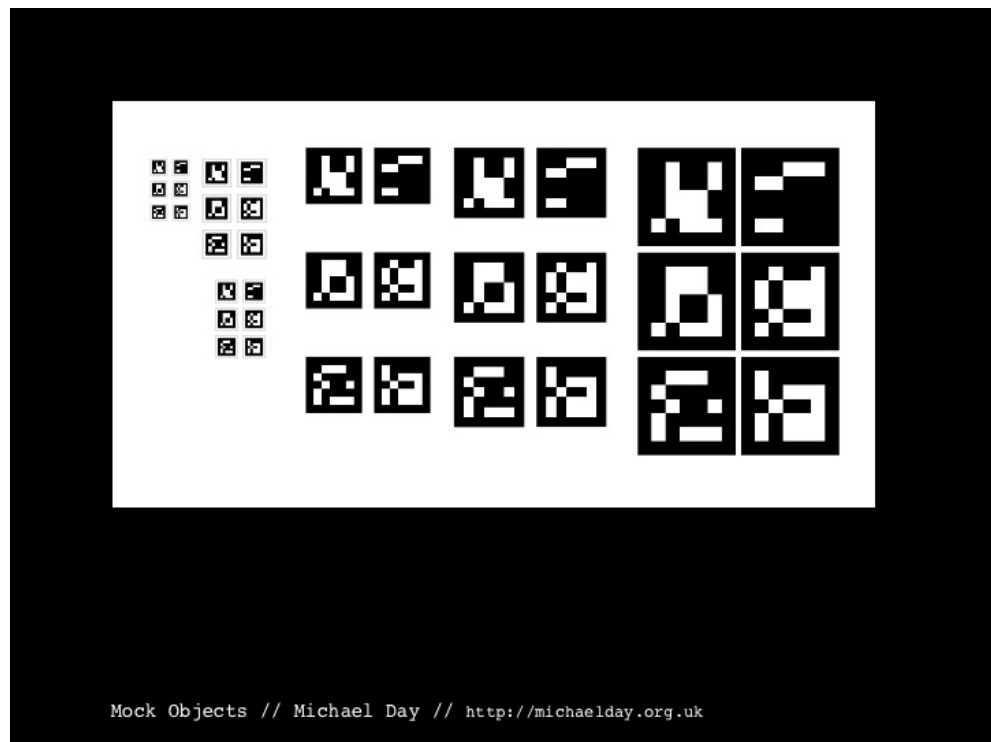
kkkk



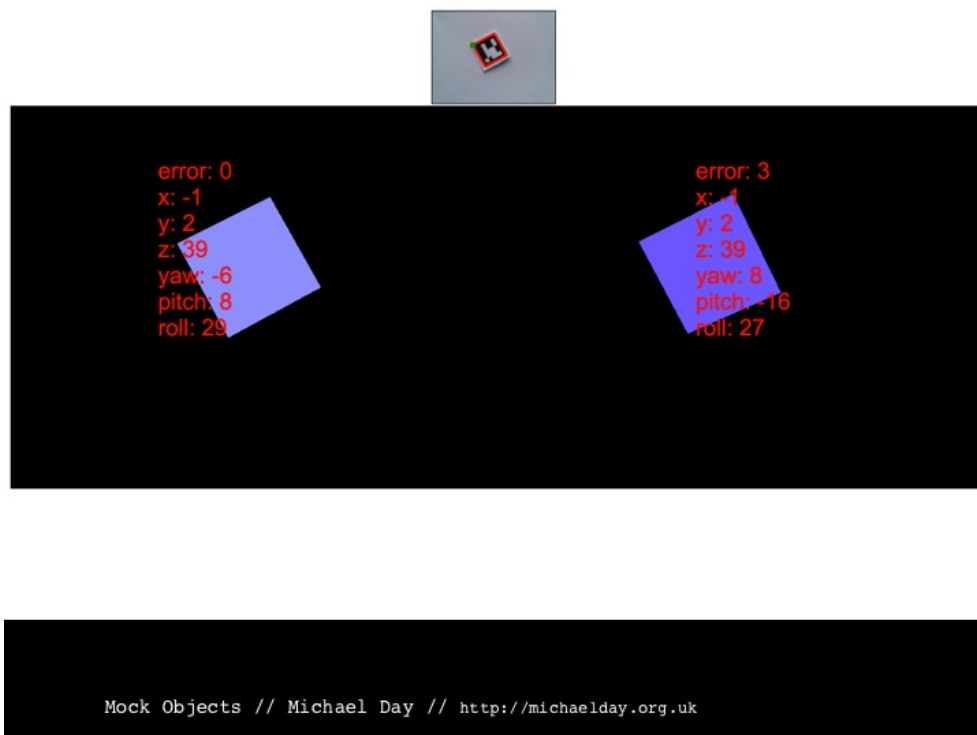
Wrote about compulsive internet usage, online/offline borders, gamification in the book so won't repeat that here Online/offline borders led me to use modified Augmented Reality software



Pokemon Go: Augmented Reality consists of live video and digitally rendered elements that 'augment' the live scene

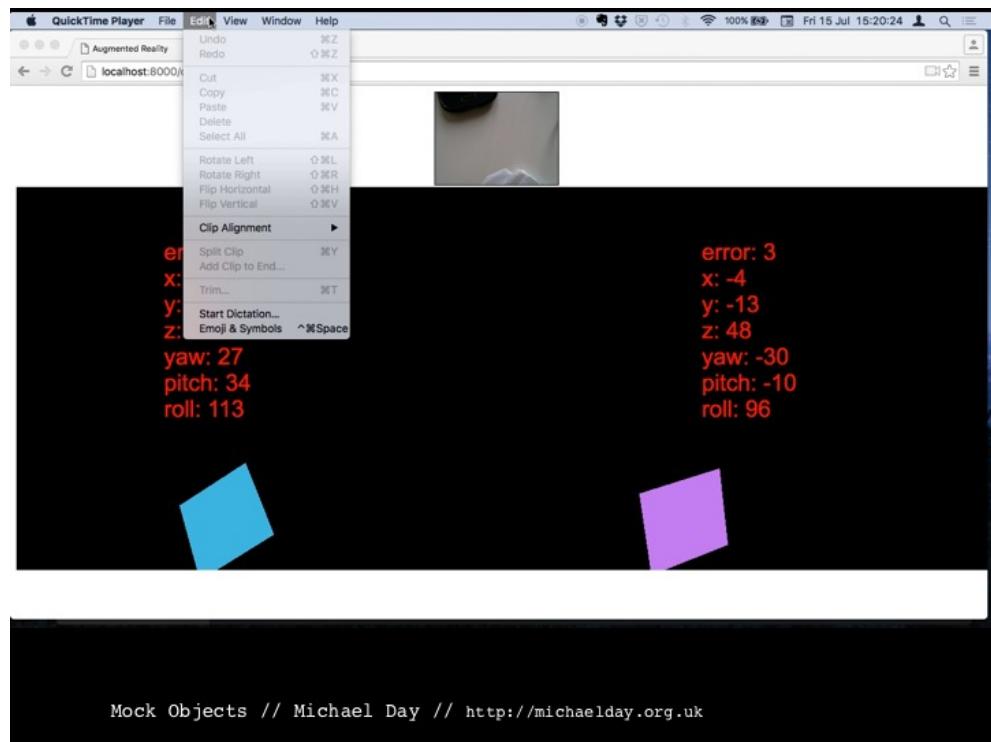


The software I have modified uses markers like this to orient the scene.



It uses a modified computer vision system to locate markers in a video scene, which is playing in the background but, based on these markers, it can only make a best guess about the orientation of them,

mmmm



leading to a level of indeterminacy or error in its interpretation of reality. It wobbles because it's processing every video frame in sequence, and each one comes out a little different results in a restless image, flickering, and making visual the uncertainty of the computer system



Analysis of form

nnnn



Installed on infrastructure wall - everything on that wall is supposed to be invisible

**“The bigger the infrastructure,
the more likely it is to drift
out of awareness”**

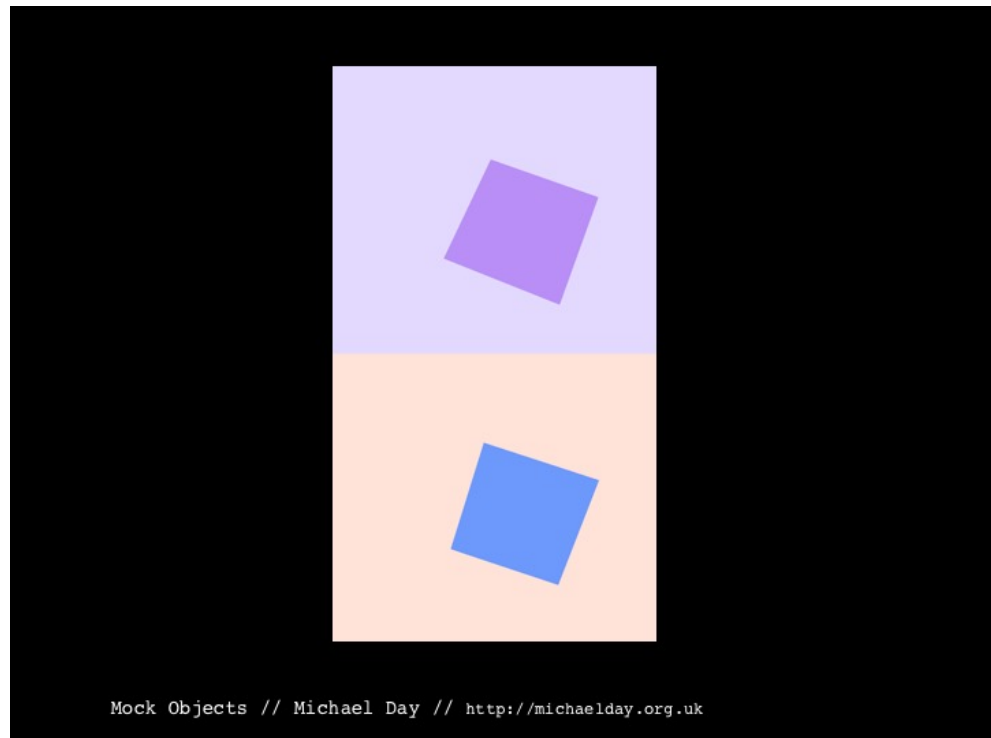
John Durham Peters, *The Marvelous Clouds*
(Chicago and London: University of Chicago Press, 2015), p. 32.

Mock Objects // Michael Day // <http://michaelday.org.uk>

As John Durham Peters writes about, infrastructure is supposed to be invisible: “The bigger the infrastructure, the more likely it is to drift out of awareness.” p36 Their invisibility is not accidental: when we consider this, they foreground what they are ‘infra’ to: in this case, the white-walled institutional gallery space with all its

0000

structures of engagement, expectations of behaviour, attentional norms
it's a sign that you're supposed to ignore is it a status readout? is
it measuring? What is the subject of the measurement?



Whether they know what they're comparing or not, making a comparison
between two images positions the viewer as an active empowered
overseer unlike compulsively designed interfaces, which reduce agency,
invoke habit visually, presents the output of a system rather than a
visual proposal - the output just happens to be visual. Aesthetics are
almost completely incidental to the work, comparisons with Albers,
minimalism etc might not yield much. Background slowly shifting to
emphasise the passage of time and the focus of attention for the
audience

“ ...it is precisely in the sub-visible experimentation that a person or thing of interest is brought to the surface of perception for action. The apparatus decides what or who matters.”

Louise Amoore, 'Cloud Geographies: Computing, Data, Sovereignty',
Progress in Human Geography, 2016, 309132516662147
<<http://dx.doi.org/10.1177/0309132516662147>>.

Mock Objects // Michael Day // <http://michaelday.org.uk>

My method - tinkering with existing libraries and reflecting on the results as if they were artworks - allows something like insight to turn up through crossing disciplines, through defamiliarisation . How is this understood? One way: What's emerging here is the uncertainty of computational representations of reality. If it can't decide which way up a square is, why defer to it in other contexts? Uncertainty is a false binary in this piece - computational modelling of reality is much more sophisticated than that multiple data points are used to create profiles with which to build things that attempt to grab your attention. One way of understanding this: Louse Amoore, *Cloud Geographies*: criticises the 'observational paradigm' that is present in art, and in fact, all empirical research: argues that the appearance, the making visible, isn't enough when there are invisible processes that are creating actionable decisions

qqqq

Thank you

Mock Objects // Michael Day // <http://michaelday.org.uk>

The question here is 'how does it work' not 'what does it look like'. What is role of the gallery as a context to talk about computational issues ? Next: questions about when UI can't rely on visual interaction alone to invoke compulsion voice interface Alexa, Siri, Cortana Eliza - that's what will go into the next book.

September 1, 2016

© 2018 Michael Day.

