Spooky Technology

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A reflection on the invisible and otherworldly qualities in everyday technologies

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Spooky Technology

A reflection on the invisible and otherworldly qualities in everyday technologies

CONTENT / Katherine Giesa / Yiwei Huang / Catherine Yochum / Matthew Cruz / Gordon Robertson / Lisa (Yip Yan) Yeung / Miranda Luong / Anuprita Ranade / Meijie Hu / Christi Danner / Elizabeth Wang / **DESIGN** / Meijie Hu / Miranda Luong / Anuprita Ranade / Karen Escarcha / Christi Danner / Elizabeth Wang / **EDITORS** / Daragh Byrne / Dan Lockton

Spooky Technology: A reflection on the invisible and otherworldly qualities in everyday technologies

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INTRODUCTION

We often hear that the technologies in our everyday lives would appear to be 'magic' and potentially terrifying to people in the past—instantaneous communication with people all over the world, access to a vast, ever-growing resource of human knowledge right there in the palm of our hand, objects with 'intelligence' that can sense and talk to us (and each other). But rarely are these 'otherworldly' dimensions of technologies explored in more detail. There is an often-unspoken presumption that the march of progress will inevitably mean we all adopt new practices and incorporate new products and new ways of doing things into our lives—all cities will become smart cities; all homes will become smart homes. But these systems have become omnipresent without our necessarily understanding them.

They are not just black boxes, but invisible: entities in our homes and everyday lives which work through hidden flows of data, unknown agendas, imaginary clouds, mysterious sets of rules which we perhaps dismiss as 'algorithms' or even 'AI' without really understanding what that means. On some level, the superstitions and sense of wonder, and ways of relating to the unknown and the supernatural (deities, spirits, ghosts) which humanity has felt in every culture throughout history have not gone away. Instead, they have transferred and transmuted into new forms.

The project leading to the book you're now reading focused on creating an inventory of 'spooky technologies' over the 'COVID summer' of 2020. To do this, we (a group of students and faculty from Carnegie Mellon) collected and reviewed work across art, design, and human-computer interaction research, both historically and more recently, along with forays into writings on the supernatural, myths, and superstitions. Our aim was to produce, collaboratively, a set of examples, from which we can extract possibilities, insights, and opportunities.

Why spooky technology?

The otherworldly, and its histories, are entwined with everyday technologies. Our networks have `daemons` -- a background process that is often shorthanded as '`d`' and probably overlooked by most who encountering the Linux processes like '`sshd`' which is notionally inspired by Maxwell's demon (in turn borrowing from Greek Mythology). These pseudo-enchanted processes set up the possibility that our computers are littered with invisible supernatural entities [1]. In so doing, it creates contemporary contexts for old mythologies to be refreshed, re-conceived and, importantly, to be entangled with the everyday.

If our systems are inhabited by — even at the very least as abstract, conceptual and tangential conceptions of — references to otherworldly, supernatural and superstitious beliefs, how has this influenced how we interpret these systems? How do these myths and legacies complicate the explanation of technology breakdowns and system errors? And if steeped in such symbolism and imaginaries, what hand has otherworldly influences in inspiring the conception and development of our contemporary technologies?

Our intention with Spooky Technology was to examine these questions. But, of course, these questions are not new. In "Haunted Media", Jeffery Sconce surveys the history of telegraphy, television and electronic media over the past century and how it is deeply connected it is to visions of the occult and the otherworldly.

> "In the case of telegraphy and wireless, in other words, many believed telegraphs and crystal sets could be used to contact incredible and unseen yet equally 'real' worlds, be they extrasensory or extraterrestrial. The ethereal 'presence' of communications without bodies suggested the possibility of other similarly preternatural interlocutors, invisible entities who, like distant telegraph and wireless operators, could be reached through a most utilitarian application of the technology.... the telegraph and early wireless held the tantalizing promises of contacting the dead in the afterlife and aliens of other planets. [2]"
>
> - Sconce, Haunted Media, p10

It also could be easily argued that these questions are not merely limited to electronic media and digital computing, but to human society's relationship to almost all new technologies. Erik Davis's Techgnosis reminds us through historical and sociological accounts that that 'the West's mystical heritage of occult dreaming, spiritual transformation and apocalyptic visions' of technology, in fact, age-old and well documented around many forms of technology:

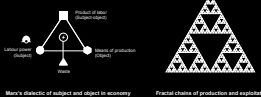
> "New technologies of perception thus unfold a new or old or at least new dimensions of universal nature. When ocular instruments extended human insight toward Galileo's moons or Hooke's microscoping cells, these tools created new regions of causal explanation and knowledge. But they also evoked a sense of wonder and mystery, forcing us to reconfigure the limits of ourselves and to shape the human meaning, if any, of the new cosmological spaces we found ourselves reflected in [3]."
>
> - Davis, Techgnosis

There is a long-standing tradition of society seeking to explain and rationalize unknown technologies and processes through unseen forces and ethereal actors. And this is no less true today. However, there has never been a time with greater proliferation of technologies into almost every facet of daily life. This comes at a time where there is increasing distance from the processes in both tangible form and conceptual understanding.

> "Today the cloud is the central metaphor of the internet: a global system of great power and energy that nevertheless retains the aura of something noumenal and numinous, something almost impossible to grasp... It is something we experience all the time without really understanding what it is or how it works. It is something we are training ourselves to rely upon with only the haziest of notions about what is being entrusted and what it is being entrusted to. [4]"
>
> - Bridle, New Dark Age, p7

Anatomy of an AI system

An anatomical case study of the Amazon echo as a artificial intelligence system made of human labor



Marx's dialectic of subject and object in economy

Fractal chains of production and exploitation

Income distribution

Occupations

Distributors

Assemblers

Issues

Low-paid labour
Illegal working hours
Health and safety risk for unscheduled overtime
Health and Safety issues
Intensive system exploitation
Poor working conditions
Working conditions
Crowded stores for workers
Workers health / pain programs

Hazards

Working

Component manufacturers

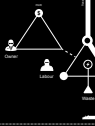
Issues

Toxic waste
Health hazards

Hazards

Working

Environmental



Smelters & Refiners

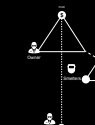
Issues

Mafia and Radioactive waste
Health and environmental hazards

Hazards

Working

Environmental



Mines

Issues

Child labour
Forced labour
Conflict
Low-paid labour
Cadmium poisoning
Environmental and working hazards

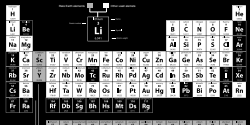
Hazards

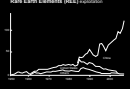
Working

Environmental

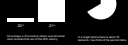
Privatization and exploitation of common resource (Earth)

Elements

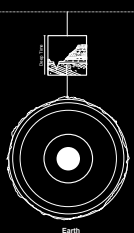




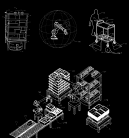
Since 1950, mining companies have produced four times the amount of many. If not all, rare metals compared to the amount they produced from the beginning of time until 1950.