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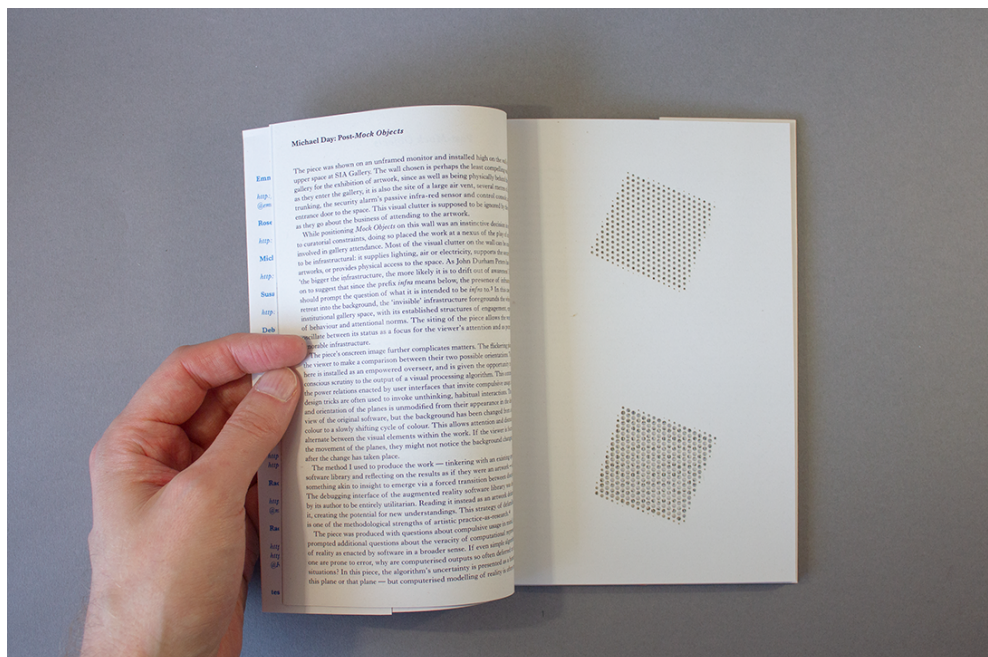
Post-Mock Objects

2016

A written piece was produced after the *Testing, Testing* symposium and was included in the volume *Testing, Testing: Dialogue*. The written piece was revised and incorporated into the body of the thesis.

A lasercut 'document' of the exhibition was included as a page in the book.

DOCUMENTATION IMAGES

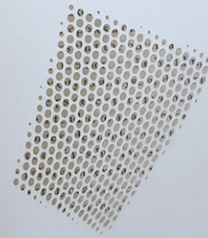
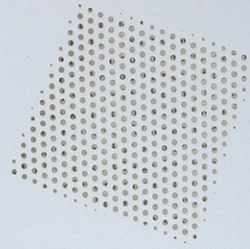


own on an unframed monitor and installed high on the wall of the Gallery. The wall chosen is perhaps the least compelling wall in the exhibition of artwork, since as well as being physically behind the viewer, it is also the site of a large air vent, several metres of cable, a fire alarm's passive infra-red sensor and control console, and the like. This visual clutter is supposed to be ignored by the viewer, the business of attending to the artwork.

Placing *Mock Objects* on this wall was an instinctive decision in response to constraints, doing so placed the work at a nexus of the play of attention and attendance. Most of the visual clutter on the wall can be considered 'infra': it supplies lighting, air or electricity, supports the security of the gallery, and provides physical access to the space. As John Durham Peters has written, 'infra-structure, the more likely it is to drift out of awareness'. He goes on to say that since the prefix *infra* means below, the presence of infrastructure is the question of what it is intended to be *infra* to.³ In this case, by its background, the 'invisible' infrastructure foregrounds the white-walled gallery space, with its established structures of engagement, expectation and attentional norms. The siting of the piece allows the work to open its status as a focus for the viewer's attention and as potentially a structure.

The onscreen image further complicates matters. The flickering planes invite a comparison between their two possible orientations. The viewer is made an empowered overseer, and is given the opportunity to apply scrutiny to the output of a visual processing algorithm. This contrasts with the interactions enacted by user interfaces that invite compulsive usage, in which the planes are often used to invoke unthinking, habitual interactions. The colour of the planes is unmodified from their appearance in the debugging original software, but the background has been changed from a static slowly shifting cycle of colour. This allows attention and distraction to be directed at the visual elements within the work. If the viewer is focusing on it, they might not notice the background changing until it has taken place.

I used to produce the work — tinkering with an existing open source library and reflecting on the results as if they were an artwork — allowed me to insight to emerge via a forced transition between disciplines. The interface of the augmented reality software library was designed to be entirely utilitarian. Reading it instead as an artwork defamiliarises the potential for new understandings. This strategy of defamiliarisation was produced with questions about the methodological strengths of artistic practice-as-research.⁴ Additional questions about the work's use in mind, but it has been enacted by software to produce computational representations of data to create a visual field.



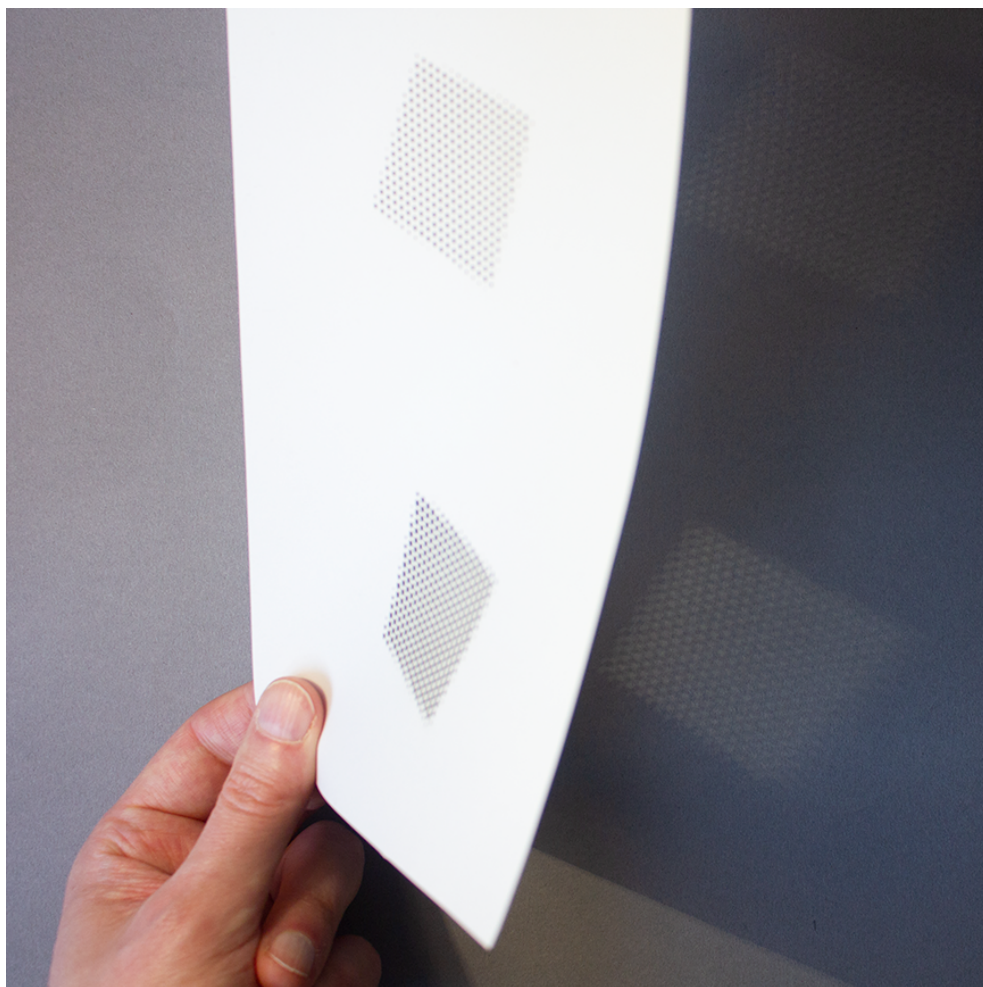
sophisticated than this, and the consequences more significant. For example, when using social media, multiple data points are passively generated and gathered to produce profiles of the user which are then used to push precisely targeted, attention-capturing advertisements. Facebook identifies almost a hundred separate data points to categorise users based on the data they generate through their use of the service.⁵ Algorithms model the user, and shape the view of reality that they are then presented with.

These interpretations of the work and the questions they raise might not be straightforward for a casual viewer to access. While a viewer might read the work only on its visual appearance, having the dual perspective of both viewer and author is enhanced my analysis. With prior knowledge that the piece is made of modified software, and knowing the extent of the modification and its functioning, questions about algorithmic interpretations of reality present themselves more readily. Conversely, reading the image solely on its appearance, a viewer might come up with a very different set of interpretations and questions.⁶ Exhibiting the work in a gallery context revealed that the meaning and the research content of this particular work are best covered not by asking what it looks like, but by asking *how it works*.

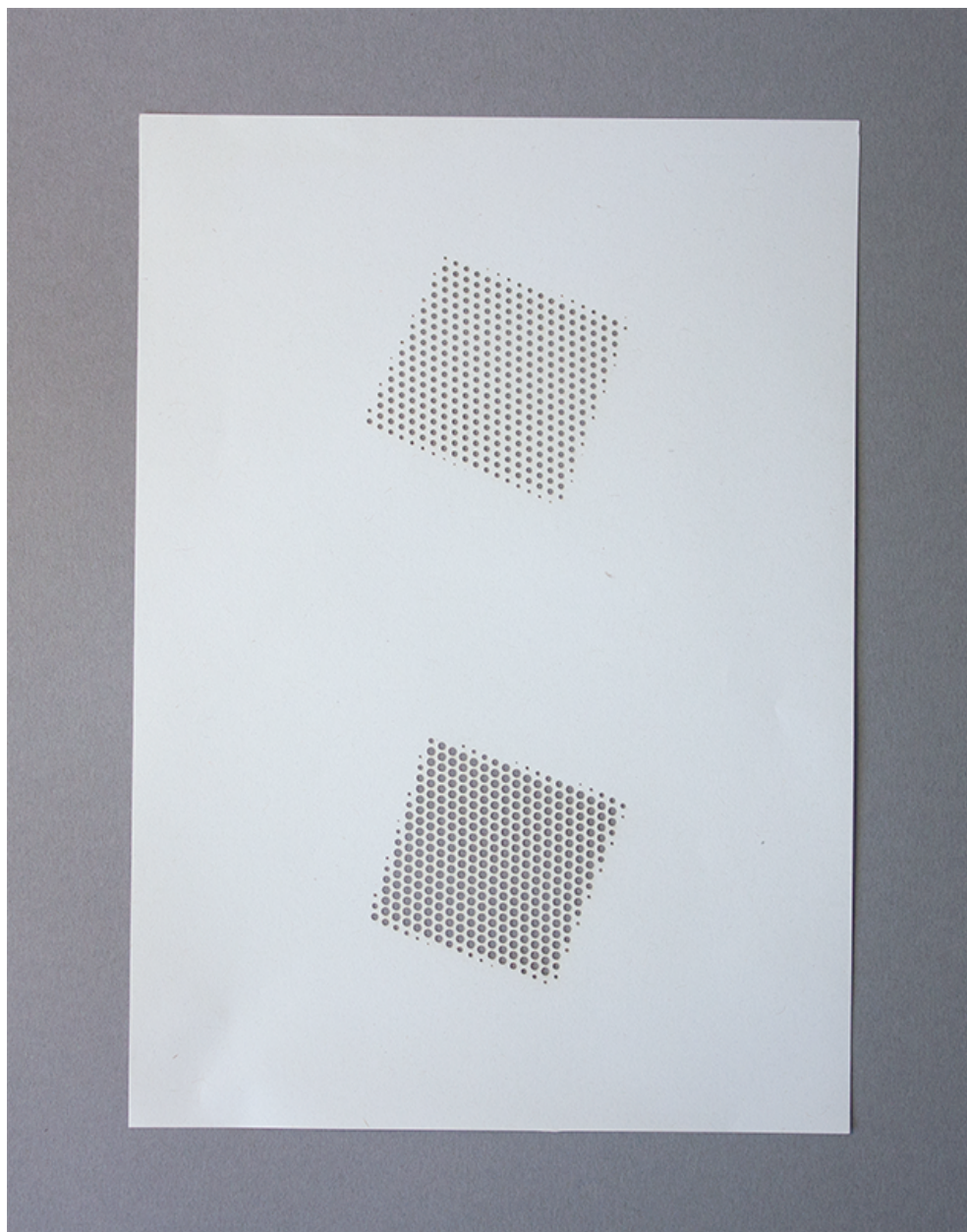
This raises a further question, one that was hinted at above: if the white-walled institutional gallery is a highly structured context in which visual appearance is usually the first point of encounter with an artwork, is staging work in this context the best way of exploring computational questions? Are there other ways of understanding the work, or more viable contexts for its presentation?

A parallel but relevant set of ideas can be found in Louise Amoore's work on the political consequences of cloud computing.⁷ Writing about Trevor Paglen's work, which consists of photographs of National Security Agency data centres taken with astronomical telescopes from great distances, Amoore locates such artistic approaches 'in and alongside the paradigm of observation'.⁸ She argues that observation is an inadequate way of understanding the computational cloud, partly because such algorithmic processing takes place at speeds that are beyond the human capacity to observe. She instead proposes a distinction between mimetic and analytical instruments, and argues that the observable physical characteristics of the cloud, such as its territorial location or the buildings used to house it, are less important than the cloud's capacity to analyse and extract patterns from data.