Geological process



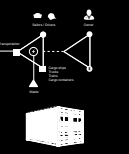
Amazon storage systems



Transportation

Issues

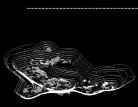
Air and water pollution
Toxic waste
Health hazards



Hazards

Working

Environmental



Human operator

Issues

Privacy
Digital security
Unpaid immaterial labour

Domestic infrastructure

Amazon Echo Dot

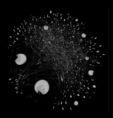
Amazon Echo Dot

Power Wifi Routers

WiFi Router

Internet infrastructure

Internet Service Provider (ISP)



Internet Exchange Points (IXP)

Routers

Cables

Repeaters

Internet Platforms & Services

Amazon Inc. Infrastructure & AWS

Corporate Sector

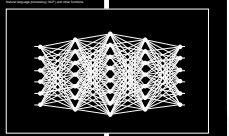
Amazon Data

AVS

Alexa Voice Service

Alexa (Voice Service) services speech-to-text and terms speech, Natural language processing, NLP) and other functions.

AVS: Speech to Text



Issues

AI 'black box'
Bias in 'teenager' modeling
Unverified and unaudited

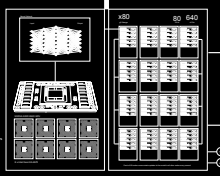
AVS: Intent

User voice

AI Training

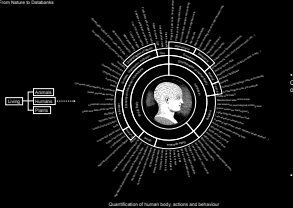
Issues

AI Black Box
Bias in 'teenager' modeling
Energy Consumption



Quantification of nature

From Nature to Databanks



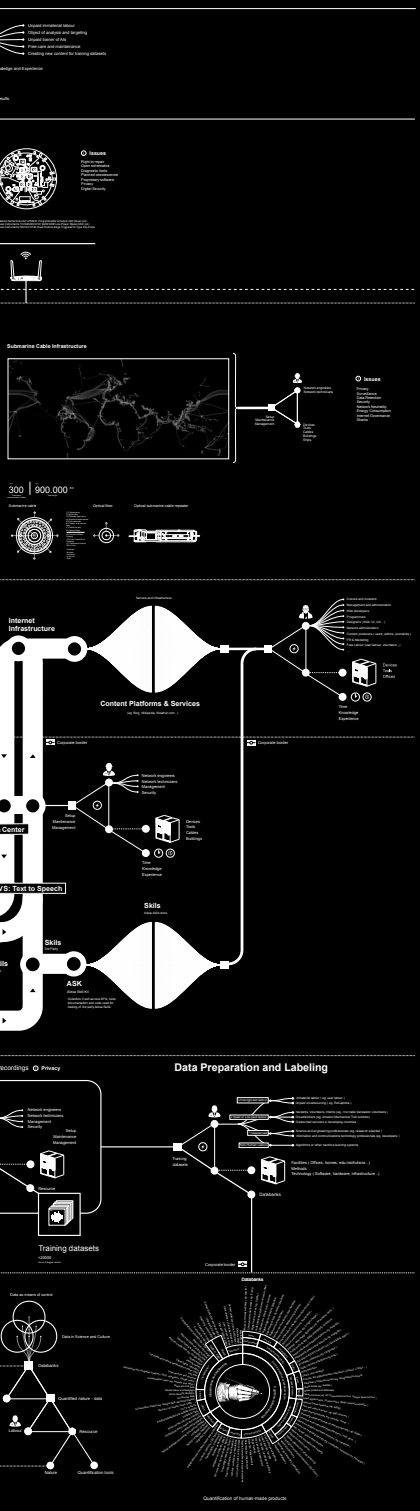
Data exploitation

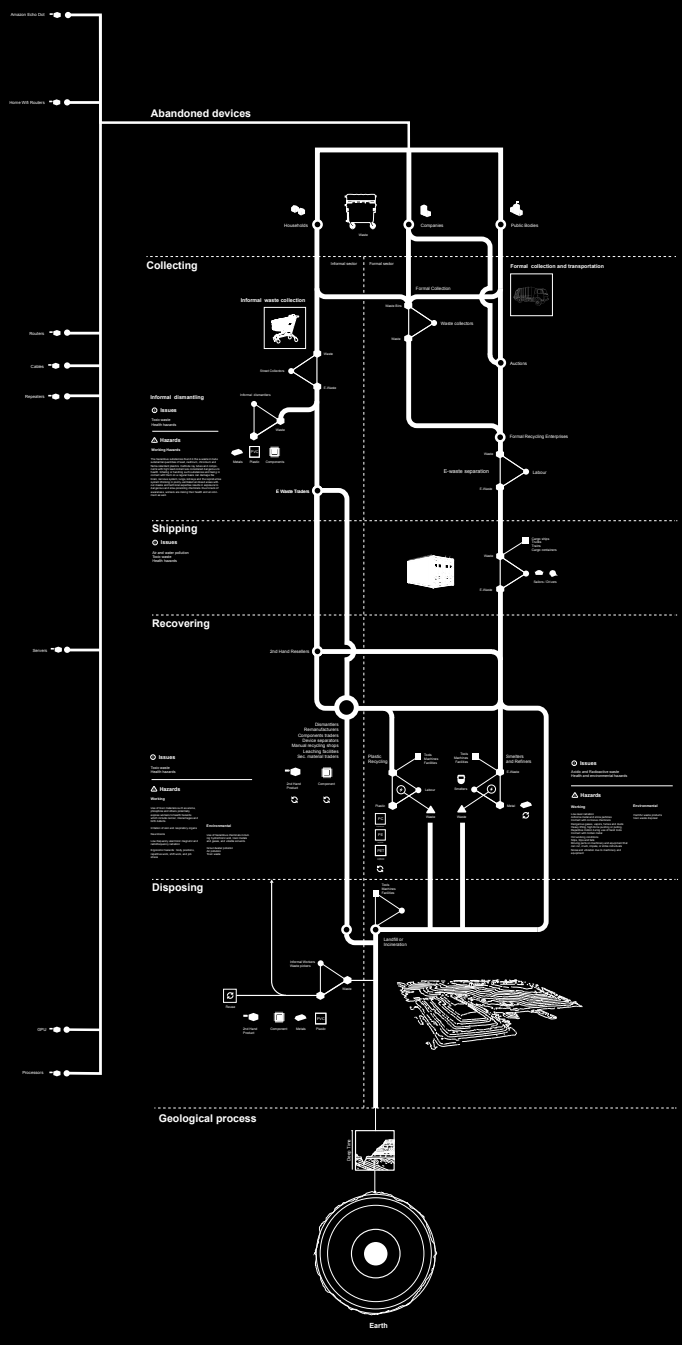
Data as commodity

Quantification of nature

A full scale, high resolution map can be viewed at:

https://anatomyof.ai/





The systems we produce and invite into our homes today are so vast, distributed, complex and intangible, that they defy a complete understanding. This is perhaps best depicted by the recent work of Kate Crawford and Vladan Joler. *Anatomy of an AI System* reveals how "each small moment of convenience – be it answering a question, turning on a light, or playing a song – requires a vast planetary network, fueled by the extraction of non-renewable materials, labor, and data." [5] This is driven home by a beautifully rendered system map that lays bare the staggering complexity of even the most simple interaction in the smart home.

When you see an image like this, it recasts the seemingly simple systems of our everyday: they operate as icebergs in our homes. Only the slightest sliver is present. The remainder from cloud-connected services, data stores and data harvesting, third-party handoffs, human effort and annotation, and hundreds of developers, customer support agents and many other forms of ghost work [6] -- or hidden labor -- remain veiled, hidden and opaque. Hidden behind the protrusion of a connected thermostator a kitchen appliance: another world; an otherworld.

The seeming simplicity of domestic technologies and the smart devices now occupying our home is intentional. They have been designed to be elegant, ornamental, and perhaps even benign. This creates a clear tension between the way they appear (simple, usable, harmless) and the way they operate (complex, unwieldy, destructive). Simply put, our systems are no longer explainable. Yet, we crave explainability.

So, in the moments where Alexa wakes without being prompted, when we receive text messages from a year ago out of the blue, when clairvoyant adverts predict our future needs, we wonder perhaps what 'daemons' possessed the systems, what gremlins (in lieu of bugs) prompted this outcome, what ghosts lie in the machine?

The supernatural is a comfortable vehicle for this interpretation. It is fundamentally about how we make sense of things that either can't be explained or are exceptionally hard to explain [1]. But magic is not limited simply to our explanations of these systems operation, behaviors, and breakdowns; it is actively and increasingly involved in the production of our experiences with these devices. David Rose popularized the 'ladder of enchantment' an approach to designing desirable smart home products [8]. Marenko & Van Allen's revived animism as a method for crafting interactivity between a human and a non-human, such as voice-assistants [9]. They further entwine mysticism with the devices that now complicate our homes.

Spooky Technology catalogs these 'otherworldly' qualities of technologies as a compelling metaphorical mechanism to reflect on and negotiate our collective frictions with contemporary technology. These effects — from small-to-large, subtle-to-overt, existent-to-speculative — are charted through the six sections of this book.

1 That is not to say it is an ideal mechanism. Natalie Kane and Tobias Revell have repeatedly highlighted through Haunted Machines [7] – an arts-based research and curatorial effort – the problematic nature of magic as a too convenient explainer for how complex systems and processes operate; espousing the 'magic' behind Alexa shrouds the true intentionality and behavior behind the systems and slowly erodes our agency over the technologies that influence and affect us.

Glitching examines how we interpret and respond to hacks and hoaxes, malfunctions and manipulations, and unexpected outcomes. Stories from targeting Facebook ads so that you can prank a roommate, trapping autonomous vehicles in salt circles to faking traffic jams on Google Maps highlight how fragile the algorithms and systems that shape our everyday experiences are. In *Mysticism*, we explore spiritual practices, rituals and belief has confronted the era of the web, mobile apps, and social media. Seances, numerology, smorfia, ESP all now have 'apps' to support them, while online conspiracy theories swirl around new technologies like 5G and urban legends, such as Lavender Town, become entangled with digital media. But both virtual and real spaces overlap with the power and the processing of the internet. *Ubiquitous Presences* documents the unsettling reality of the new panoptic home, the creepy coincidence of targeted advertising, and ghosts in the networked machines that we invite into our homes through smart and connected appliances. Building on these three sections, *Black Box* explores how we navigate the explainability of the increasing number and complexity of systems surrounding us. Focusing on voice assistants, it juxtaposes our jarring encounters with them against a series of speculative, alternative voice interfaces that amplify their otherworldly and seemingly magical abilities. *Uncanny Valley* extends this conversation and examines why we find technologies that try mimic human behavior — from deep fakes, robot dogs, 3D printed masks, to human avatars and simulations — so eerie. We conclude with *Posthuman*, which looks at how emerging technologies, such as cyborg implants, digital afterlives, will fundamentally alter our bodily existence and unsettle our understanding of what it is to be human.

There are of course many, many more, case studies, experiences, and examples — and points of view upon them — that could be included in each chapter and in this volume. Spooky Technology is not intended to be a comprehensive survey. Instead, we see it as an interpretive framework and a starting point for discussion, debate, and dialog about our entangled relationships to technology.

"What is needed is not new technology but new metaphors: a metalanguage for describing the world that complex systems have wrought"

- James Bridle

A fuzzy definition of Spooky Tech

With that said, we do also draw some boundaries around this project and the works it compiles. There are many possible interpretations of what spookiness is and could be.

We intend “Spooky Technology” not as an expansive umbrella term but instead as a framework to curate and draw together a dialog about specific kinds of kinds of projects, experiences, and reflections on computing today. We intend ‘spookiness’ to be about unease with, vagueness surrounding, and the mysteriousness of technology. We are concerned with how we make sense of things that either can’t be or are hard to explain. What it isn’t however is a ‘house of horrors’: we are emphatic that it isn’t about the terrors, fears, and ghastly outcomes that can result.

While we set these constraints upfront, part of the beauty of a term like “spookiness” is that it defies a singular perspective. Throughout, we regularly had to navigate our own interpretations to coordinate our shared understanding. “Spooky Tech is...”: we posed the definition as an open-ended question to everyone involved at multiple stages of this project to examine and reexamine what this term meant to us. Of course, how we define and specify “spooky tech” has warped and changed over the course of this project. We offer the below as a small illustration of some of our efforts to contain our exploration with a succinct definition.

> **Spooky Tech is …**
> *Christi Danner:* The ominous mystery that is our reliance and use of machines that we don't fully understand
> *Anuprita Ranade:* Encountering the unknown through tech
> *Karen Escarcha:* Tech that makes our arm hairs stand up a little bit, but we don't know why
> *Gordon Robertson:* The arising spookiness from technology, intentional or not
> *Lisa Yeung:* something we haven't seen before or cannot explain
> *Matthew Cruz :* technology that can "spook" people through its abilities or connection to the supernatural
> *Katherine Giesa:* about experience, inspired intentionally, or not, by the technology around us
> *Meijie Hu:* useful technology misused
> Yiwei Huang: A way to pose questions into our present and future to challenge the status quo
> *Elizabeth Wang:* making me really paranoid What if my cringy teen years get exposed!
> *Meijie Hu:* it is Spooky not just because of the technology but also the social impact it creates
> *Catherine Yochum:* something that alerts us to the functioning of tech or functioning of ourselves through tech in a way that is just beyond the realm of understanding
> *Matthew Cruz:* technology that can be perceived as "scary" to any one person whether because of its power or its seeming connection to the supernatural
> *Miranda Luong:* tech that we don't understand and is seemingly out of our control
> *Anuprita Ranade:* something that is beyond our scope of imagination, therefore it scares us/intrigues us/freaks us out while experiencing it.
> *Gordon Robertson:* Using the super-natural to complement our understanding of modern technology
> *Christi Danner:* An experience with technology that leaves one feeling unsettled, because it is not clearly understood or because the implications of the interaction are uncertain
> *Katherine Giesa:* about experience, largely about relations between material and immaterial

All of these are pieces of the puzzle: neither right nor wrong. What's 'spooky' to one person isn't necessarily to another. The definitions and explanation might also depend on which aspect of "spooky tech" you are concerned with. After all, this isn't an objective framework – it dances between the subjective, the critical and the surreal.