Following this reasoning helps develop a more nuanced understanding of *Mock Objects*. The piece asks to be attended to as art, invoking the established forms of exhibition that the gallery context demands, even though these are problematized by the work's location alongside 'invisible' infrastructure and by the behaviour of the onscreen image. Since the gallery context favours the observable characteristics of an image, the power dialogues inherent in an image system over its analytical capacities, the power dialogues inherent in data remain obscured: *infra* to the display of work and difficult for the viewer to access. As a research practice, the work is a visual field of data that is



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October 27, 2016

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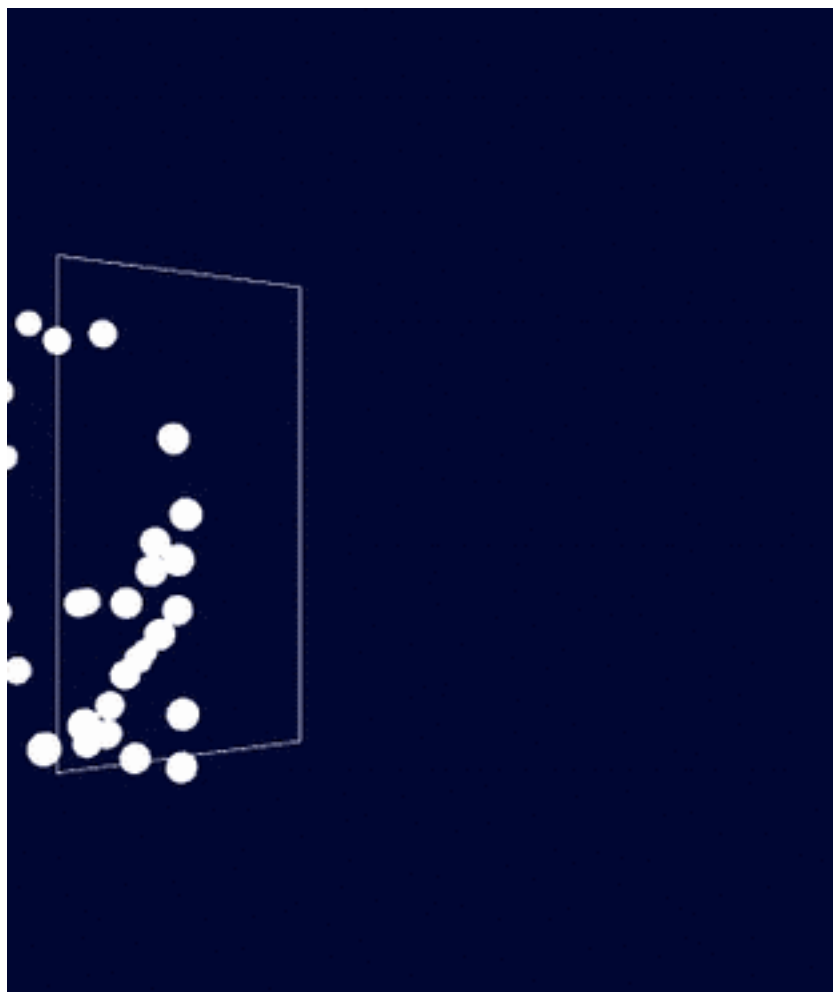
'Hooked' Exhibition Proposal

2016

This is a proposal for a commission for the Science Gallery London for their 'Hooked' exhibition.

TIME ON DEVICE

What would it be like to see a habit forming? My artistic practice is informed by a research interest in compulsive device usage. Why do we spend so much time on our smartphones?



Writers like Nick Carr suggest that we are hard-wired for distractibility, and cites neuroplasticity as evidence that we are training ourselves to be distracted. Nir Eyal also describes the 'compulsion loop' and the way in which triggers for

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repeat behaviour are often to do with affectual discomfort. Boredom, indecision: these are the emotional states that prompt the desire to engage with digital devices, and addictive responses to user interfaces become reinforced by small, repetitive behaviours and movements like taps and swipes.

‘Time On Device’ has two stages. The first stage will involve data gathering during the preproduction period. A number of selected participants will be supplied with a modified smartphone (rooted and installed with a benign ‘key-logging’ app) that will record each touch, swipe or key press with a time stamp. This data will be gathered for 24 hours and then the phone returned and the data retrieved. This data will then be visualised in the gallery as a screen-based work that ‘plays back’ these taps in real time. The piece turns the process of habit formation into a growing morass of thumb-taps, swipes and jabs dispersed in three-dimensional space. Viewers will be able to watch the accrual of normally ignored gestures and will see them accumulate into a multiple, visually complex mass. The intention is to make visible the quantity of micro-gestures that take place over a typical day’s device usage, and to reveal the scale of the reinforcement that accompanies everyday smartphone use.

The piece is a screen-based piece that plays back the data gathered from the smartphone user in real time, generating a 3D visualisation. At this early stage of development, I’m working with very rudimentary geometric visualisations, but it’s anticipated that the final work will have a more organic feel. Regardless, I intend that the imagery is quite understated. Rather than presenting these interactions as a whizz-bang visual spectacle, the piece needs to be more of a ‘curio’: the point of the work is to make visible actions that are usually carried out below the threshold of attention, so it’s important that they are presented in a way that alludes to their everyday invisibility.

October 27, 2016

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Site Platform Proposal

2017

This is a proposal and presentation prepared for the Site Platform commission. Please scroll down for the presentation and slides.

PROPOSAL

Brief summary of your proposal

*Please include when you first started developing this idea, and why you think it is appropriate for Platform (max. 500 words) **

The idea for this proposal has been developed alongside my PhD studies at SHU, where I am a practice-based researcher in the arts and media subject area. My research is concerned with experiences of distractibility that are said to have emerged alongside the recent widespread adoption of digital communications technologies. I'm interested in the way digital systems can be understood as data streams or cloud processes, and how this might impact on the way we attend to them, or how they algorithmically attend to us. My artistic practice often appropriates pre-existing images, software or datasets as ready-mades, and uses computer programming techniques to modify them or highlight their particular characteristics.

Attention is often considered a scarce resource in an age where constant emails, notifications and status updates compete for our cognitive focus. Alongside this scarcity of human attention, recent years have seen an exponential rise in the 'machine reading' of images (Hayles), where algorithms are routinely used to analyse the visual characteristics of images. It's now commonplace for a digital camera on an iPhone to use face recognition algorithms to identify the optimal area to focus on, with some mobile devices going as far as automatically capturing the image when a smiling subject is detected. While many of these recognition algorithms are hard-coded into consumer software and devices, there are some that are more accessible to users.

ZZZZ

For this project, I aim to use a range of these computer vision APIs (application programming interfaces) to explore Site Gallery's database of exhibition and event documentation images that is made available through the gallery website and marketing channels. This will generate a series of images that present this material through the lens of machine vision. I intend to mainly use the Google Vision API, which offers a powerful set of image analysis algorithms that can perform a wide range of tasks. Google Vision can identify faces and provide an estimate of the emotion on the face; can identify landmarks; will isolate and recognise text; as well as providing image analysis data such as the quantity of colour or brightness in the image.

I'm curious about what might be revealed through the process of passing the gallery archive images through this system. Could the sentiment analysis be instrumentalised as ACE evaluation feedback? Is there a preference for particular colour schemes, subject matter, or other identifiable features? What are the implications for the gallery in terms of data stewardship? More broadly, what might machine vision see in an artwork that a human reader might overlook?

I anticipate that the results will invite readings that question the stability of archives while also presenting a perhaps sobering sense of the capability of commonly used image analysis algorithms to identify and reinterpret images as data artefacts.

Describe your idea and how you will approach this as a Platform project.

*What resources will you need (max. 500 words) **

Development of the system:

Since coding can be quite a solitary activity and isn't particularly accessible to an audience, I anticipate having the bones of a working system ready in advance of my arrival onsite. In the weeks prior I would hope to liaise with the gallery web team and begin to make sense of the structure of the image archive, and start to process the images in preparation for analysis. In the very early stages of the onsite phase of the project, the code could be projected to make it available for scrutiny in a similar way to 'algorave' events.

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Processing of images:

I will aim to produce a system that makes the process of the analysis of the images visible. This is likely to be a screen-based interface that will show the image on the way in to the analysis process, and then combine this with the images produced by the machine vision system.

Display of images:

I anticipate that the residency will generate a large quantity of images, perhaps three or more per source image, each with a very specific aesthetic. With the Google Vision API, faces can be identified by 'landmarks' such as 'left_eye', 'mouth_left' and so on, and this information compiled into a very visually reductive image. Colour distributions and tags can also generate images. (See the API demo GIF in my supporting material.) I anticipate the gallery gradually filling with a set of images that have been produced by the algorithm in response to the archive, and are representative of the data contained in the archive while having their own specific aesthetic quality that is very different to the source images.

In previous work, I have presented visual data as an infrastructure that competes for invisibility with physical characteristics of the gallery space, such as cable trunking and air vents, that are supposed to be ignored by the viewer. In Site, the long gallery back wall presents itself as a likely location for a sequential projection of images, and by the end of the residency I would aim to fill as much wall space as possible with these projected images. I would also like to explore the possibility of outputting the data-images produced onto the Site website, temporarily allowing them to replace their sources.

Gallery resources / Production budget:

The main gallery resources I'll need while onsite will be access to projectors, computers, and installation assistance. Prior to beginning the residency, I'll need access to the archive of images and communication with the web team in order to get the sources together. There will be some costs involved in the use of the API, but I'm hopeful these can be kept to a minimum.

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PRESENTATION



I'm an artist working with digital media, typically installation and interactive projects

Currently doing phd about art, attention, distraction, and digital media.

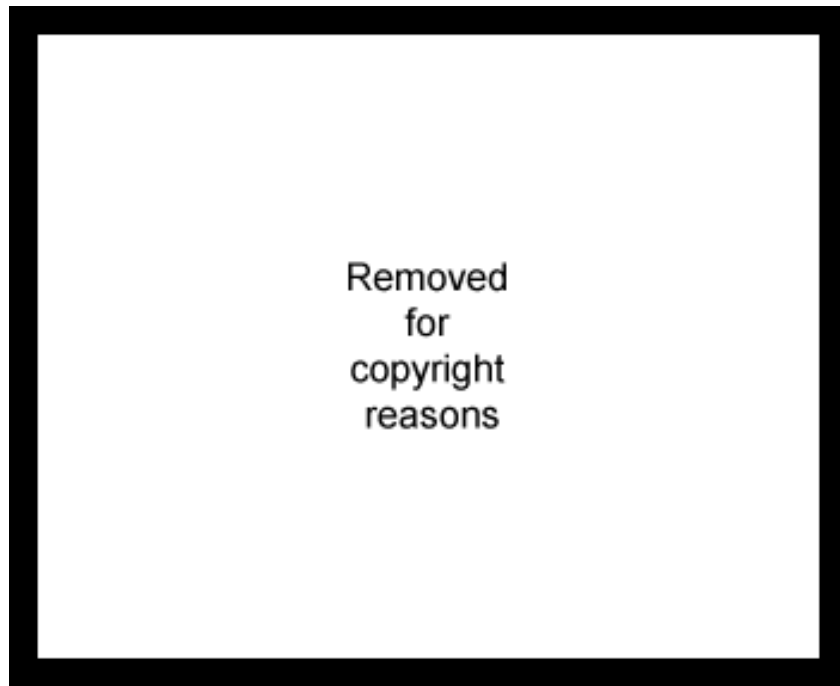
- * led onto human vs machine attention, control of attention

- * ubiquity of algorithms and image analysis, phones, number plate recognition, etc

algorithms link to databases, things are below the scope of attention, invisible yet actionable. Seen as OBJECTIVE but are totally not

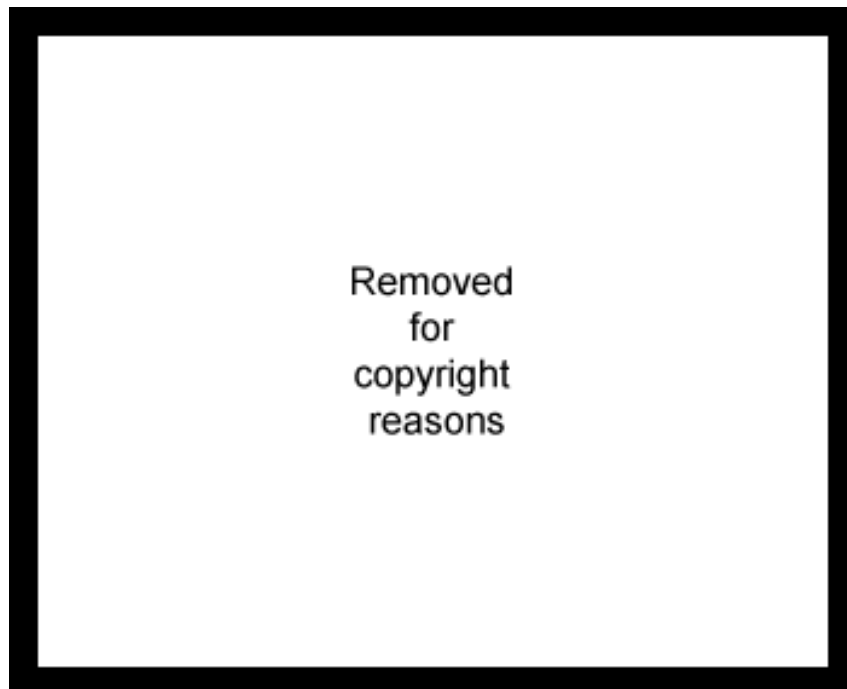
- * infrastructural: ie, not usually visible, and this invisibility obscures ideological or political bias

CCCCC



- * intend to use Site's archive of documentation images
- * send it through Google Vision API
- * it detects:
 - +++ face, plus basic sentiment (joy, sorrow etc)
 - +++ landmarks (such as Eiffel Tower etc)
 - +++ text (OCR - will return as text strings)
 - +++ colour (basic quantity analysis)
 - +++ labels (text tags referring to image content)
- * Curious to see what it turns up