For example, it might most obviously evoke notions of otherworldly apparitions; a connection to hauntings; and through this it becomes a mechanism to explore those moments when 'technology goes bump in the night', causes friction, or seems to possess some attributes beyond the mechanisms and systems that govern it. But a haunting may also suggests that some spectral, even unwanted aspect of the past is simply attempting to push into our present. Ghosts often represent spiritual presence of a deceased family member, but more broadly might be viewed simply as a disconnected 'other' from the legacy of a home, place or time. This brings to mind the concept of spectrality as introduced by Jacques Derrida . This describes how the "living present" is "out of joint" with the past or future of a place leading to 'haunted' encounters where this disjointedness can be temporality perceived and co-exist [10]. Similarly, W.G. Sebald's writings "characterized by irruptions of the surreal and the phantasmagorical" which are used to unsettle and trouble his "sustained meditations upon relationships between place, memory and subjectivity. [11]". So too can "Spooky Technology" be viewed as a hauntological framework. It simultaneously threads pasts, presents, and possible futures of technology to complicate our interpretation and provide an unconventional perspective on everyday systems and processes.

Alternatively, "spooky" might for some connote the lens of physics and "spooky action at a distance" [2]. This rather nice phrase covers the notions of entanglement -— the ability of separated objects to share a condition or state. Interestingly, this concept of entanglement is increasingly used in HCI and design research scholarship [12,13]. It "point[s] to the intimate entanglement between humans and machines and that there is no human experience that is not mediated through some kind of technology and this shapes who we are in the world. [13]" This argues for increased consideration how objects assert new agencies and how this creates implications not only for socio-technical understanding of our messy encounters with data and systems but also in how we design with responsibility and accountability to these lived realities. Viewed as entanglement HCI, Spooky Technology operates an interpretive framework to re-conceptualize and de-familiarize our unsettling entanglements with computing; and aspires to inform how design is practiced through conversation and debate about the effects and ethics of our systems and devices.

[2] "Spookiness" has a complicated relationship to science and scientific knowledge. Take, for example, a leading figure like Isaac Newton. He is recognized as an eponymous forebearer of modern physics by helping to define the notion of gravity and provide concrete framing to the operation of our world and our universe by defining the nature of an unseen force operating on matter. Yet his theories of gravities "action at a distance" were derided as occultist. And not without good reason. Newton's unpublished manuscripts reveal an obsession with alchemy for which economist John Maynard Keynes (who collected Newton's manuscripts) called him "the last of the magicians." Popular wisdom reflects the pursuit of alchemy as a fool's errand, yet these inquiries as it turns out are significant for humankind's understanding of the world and offer precursors too many avenues of modern science. As Einstein's popularized 'spooky action at a distance' borrows from Newton's "action at a distance", modern physics remains entangled with the alchemy and the occult.

This wide array of interpretations means that a complete, final definition of "Spooky Technology" is hard to pin down. So instead, below is a looser working (or fuzzy [3]) definition that speaks to the intentions of this work and to the general traits of the projects, experiences and reflections curated through this volume.

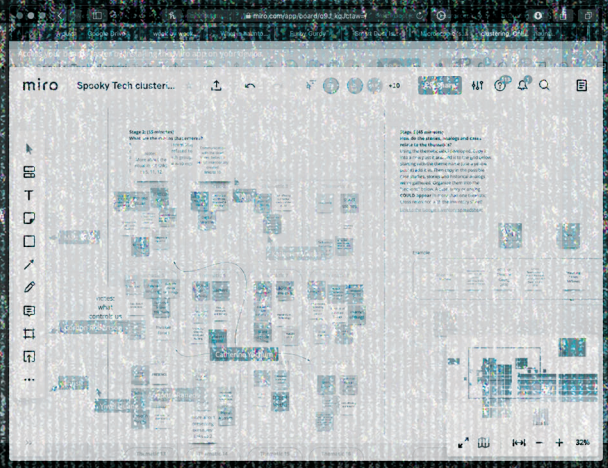
This is what "Spooky Tech" is about:

- the histories of these devices and how they haunt our present
- making sense of everyday entanglements with data and systems
- our interpretations and encounters at the margins of our understanding of how these systems operate
- the beliefs, superstitions, and myths that emerge and endure around the past, present and future of everyday technologies
- critically examining these relationships and positing alternatives
- revealing our individual and collective anxieties for the future
- offering a framework and resource for designers to attend to these questions and concerns.

We offer "Spooky Technology" as an umbrella term to consider not just the works depicted here but one which can be applied to many more beyond. Much as the works represented in this book are partial, subjective and incomplete, so too is this working definition of "Spooky Technology." Iterations, extensions and adaptions are welcomed.

[3] A fuzzy definition is inspired by Marie Laurie Ryan's approach to defining narrative [14]. She calls out narrative as seemingly easy term to define when it is in fact incredibly challenging to do so: "Rather than regarding narrativity as a strictly binary feature, that is, as a property that a given text either has or doesn't have, the definition proposed below presents narrative texts as a fuzzy set allowing variable degrees of membership but centered on prototypical cases that everybody recognizes as stories." We similarly opt for a fuzzy-set approach, allowing as Ryan did, for the characteristics to vary depending on context and considerations.


Lisa Yeung
Christi Dinner
M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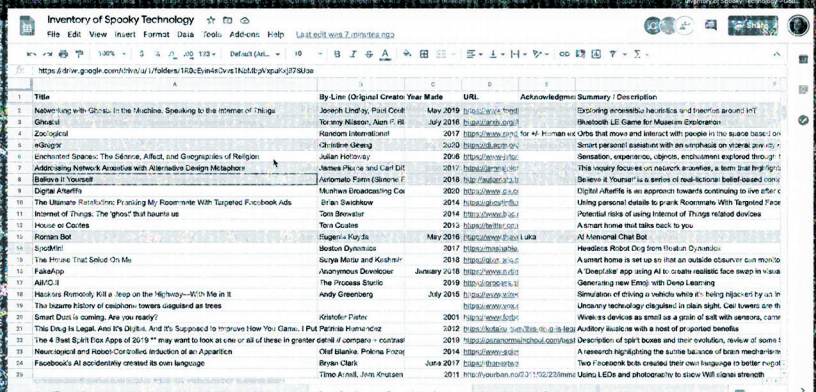
Spooky Tech cluster...


Inventory of Spooky Technology
File Edit View Insert Format Data Tools Add-ons Help

On Presence and Presents: About Our Process

Presence

noun

1 presence of a train on a section of track was indicated electrically: existence, being there. ANTONYMS absence

2 I would like to request the presence of an adjudicator: attendance, attending, appearance, residence, occupancy; company, companionship; informal turning up, showing, showing up. ANTONYMS absence

3 he was impressed by her presence: bearing, carriage, stance, deportment, comportment, attitude, posture, manner, air, guise; demeanor, mien, behavior, conduct, dignified air/demeanor, dignified bearing, dignity.

4 a woman of presence: aura, charisma, personality, strength/force of personality, individuality, magnetism, attraction; poise, self-assurance, self-possession, self-confidence.

5 she felt a presence in the castle: ghost, spirit, specter, phantom, vision, wraith, shadow, poltergeist, manifestation, apparition, supernatural being; Scottish & Irish bodach; West Indian duppy; informal spook; literary shade, visitant, revenant; archaic eidolon.

In preparing this compendium, the word, 'presence,' surfaced and resurfaced in our discussions. At times 'presence' was used to suggest 'unseen forces' operating either as apparitions or behind the mechanisms of our technology, such as in *Ubiquitous Presences*, which discusses this in the context of the Internet of Things (IoT) and the smart home. At other times, it suggests the delicate relationship between tangible and intangible components of modern computing; 'the cloud' — an ethereal and vague concept — starkly contrasts the resurgence of hardware and physical forms in everyday computing. Yet, the word itself is especially resonant to the preparation of this project: it reflects the uniqueness of us 'being there' together in this process. None of our team was actually together at any point. We never physically met. Instead, we gathered via Zoom for two months in Summer 2020. Trapped at home during the pandemic lockdown, twelve disembodied voices connected over video conferencing streams.

To be working on a book about 'spooky technology' and solely operating through these strange mechanisms for collective gathering — entirely dis-corporeal digital mediums — has a certain poetic quality. But it also added something unique, timely, and surreal to the process. Stay-at-home orders thrust us into a bizarrely forced engagement with our domestic spaces, where we had the unlikely occasion

to become increasingly attuned to the conditions and character of our (smart) homes. Navigating this uncanny (if not surreal) new-normal was an opportune moment to question the status quo of our everyday technologies and to be receptive to 'otherworldly' influences [4]. It has allowed us to embody our ideas and exploration in something quite material, born entirely from the aether [5] of distributed work and telematic processes. And perhaps we could not have yielded this particular outcome otherwise.

This book may also be 'of a moment' - a present reflection on our experiences unfolding during pandemic. This contemporary context also speaks to another aspect of spookiness. It is always 'of a moment'. What's spooky today, is unlikely to be so spooky tomorrow. Take for example our first encounters with emerging ideas; these are often unsettling. During one of our meetings, one of our team shared how their grandmother had found it unnerving the first time she used Skype. These initial reactions to unsettling new technological possibilities and mediums are often normalized over time. Much as Zoom was felt to be a jarringly uncomfortable medium for collaboration at the beginning of this project; by the time this project rounded out, we were habituated to its oddities and rough edges.

Similarly, current circumstances and our present values in this moment can recast and reframe old and analog practices. For example, when we uncovered 'death portraiture' (see *Posthuman*), we found it disturbing; it confronted our expectation of how the bodies of the dead are handled, encountered, and remembered today. It is almost inconceivable to take a photo of a dead body as a keepsake, let alone to give it pride of place in the home. And yet this was once common practice. Compare this to the tale of Roman Mazurenko (see *Posthuman*), who was partially reanimated after his death in 2016 as an interactive chatbot built on machine learning and pervasive capture of personal digital data. For some this will be remarkable and for others this will be deeply troubling. Our final section, *Posthuman,* explores this and the many other ways our digital legacy can re-connect us with our loved ones who may no longer be with us. We can easily wager that the disquiet of these presently unsettling mediums will likely quell and become an everyday reality in the near future.

So, what's spooky is certainly 'of a moment'. Yet this book is produced in perhaps the most deeply unsettled and unsettling times in recent history: the COVID-19 Pandemic. Thus, it is important to note that this catalog and inventory is of this

[4] Molly Fitzpatrick wrote about this in "Quarantining With a Ghost? It's Scary," for the New York Times in May 2020 [15]. Excerpts are below (emphasis added on last sentence of first paragraph":

> John E.L. Tenney, who describes himself as a paranormal researcher and is a former host of the TV show "Ghost Stalkers," estimates that he received two to five reports of a haunted house each month in 2019. Lately, it's been more like five to 10 in a week.
>
> "It does seem to have something to do with our heightened state of anxiety, our hyper-vigilance," he said.
>
> Mr. Tenney has no doubt that the vast majority of these cases in his inbox are "completely explainable" in nature. "When the sun comes up and the house starts to warm up, they're usually at work — they're not used to hearing the bricks pop and the wood expand," he said. "It's not that the house wasn't making those sounds. They just never had the time to notice it."

[5] "Aether" is a deliberate term. This borrows from J. Stanley Grimes' definition of Ethereum as "a material substance occupying space, which connects the planets and the earth, and which communicates light, heat, electricity, gravitation, and mental emanations from one body to another and from one mind to another [15]". Considering such 'mental emanations' in light of the internet's remarkable capacity to connect us at a time like the pandemic is an interesting thought exercise. Of course. this comparison between electronic media and the alchemical explorations of aether is not new [2,3,4,7].

particular moment. It captures our present relationship to the disembodied, disconnected, telematic processes we used for collaborative authoring and our current relationship to technology in the home and beyond. Spooky Technology operates as partial, subjective, and interpretive account that reflects our shared preoccupations, interests, and particular cultural perspectives in and on this moment: the ghost stories we told each other during the pandemic.

If we repeated this curatorial effort with another group, or in another time, we would expect very different outcomes. Equally if repeated in a year, or perhaps five, what we highlighted as spooky may long longer have those qualities. We see this not as a limit of the approach, but an opportunity. This book is a starting point: for curating projects that discuss the otherworldly aspects of technology; for dialog about our systems and their effects; and for producing new work.

We invite others to build on efforts, repeat the processes, and examine yesterday's, today's, and tomorrow's systems with a similarly mystic and mythic lens.

/by Daragh Byrne

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GLITCHING

The unpredictability of glitches often contributes to their spookiness, leaving users wondering whether the event is a random occurrence or a larger problem in a system.

Glitches. Hacks. Hoaxes. Each of these prompt us to consider the ways in which the technologies around us are not as they seem. Such realizations can put us on edge in a world where we take digitized aspects of our lives for granted.

A "glitch" (a word that likely originated from the German and Yiddish word *glitschen*, meaning "slip" or "error"[1]) is a hiccup in any technological system. Glitches can encompass all types and severities of abnormalities, from a screen freezing momentarily, to a mass deletion of data. The unpredictability of glitches often contributes to their spookiness, leaving users wondering whether the event is a random occurrence or a larger problem in a system.

Glitches in visually oriented platforms, such as TVs and video games, quickly become spooky. We attribute meaning to whatever new form they take. *The Sims*, for example, in its attempts to mimic mundane aspects of everyday life, prompts hilarity and horror when glitches disrupt the game's depiction of normalcy.

Glitches in Google Earth and Google Street View can be even more jarring because these images are supposed to closely capture and represent the real world. Abnormalities in user-uploaded 360-degree "Photo Spheres" on Google Earth even inspired artist Kyle Matthew F. Williams to capture and compile a collection of these glitches on a Tumblr [2].

Glitches catch us by surprise; hacking, on the other hand, seeks to intentionally understand, expose, or exploit the technologies that influence us. "Hack," "hacker," and "hacking" have many definitions, but seem to first be tied to tinkering with at MIT in the 1960s, where a "hacker" was someone who slacked off on schoolwork but had an obsessively passionate hobby [3]. While some hacks wreak havoc, hackers' intentions are not necessarily malicious; curiosity or efficiency are often the driving factors behind exploring the inner workings of technology. Hackers may also view attempting unlawful cyberattacks as ethical breaches intended for the good of the public.