Interested in how utilitarian images have unintended aesthetic qualities

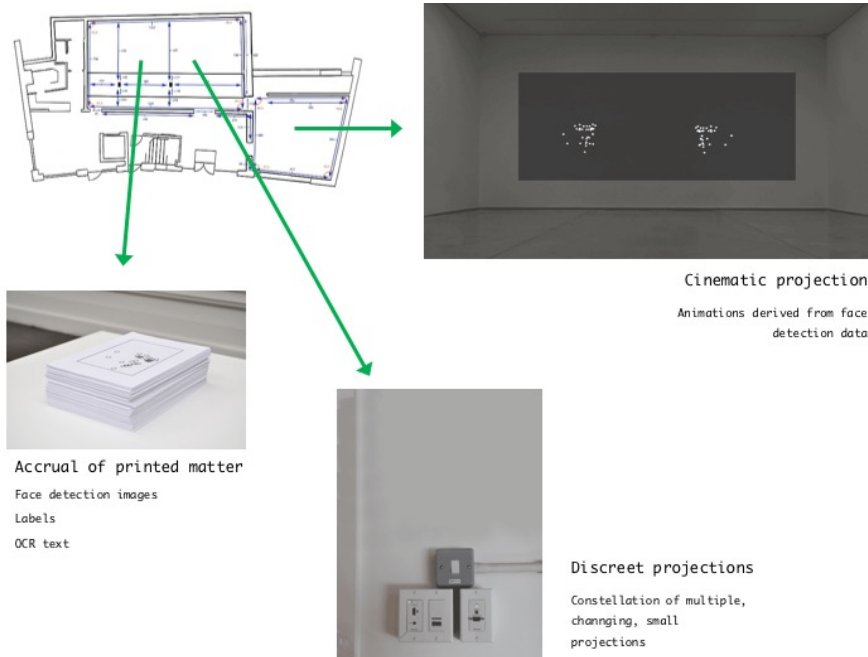


dddddd

Face recognition points have a sense of the punchcard or invoke the physical



Vision API returns inferred 3D points for face landmarks



* Talk about outcomes in each gallery:
+++ Data as infrastructure = invisible.
+++ Gallery as an attention infrastructure in itself
+++ Large gallery, hiding work, making it quite difficult to see: Make the work compete for invisibility with gallery infrastructure such as plugs etc

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+++ Through projection, hiding the workAggregation - most populous
words, colours, etc
Multiplicity of faces
Smaller gallery: use for cinematic projection of 3D face animations

January 13, 2017

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Macchia

2017

Macchia is a work produced with Penny McCarthy for inclusion in the *Material Truths* exhibition at Site Gallery in 2017.

SCREEN CAPTURE OF THE PIECE IN USE

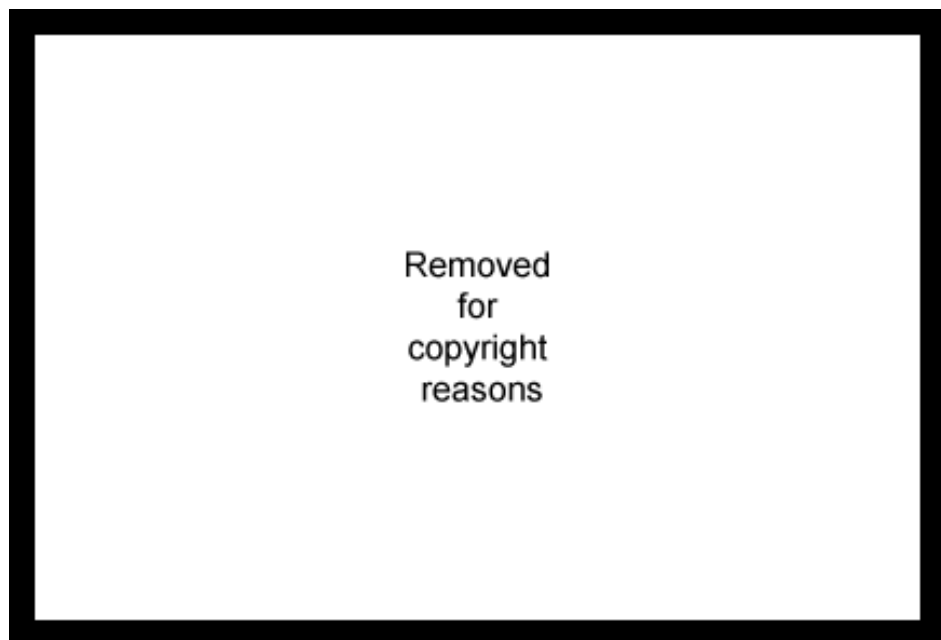
[VIDEO]

WEBSITE

<http://macchia-2017.herokuapp.com/>

Since the piece was designed for gallery installation, it was made to function at a specific screen size. Please note that the website will only work in landscape orientation and is best viewed on a desktop computer.

DOCUMENTATION IMAGES



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ABSTRACT

The following abstract was written by Penny McCarthy and is reproduced here from her own website. It should be noted that as collaborators, our concerns differ and the insight we each draw from the piece is directed toward our own individual research agendas. McCarthy's text is reproduced here to further contextualise the discussion of this work in the thesis.

hhhhh

Macchia indexes a series of my own drawings of digital images to explore the ways that image search engines interpret hand-made representations as 'equivalents' of their source.

In his Treatise on Painting (1452-1519) Leonardo da Vinci described the painting's 'macchia': '(...) a stain on a wall, where you see a beautiful country' (my translation).

The Macchia project examines the framework of meaning that is produced when representations of material forms are transported between the material world and the digital domain.

This research reflects on the ways that hand-made images are understood when transported into the digital domain. Through a series of my own drawings that accurately reproduce digital images I have been testing the ways that image search engines interpret hand-made representations as 'equivalents' of their source. My drawings are close facsimiles of material found online, citing and reversing the detachment from hand-made processes. Experimenting with internet image search engines I 'return' my copies to image-search for 'equivalent' images. The plagiarism search engine software appears unable to read my images correctly and often cannot locate the sources from my drawn copies. The image search 'equivalents', the demonstration of what the artificial intelligence 'sees' raises questions about the difference between human and AI visual comprehension.

I worked in collaboration with artist Michael Day on this project to develop a prototype app that produced search results paralleling my own mimetic copies of images found online with search results that only occasionally located the images that I had copied. Working between two materialities enabled a focus on the distinct characteristics and formal languages of representation in the analogue and digital. I wanted to map the limits of each form to think about how they sit side by side. Through a 'dialogue' with the search engine's artificial intelligence, I was learning about the software's process, and through this interaction it was also reacting to me. The project opened up in ways I could not have foreseen, becoming an exploration of art's connection to personhood and

the potential for loss of personhood in the digital world as the trace of the artist's hand recedes.

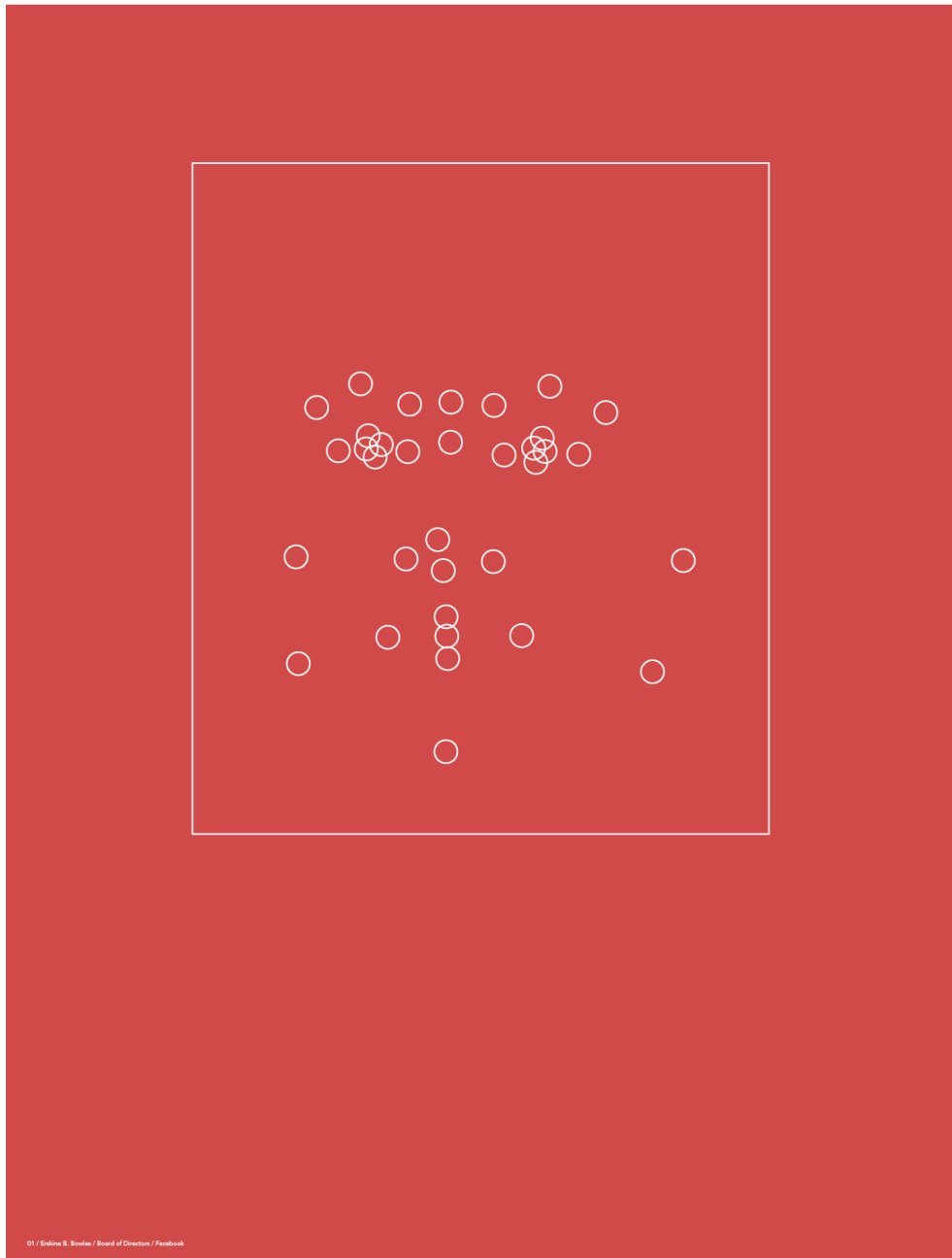
February 27, 2017

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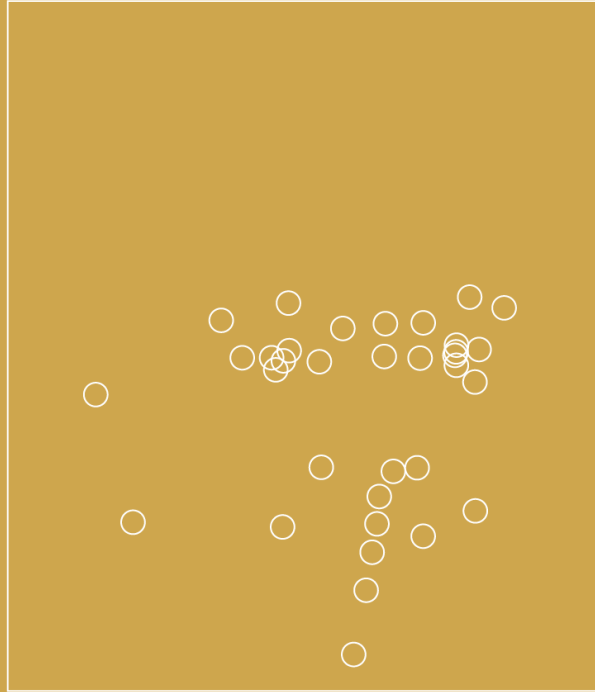
Power Portraits