The variation in what constitutes hacking means there is also variation on when hacking becomes spooky: an understanding of the mechanisms or intentions behind technology through clever hacks might take the mystery out of them, thus eroding perceived spookiness. Alternatively, hacks may heighten apprehension regarding malicious intent and the vulnerability of the everyday technologies we unthinkingly trust.

This section explores the spooky sides of glitching and hacking, and their influence in our lives.

/by Catherine Yochum

[1] Ben Zimmer (2013) "The Hidden History of 'Glitch'" Visual Thesaurus, Nov 4, 2013. https://www.visualthesaurus.com/cm/wordroutes/the-hidden-history-of-glitch/

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[3] Eric Raymond (2000) "A brief history of hackerdom." http://www.catb.org/esr/writings/hacker-history/hacker-history.html

Not a scene from Inception really.

Trouble swallowing pills?

gallery.zzq.org

Does it seem ironic that swallowing swords is easy and then small pills make you gag?

The Ultimate Retaliation

Brian Swichkow, 2014

> When the target size is one person, the content becomes uncomfortably personalized in detail as if "someone, somewhere, was watching his every move."

With only $1.70, his roommate's Facebook user name, and some careful daily-life observations, Brian Swichkow's revenge prank on his roommate triggered real concern about a leak in his personal information [1]. Brian was able to create Facebook ads using his roommate's private details and target them specifically to his roommate. For example, Brian had seen his roommate, a professional sword-swallower, struggle to choke down morning vitamins. Only his roommate's close friends were aware of these ironic difficulties, so imagine his surprise when he spotted an extremely pertinent ad pop up on Facebook (left).

Throughout the prank, Brian remained anonymous. The highly personal ads, which all included details his roommate was certain he had never discussed beyond his close friends or posted about online, created an illusion that he was under watch. Coincidentally, the news of the Edward Snowden controversy further increased his paranoia. Although Brian revealed himself after three weeks and his roommate's anxieties were restored to peace, the target marketing technology involved is still very unsettling.


Hey [redacted]!
youtube.com
[redacted]
Ever feel like your roommate is creating Facebook ads targeted to a niche of just you?

Audience targeting is a commonly used strategy in advertising. When a target audience is a group of people, the ads can only identify a general commonality of their lifestyles, so the audience remains relatively anonymous. However, when the target size is one person, the content becomes uncomfortably personalized in detail as if "someone, somewhere, was watching his every move."

In an update to his blog post, Brian added that although Facebook claims it has changed to the policy to prevent targeting audiences with less than 20 people, people can still easily hack it by singling out a person with the desired trait and finding just 19 others who share it.

Another concerning part of the technology is that Brian was able to remain anonymous until he chose to reveal himself (through a final Facebook ad, of course), which shows the imbalance in information transparency between the advertiser and the audience. Privacy-related technology, just like supernatural events, is spooky not only because of the phenomenon itself but also because of the lack of transparency and control in the process. Maybe if we can empower the audience with more knowledge about what's going on behind the scenes when they receive the information, the technology would appear to be less troubling.

/by Meijie Hu

[1] Brian Swichkow (2014) "The Ultimate Retaliation: Pranking My Roommate With Targeted Facebook Ads." Ghost Influence blog, September 6, 2014. https://ghostinfluence.com/the-ultimate-retaliation-pranking-my-roommate-with-targeted-facebook-ads/

Ghosts in The Kitchen

The technology-driven side of the restaurant industry is producing its own forms of glitches and hacks.

Ghost Orders

Can a glitch be intentional? Many people who have worked as drivers for GrubHub think so. Drivers have testified (both on internet forums and in court in 2017) about receiving "ghost orders" – orders that manage to come through the GrubHub app without a push notification for the driver, prompting ripple effects on drivers' careers.

Drivers choose their schedule once a week, when the GrubHub app notifies them that the schedule of available windows for driving has been updated. Each driver opens the app and adds their preferred time windows to their schedule, pending availability. During these times, they'll receive notifications for orders which they can either accept or decline.

Peak meal times are bound to be busier than other hours, and thus more profitable for drivers. According to TechCrunch's reporting, one driver's description of the scheduling process called it a "mad scramble" for the best hours [1]. GrubHub prioritizes the availability of these prime schedule windows depending on who accepts the highest percentage of orders that come their way. So not picking up a ghost order can be detrimental to a driver's acceptance rate, influencing their ability to drive at peak hours, influencing their take-home pay.

GrubHub has blamed ghost orders on drivers' devices (the company does not supply phones), and some drivers on Reddit have confirmed that keeping their phones updated and not overheated on the dashboard has rid them of these ghosts [2]. Others speculate that ghost orders are an intentional tactic by GrubHub to "keep drivers on their toes" [1].

No matter the glitch's intentionality, ghost orders are a spooky reminder that the consequences of technological glitches often do not stay confined to the digital realm: as we rely more on technology-based services, these glitches can haunt our paychecks, privacy, sense of autonomy, and more.

Ghost Kitchens

Delivery apps allow you to have food delivered to your door from your favorite restaurants. But are you sure those restaurants are really... restaurants? Facing sky-high real estate prices for restaurant space and the dangers of offering in-person dining during a pandemic, some entrepreneurs are opting to establish delivery-only food businesses exclusively on delivery app platforms. These "ghost kitchens," "dark kitchens," or "virtual kitchens," as they have been nicknamed, make food out of preparation spaces without a front of house; these locations are sometimes even owned by the delivery platforms themselves [3]. This allows ghost kitchens to cut costs on several fronts, test out changes to their branding and menu with flexibility and ease, and even develop multiple brands to run from the same space.

Ghost kitchens have "hacked the system" in the sense that they have created a scrappy and efficient response to the ways in which delivery apps are changing the restaurant industry. They do nothing to question the negative impact of delivery conglomerates and their often exorbitant fees on brick and mortar restaurants; they have simply adapted. And for better or worse, their ability to adapt likely means these ghosts are here to stay [4].

/by Catherine Yochum

[1] Megan Rose Dickey (2017) "Former Grubhub employee testified drivers often complained about 'ghost orders'". TechCrunch https://techcrunch.com/2017/09/07/former-grubhub-employee-testimony-ghost-orders/

[2] "Grubhub ghost orders" (2018) r/couriersofreddit: https://www.reddit.com/r/couriersofreddit/comments/923yv3/grubhub_ghost_orders/

[3] Shannon Bond (2019) "Delivery Only: The Rise Of Restaurants With No Diners As Apps Take Orders".National Public Radio https://www.npr.org/2019/12/05/783164944/delivery-only-the-rise-of-restaurants-with-no-diners-as-apps-take-orders

[4] Anna Wiener (2020) "Our Ghost Kitchen Future". The New Yorker: https://www.newyorker.com/news/letter-from-silicon-valley/our-ghost-kitchen-future

Autonomous Trap 001

James Bridle, 2017

If a salt circle can easily confuse an autonomous vehicle, then what else might it "read" on the road that disrupts its normal habits?

Autonomous Trap 001 is an art piece created by James Bridle, a British writer, artist, publisher, and technologist. Through a mysterious but scenic video clip [1], we see Bridle pouring out salt to form two circles (the outer ring is dashed and the inner ring is solid). The video then shows Bridle in a vehicle easily driving into the circle, but then the car is seemingly unable to exit its salt confinements. The video is accompanied by three photographs of the peculiar scene, but they leave the viewer without an immediate explanation about what just occured, and an uneasy feeling.

Thankfully, Bridle explains the significance and meaning behind *Autonomous Trap 001* in a Vice interview with Beckett Mufson [2]. Bridle was hacking their own car to become autonomous and drew from that the simple yet profound ways a self-driving car's vision and processing could be influenced. The dashed lines of the outer circle are easily processed by the car as allowing entry, while the solid line of the inner circle signals a 'No Entry' glyph (effectively trapping the smart vehicle).

The use of salt in the formation of a circle no doubt evokes spiritual or magical

symbols for many. Specifically, the magic circle is physically marked out with salt on the ground and used to contain energy around a sacred space or act as a barrier for protection. In this instance, the circle seems to be more of a hazardous trap to the car than it is a form of protection.

Bridle created *Autonomous Trap 001* as "part of a body of work / research / writing / fooling about to explore and understand the contemporary technologies of automation, in order to better use them, and in some cases to disrupt and oppose them." Bridle categorizes the project under "resistance," hinting at both resistance to the rise of self-driving cars and the notion that there are only a select few who can create them: "the attempt to build my own car is a process of understanding how the dominant narratives of these technologies are produced, and could be changed. I don't see why cab drivers of the future shouldn't be chalking white lines on side streets to derail self-driving Ubers which are putting them out of work, and I also think we need more eyes and hands on the tools which are shaping all of our futures."

Autonomous Trap 001 is a simple example of how new, cutting-edge technology coincides with age-old, magical traditions. If a salt circle can easily confuse an autonomous vehicle, then what else might it "read" on the road that disrupts its normal habits?

/by Karen Escarcha

[1] James Bridle (2017) 'Autonomous Trap 001.' https://jamesbridle.com/works/autonomous-trap-001 and Video: https://vimeo.com/208642358

[2] Beckett Mufson (2017) "Meet the Artist Using Ritual Magic to Trap Self-Driving Cars." Vice https://www.vice.com/en_us/article/qkmeyd/meet-the-artist-using-ritual-magic-to-trap-self-driving-cars

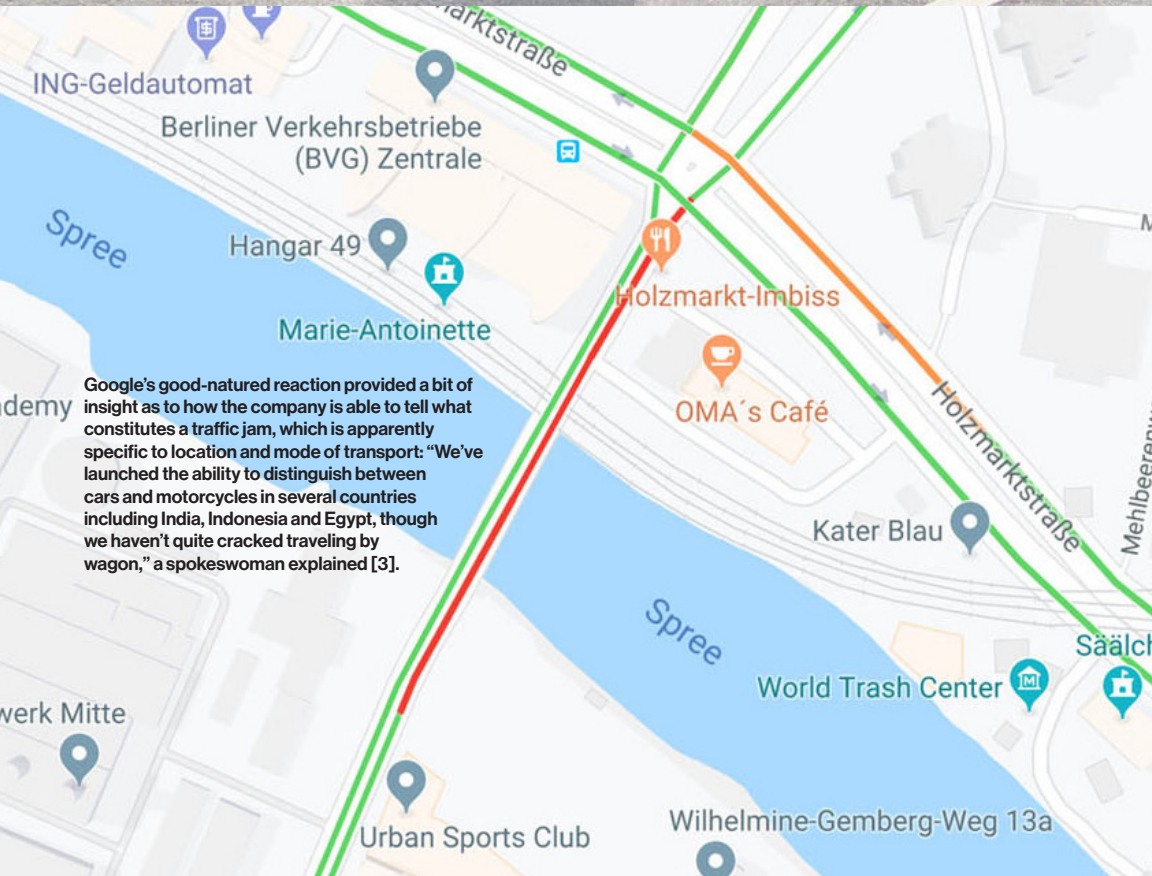
Google Map Hacks

Simon Weckert, 2020

Not only do we manipulate data, but we can be manipulated by it as well.

Since long before the advent of computers, satellites, or the Internet, maps have served as a proxy for our world. However inaccurate or incomplete, maps have influenced our understanding of what exists beyond our immediate proximity for centuries. Centuries-old maps often displayed mythical creatures in addition to topographical features, propagating and shaping contemporary beliefs: nine-foot giants supposedly sighted in Patagonia, mermaids and sea monsters dotting the oceans, a whale so still and large that a crew debarked thinking it was an island [1].

Irish legend has it that Saint Brendan's crew landed on the back of a whale so large, they mistook it for an island. Saint Brendan's Island appeared on maps into the 18th century. (The Guardian, 2016)



Google's good-natured reaction provided a bit of insight as to how the company is able to tell what constitutes a traffic jam, which is apparently specific to location and mode of transport: "We've launched the ability to distinguish between cars and motorcycles in several countries including India, Indonesia and Egypt, though we haven't quite cracked traveling by wagon," a spokeswoman explained [3].

Now, satellites and other technology can easily be used to confirm concrete topographical details such as the locations of islands, coastlines, mountains, roads, and buildings. Thanks to ever-improving platforms like MapQuest, Google Maps, Yahoo Maps, and Apple Maps, we have instant access to all of this information right in our pockets. As a result, we have become more reliant on navigation applications to give us directions to a destination. In order to do so, these platforms gather up-to-date information on the status of the roads, including whether or not a street is one-way, blocked by construction, or congested with traffic.