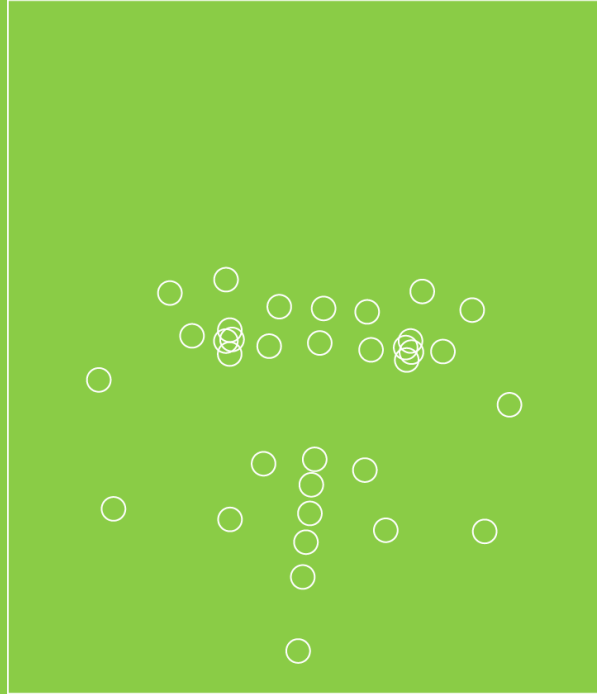
2017

FACEBOOK BOARD OF DIRECTORS



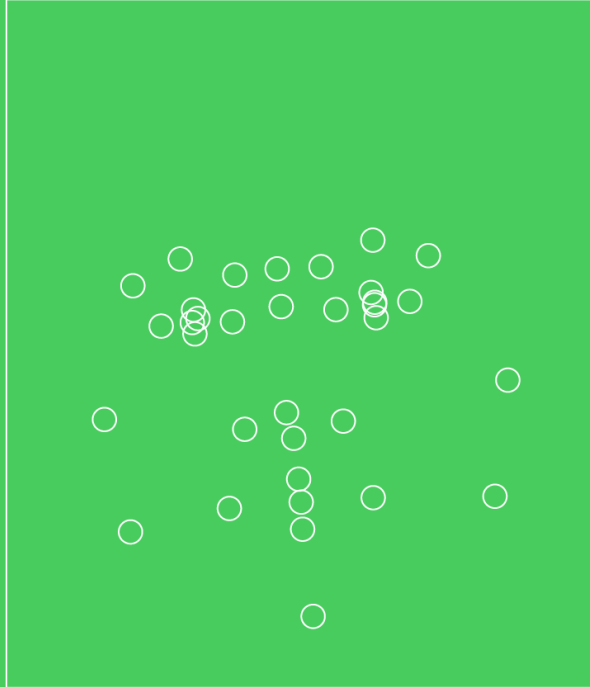
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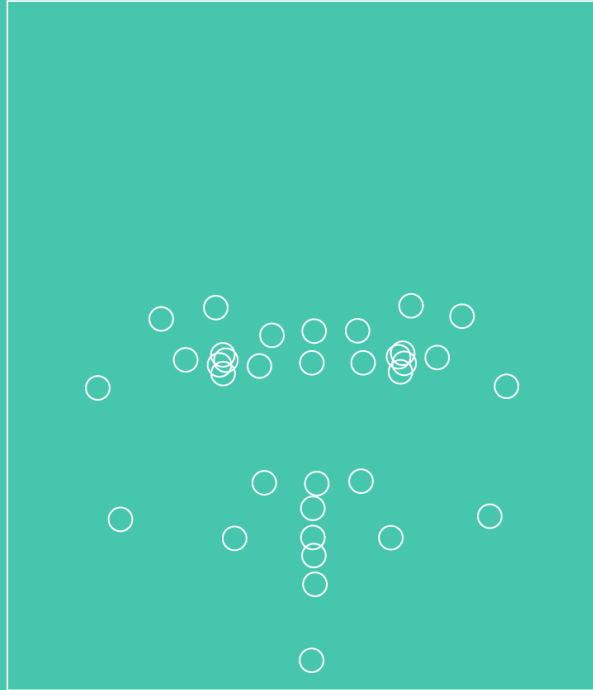
03 / Marc Andreessen / Board of Directors / Facebook

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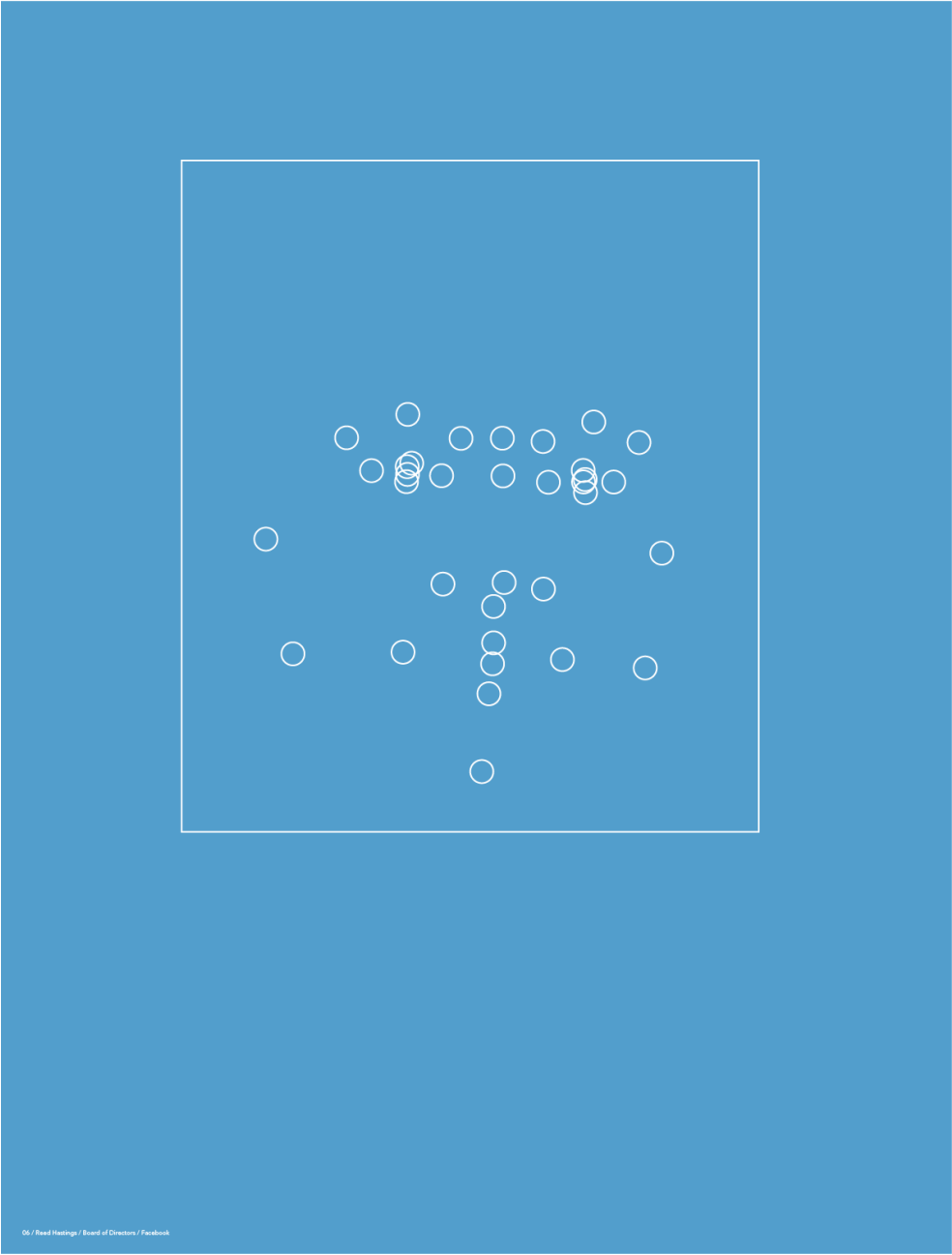
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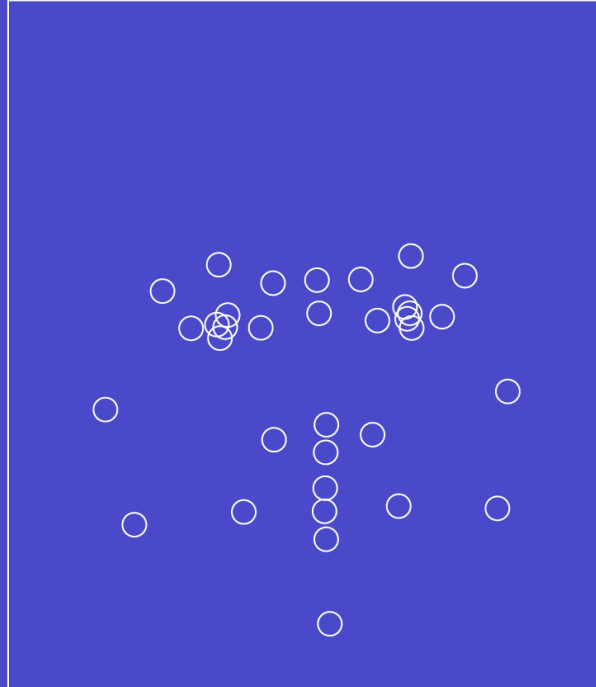
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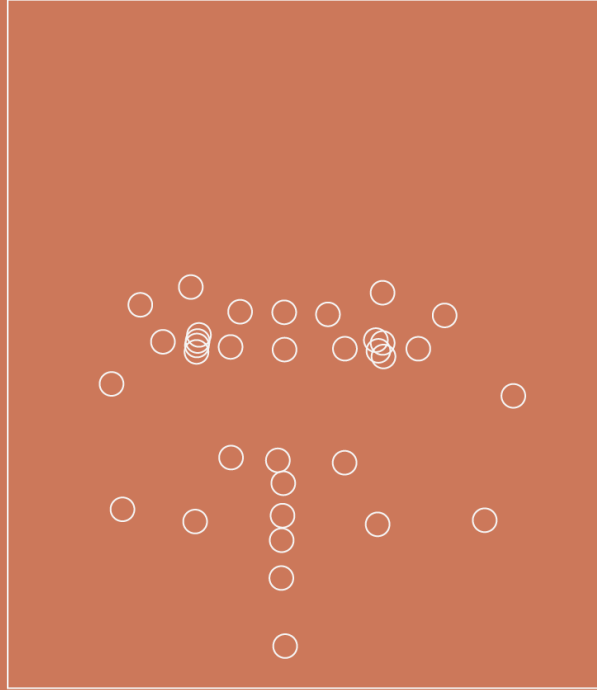
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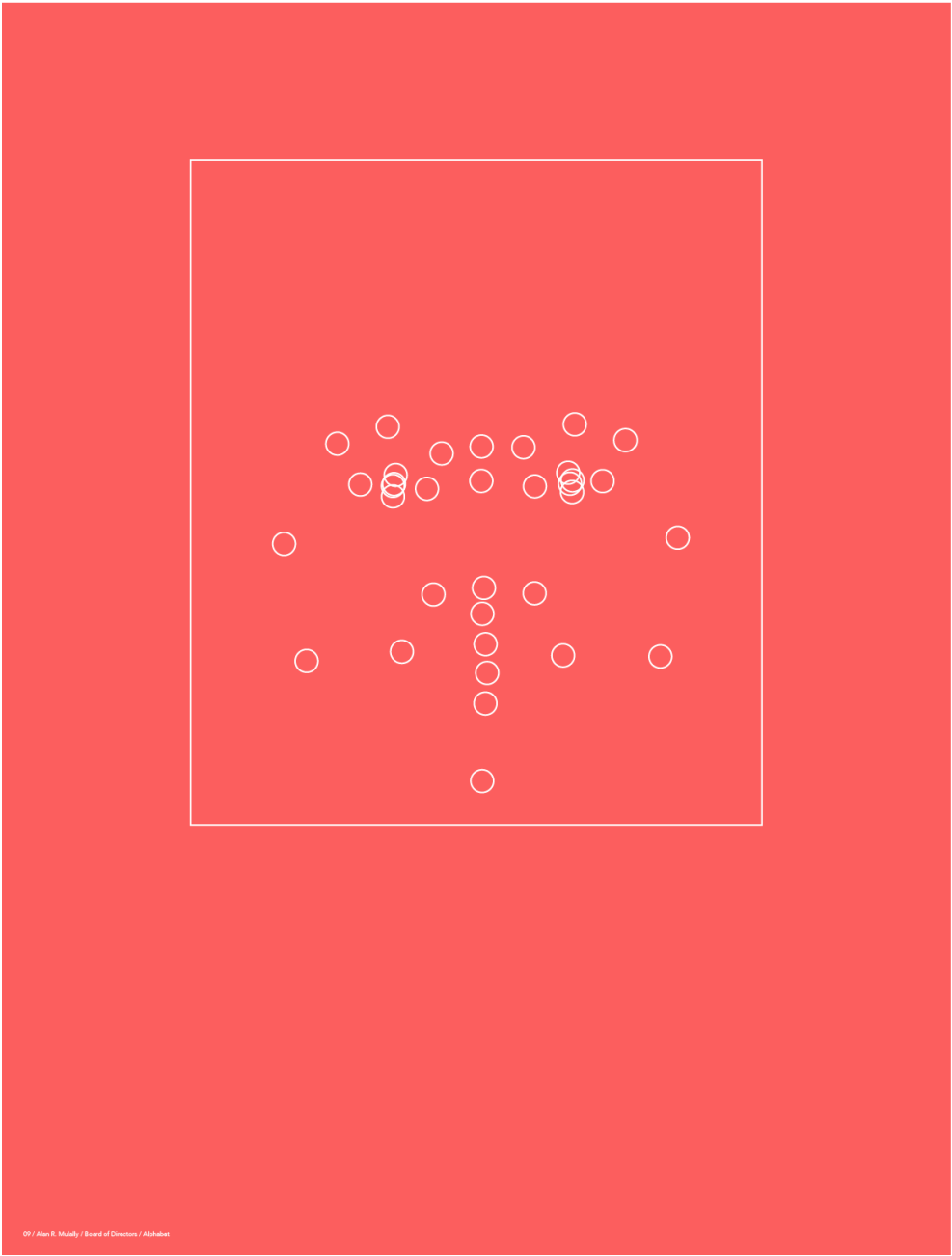
05 / Read Hastings / Board of Directors / Facebook

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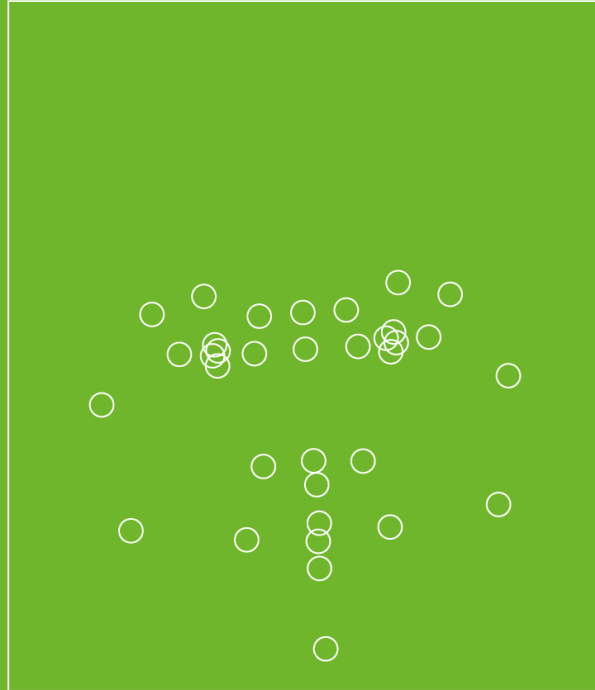


ALPHABET BOARD OF DIRECTORS

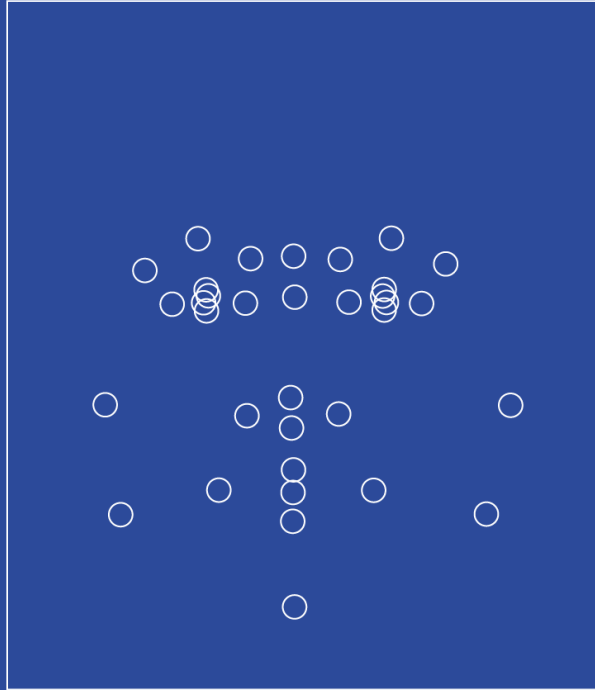


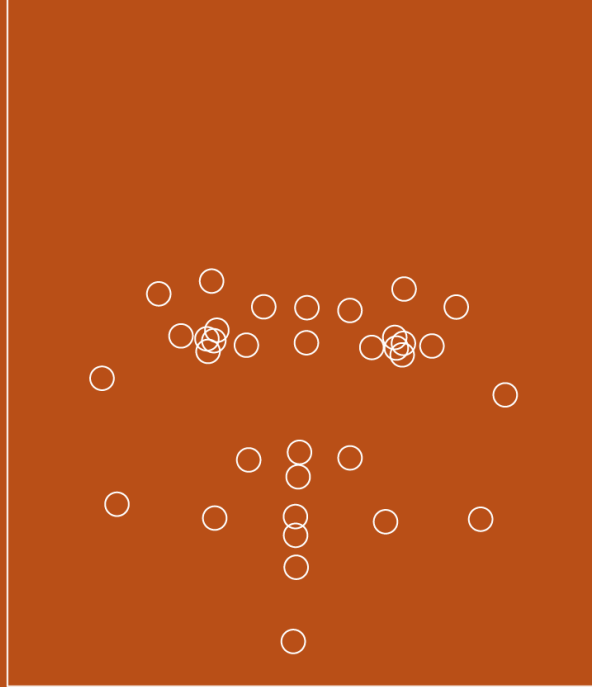
09 / Alan R. Mulally / Board of Directors / Alphabet

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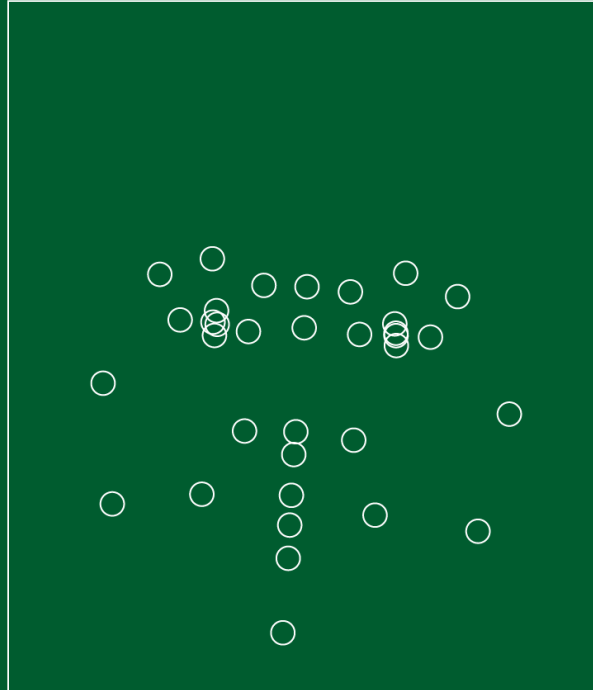
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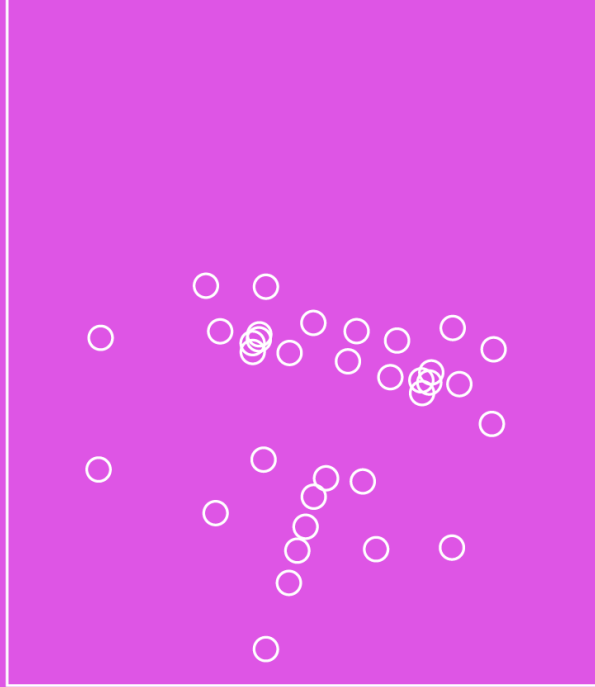


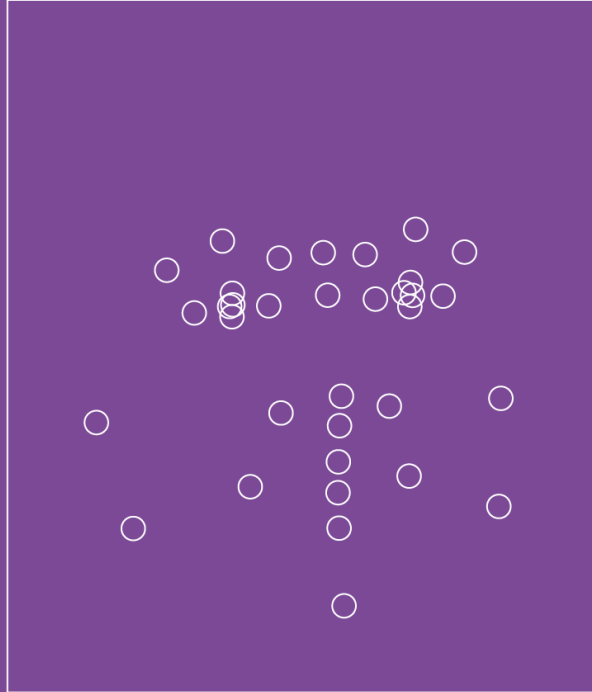


12 / Eric E. Schmidt / Board of Directors / Alphabet

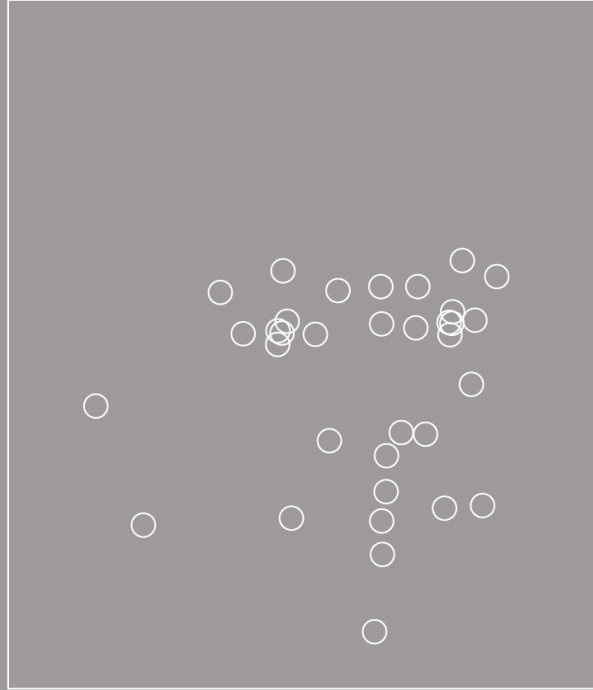
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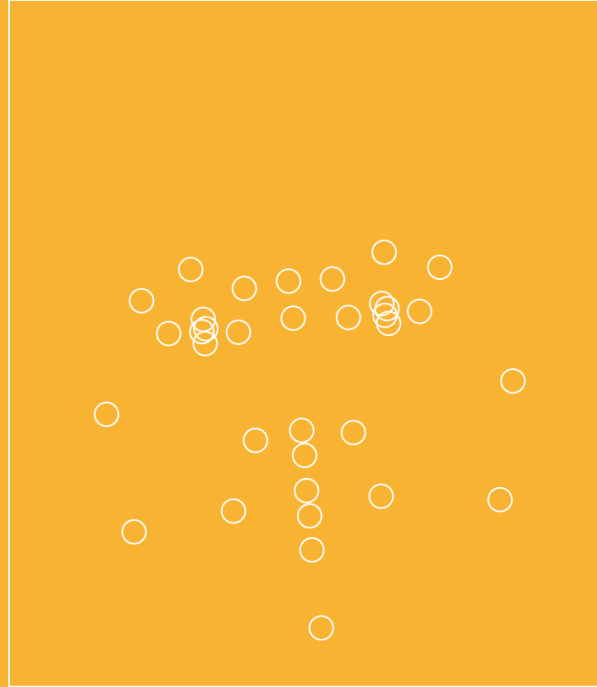




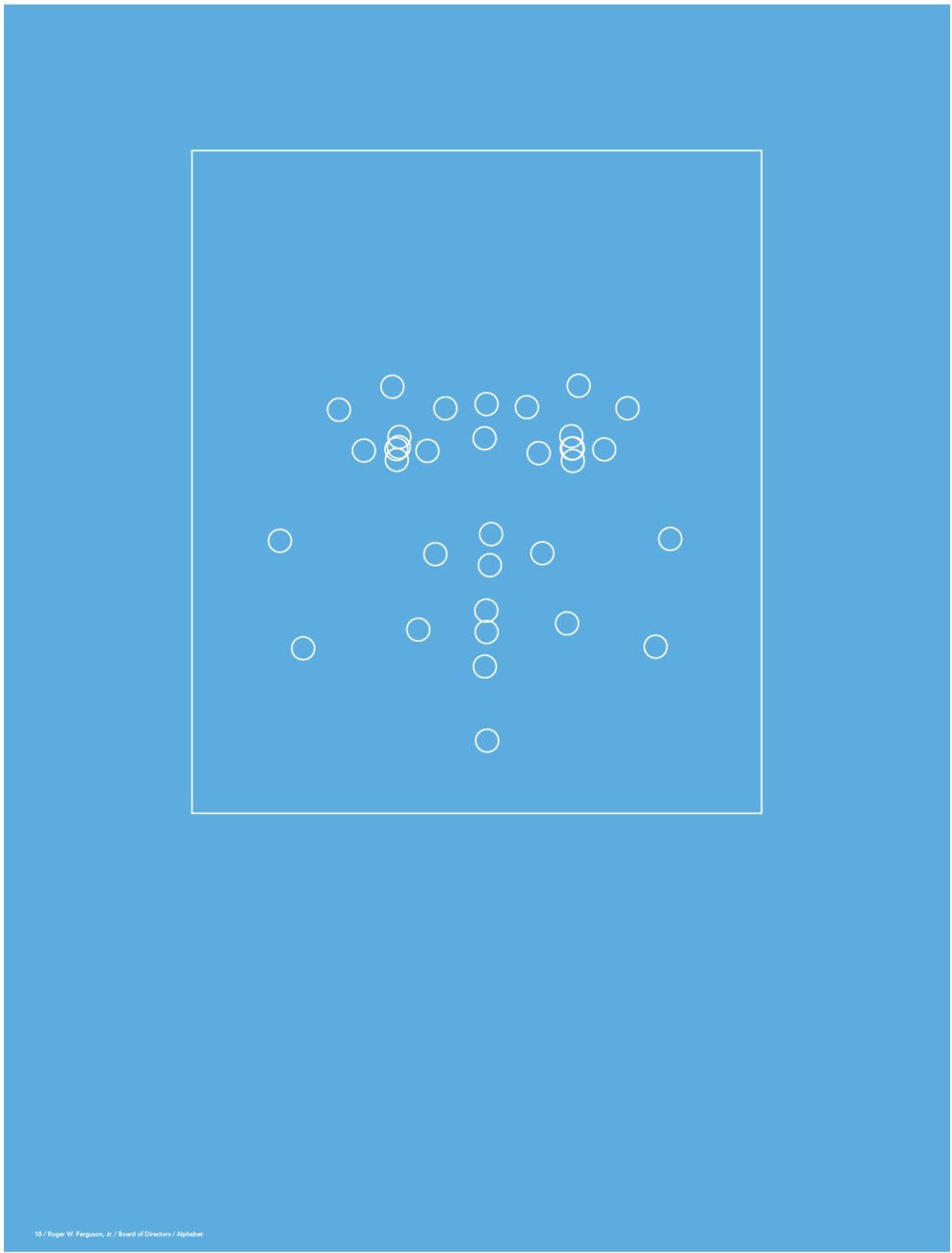
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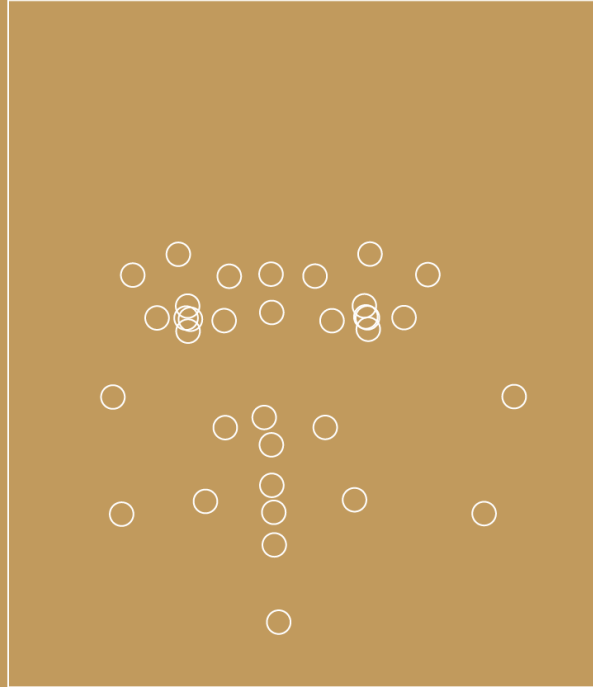


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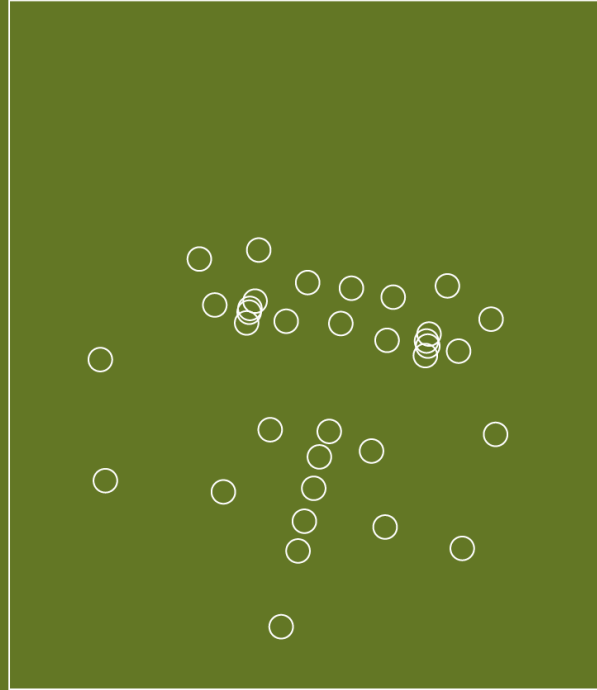


18 / Roger W. Ferguson, Jr. / Board of Directors / Alphabet

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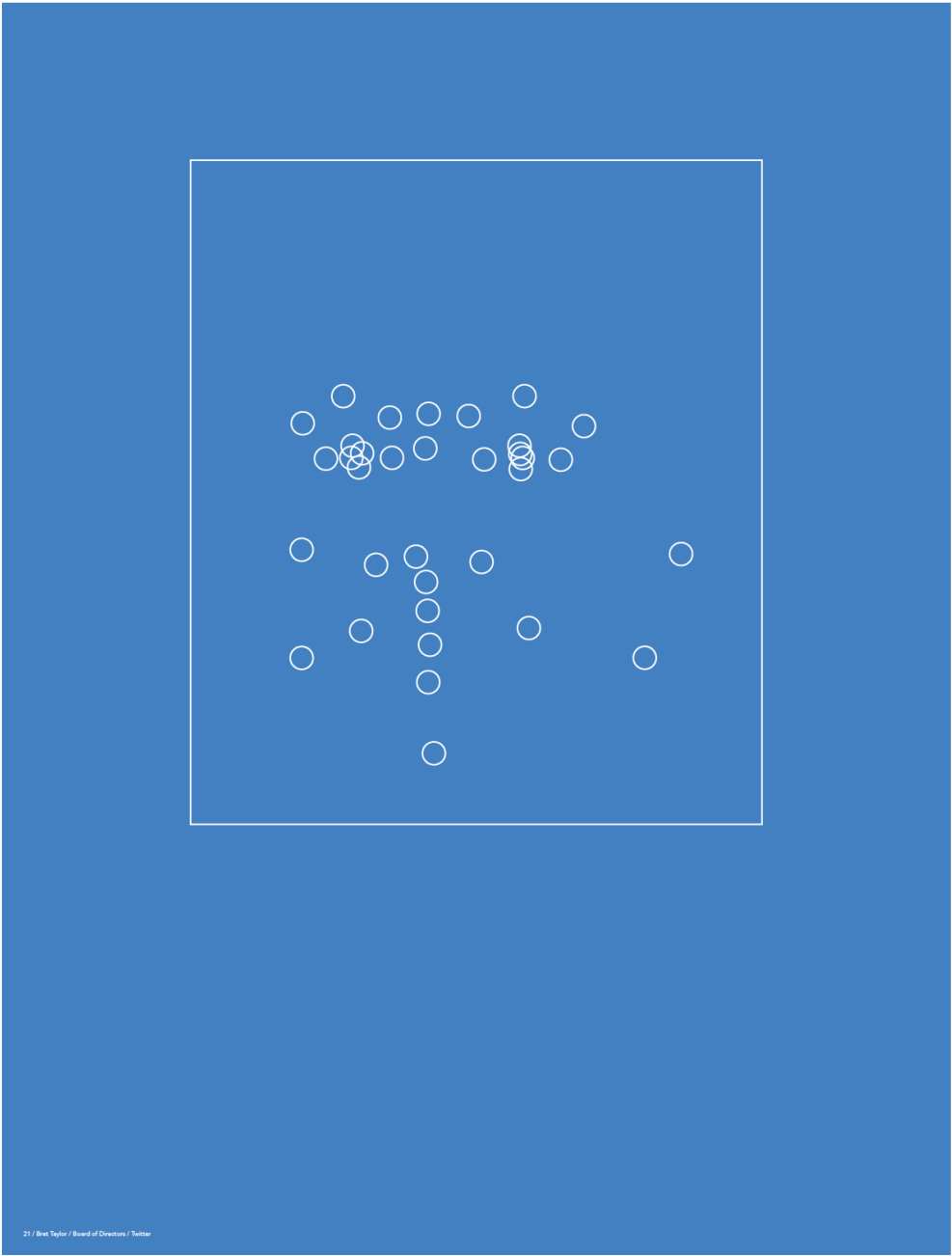


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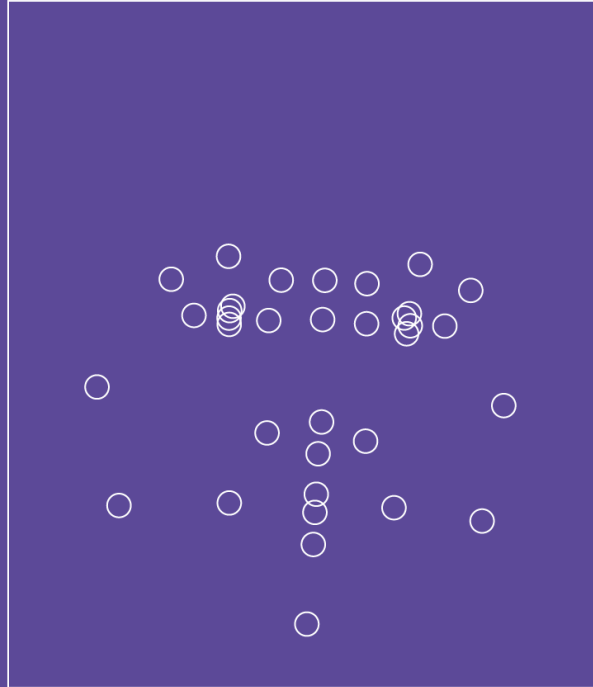


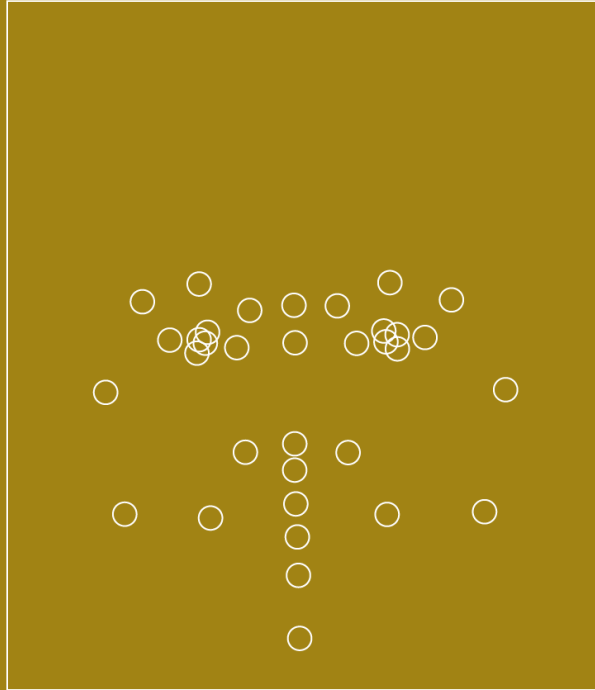
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TWITTER BOARD OF DIRECTORS

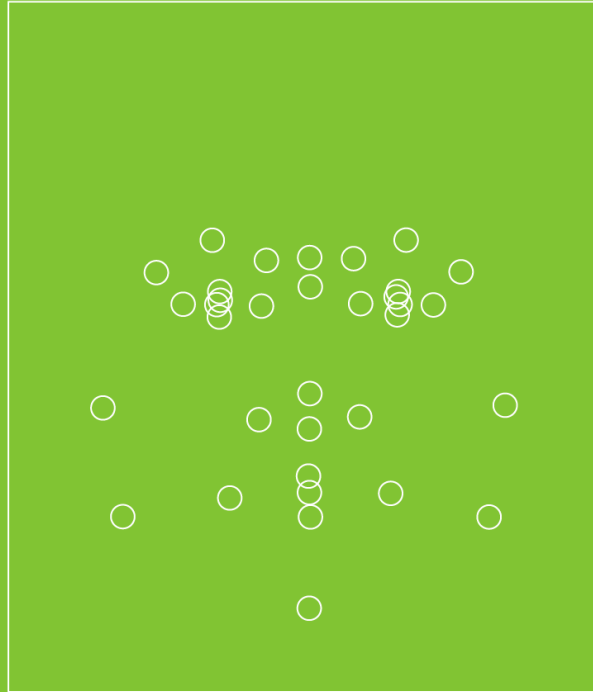


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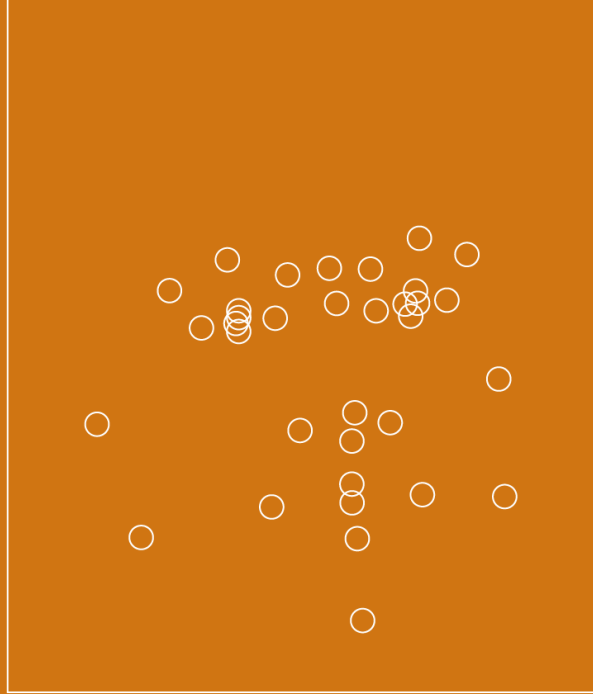


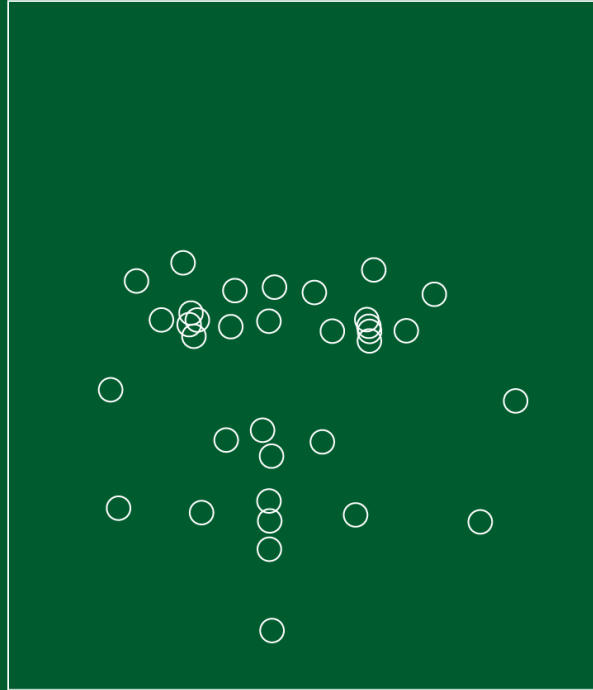


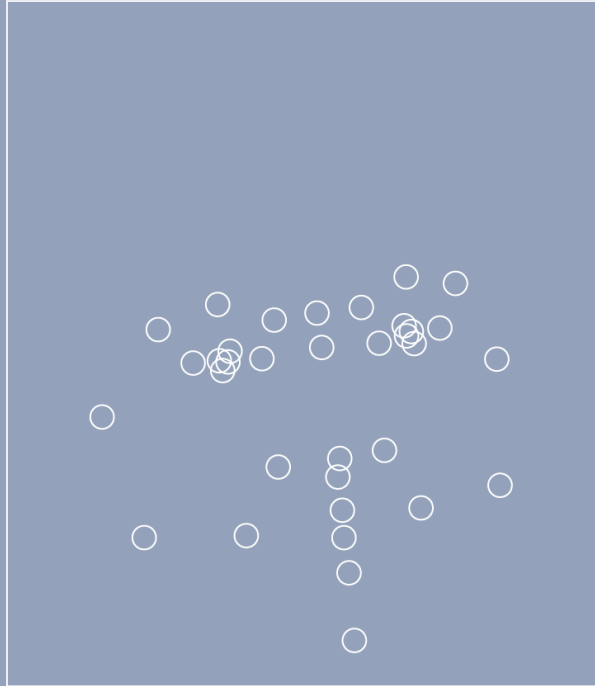
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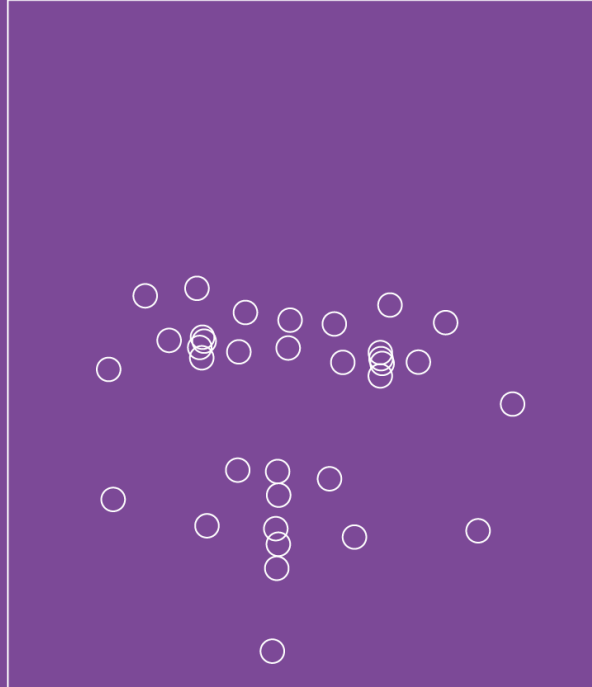
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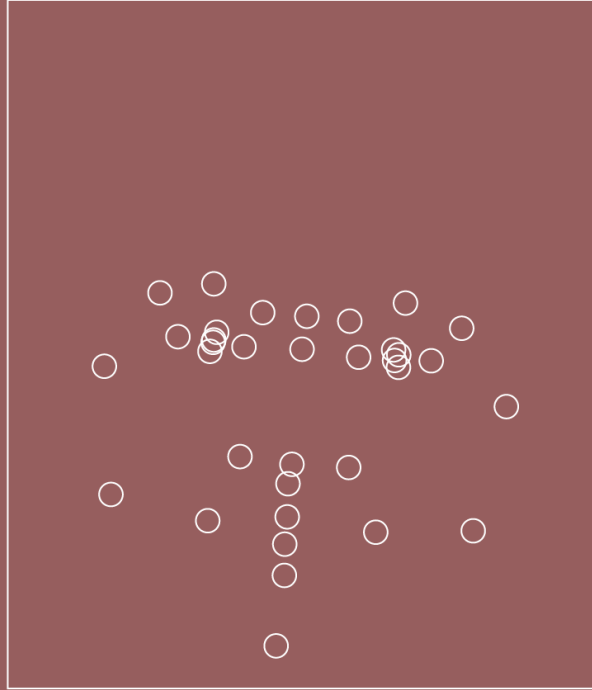






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30 / Peter Fenton / Board of Directors / Twitter

EXHIBITION HISTORY

TALKEX17, Rotherham Open Arts Renaissance, St. Ann's Building, Rotherham, March 2017.

March 5, 2017

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Creative Spark Poster

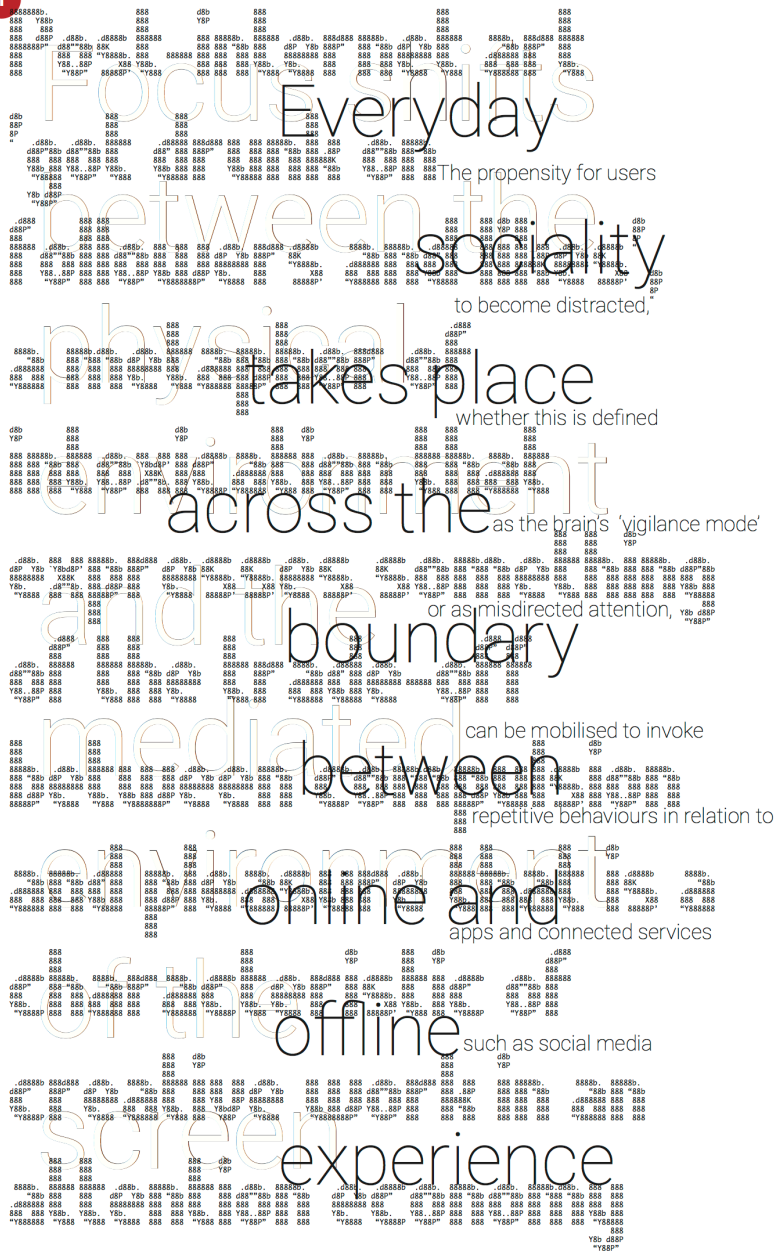
2018

A poster presentation for the exhibition *Title, formatted in sentence case (Not Title Case and NOT ALL CAPS), hints at an interesting issue and/or methodology, doesn't spill onto a third line (ideally) and isn't hot pink*, Sheffield Institute of Arts, 2018.

'Twenty one of the ADRC PhDs communicate their research through the terms of the academic poster- materially twisting, eliding, collaging and knotting its' conventions of status, academic distance, text quality, volume, description, narrative, voice, density, structure, image, time and space'.

<https://phdshu.tumblr.com/>

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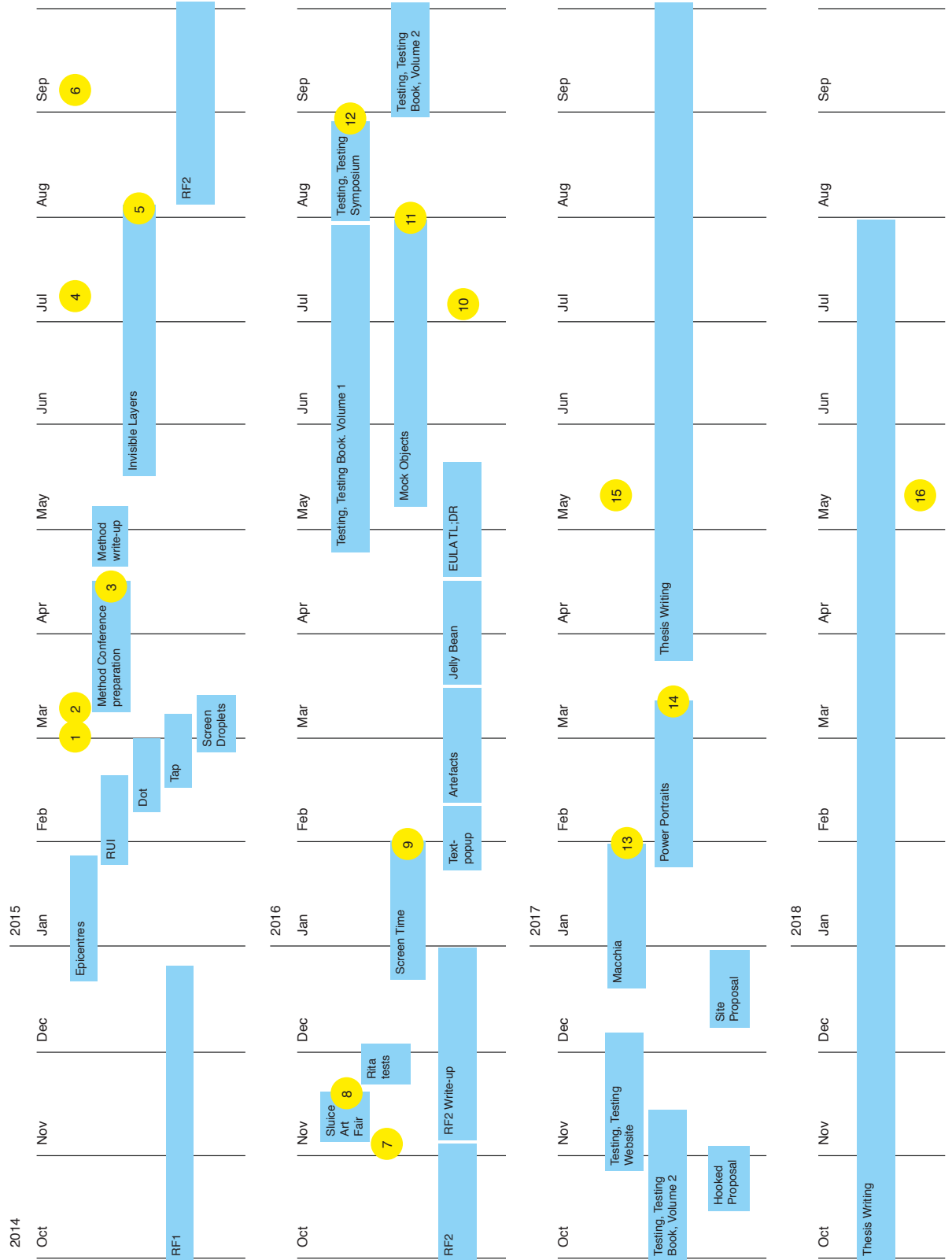


May 27, 2018

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Appendix 2: Timeline



Numbers indicate where works have met a public audience.

1. *Epicentres book*, Pages International Contemporary Artist's Book Fair, The Tetley, Leeds, March 2015
2. *Epicentres book*, The Hepworth Print Fair, The Hepworth, Wakefield, March 2015
3. Method Conference, Sheffield Hallam University, April 2015
4. *Epicentres book*, Liverpool Artists Book Fair, Liverpool Central Library, July 2015
5. *Invisible Layers*, Terminus, S1 Artspace, Sheffield, Aug 2015
6. *Epicentres book*, London Art Book Fair, Whitechapel Gallery, September 2015
7. *Epicentres book*, Manchester Artists Book Fair, Holden Gallery, October 2015
8. *Sluice Art Fair images*, Oxo Wharf, London, November 2015
9. *Screen Time*, Research Inside Practice Symposium, Peltz Gallery, Birkbeck College, University of London, January 2016
10. *Epicentres photographs*, Northern Light, SIA Gallery, Sheffield, July 2016
11. *Mock Objects*, Testing Testing Exhibition, August – September 2016
12. *Mock Objects* Symposium Presentation, Testing, Testing Symposium, September 2016
13. *Macchia*, Material Truths, Site Gallery, January 2017
14. *Power Portraits*, TALKEX17, ROAR, Rotherham, March 2017
15. *Screen Time*, Affect & Social Media #3 Conference, University of East London, May 2017
16. Creative Spark Poster, *Title, formatted in sentence case (Not Title Case and NOT ALL CAPS), hints at an interesting issue and/or methodology,*

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doesn't spill onto a third line (ideally) and isn't hot pink, Sheffield Institute of Arts, June 2018

RF1: Application for Approval of Research Programme. This comprises a 500-word written piece.

RF2: Confirmation of PhD. This comprises a public viva presentation and a 6000-word written piece, as well as other supporting material.

Appendix 3: Screen Time Sources

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