In his performance piece, Google Map Hacks, Berlin-based artist Simon Weckert attempts to manipulate these more dynamic aspects of Google Maps by manufacturing a "traffic jam": he does so by having a man lead a wagon brimming with 99 cell phones down the middle of the street, creating the data-based illusion of several drivers or vehicles converged in one place [2]. Video of Weckert's performance shows a progression of red lines on Google Maps, which indicate stopped traffic, following the stroll that the wagon takes.

We as individuals can't be everywhere at once, but we have enough collective, verifiable information about the world and repeated confirmation of Google Maps' relative omniscience to trust that the platform mirrors the reality of navigating our world. The extent to which we trust the accuracy of Google Maps' tools makes it spooky to see that, in fact, the signals given by a powerful application can be "hacked" by a mischievous artist and a little red wagon full of phones.

Weckert's project reminds us that maps and mapping technology don't just reflect our reality—they have the potential to shape it. That is to say, not only do we manipulate data, but we can be manipulated by it as well. Google Maps' algorithms will change traffic patterns by directing vehicles away from areas where congestion is detected, as in Google Map Hacks. Google Maps has also introduced typos to neighborhood names (Detroit's Fiskhorn neighborhood became "Fishkorn"), and even rebranded neighborhoods entirely (San Francisco's South of Market became "the East Cut"), reshaping reputations and real estate as they go [4]. Weckert's work encourages us to examine the ways in which we accept technology to be a neutral, objective arbiter of reality, and what impact those technologies might in turn have on shaping our world.

/by Catherine Yochum

[1] Edward Brooke-Hitching (2016) "The lie of the land: when map makers get it wrong – in pictures". The Guardian: https://www.theguardian.com/books/gallery/2016/nov/16/the-lie-of-the-land-when-map-makers-get-it-wrong-edward-brooke-hitching-in-pictures

[2] Simon Weckert (2020) "Google Map Hacks by Simon Weckert". YouTube: https://www.youtube.com/watch?v=k5eL_al_m7Q ; Project page on Weckert's website: http://www.simonweckert.com/googlemapshacks.html

[3] Britney Shammas (2020) "A man walked down a street with 99 phones in a wagon. Google Maps thought it was a traffic jam." The Washington Post https://www.washingtonpost.com/technology/2020/02/04/google-maps-simon-weckert/

[4] Jack Nicas (2018) "As Google Maps Renames Neighborhoods, Residents Fume" https://www.nytimes.com/2018/08/02/technology/google-maps-neighborhood-names.html

Kill A Jeep Remotely

Andy Greenberg, Charlie Miller, Chris Valasek, 2015

"The accelerator won't work. It won't work. You're doomed!"

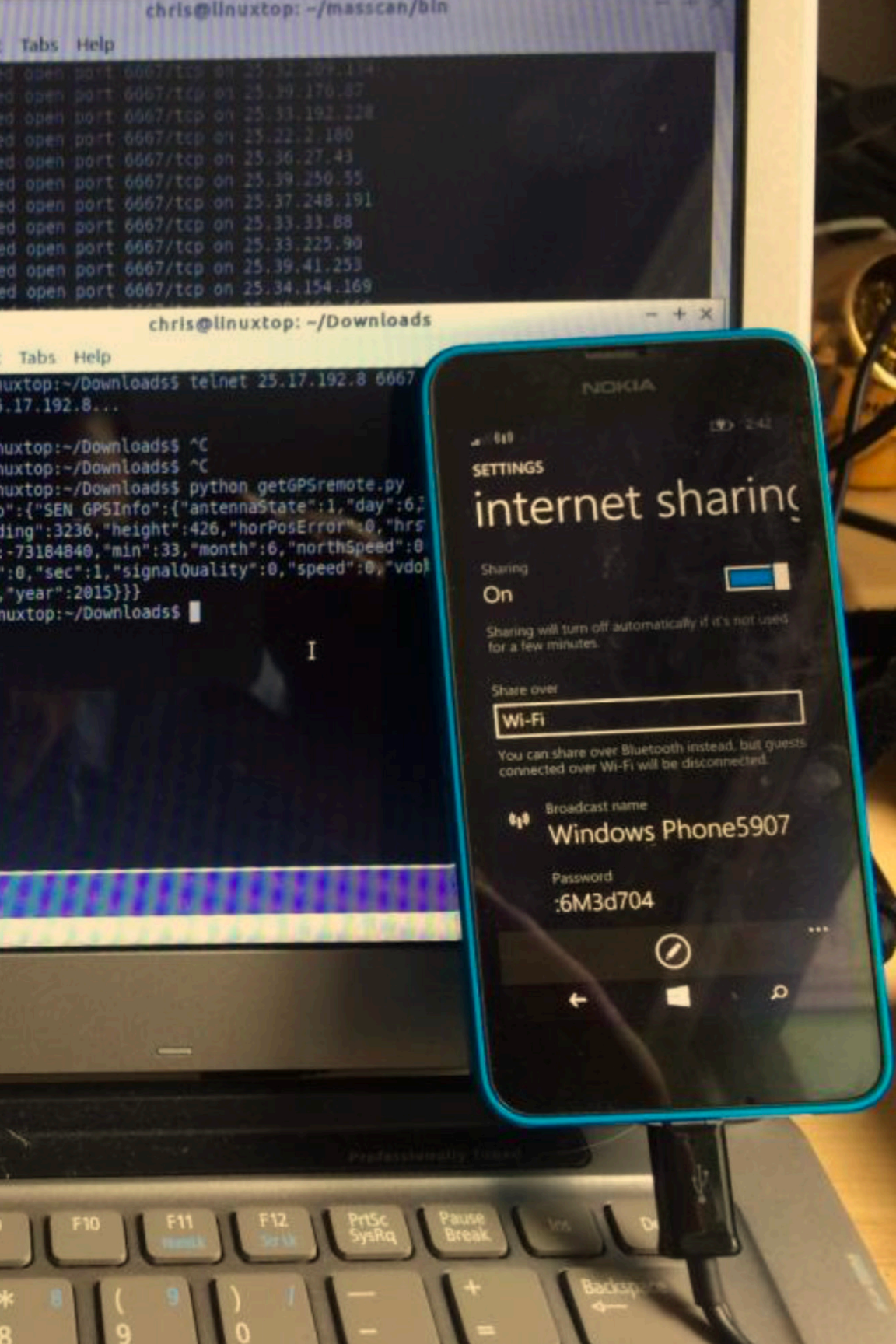
Andy Greenberg, senior writer for WIRED, was driving down a St. Louis highway when he started to lose control of his vehicle [1]. At first, the car was behaving innocently enough—blasting the air conditioner, switching radio stations, and turning on the windshield wipers and wiper fluid without Greenberg's input. While visibly annoyed, Greenberg remained calm... until the engine was cut off and all hell broke loose.

When the hackers killed the engine and the car could no longer accelerate, Greenberg went from mildly unsettled to increasingly scared for his life. Greenberg called on the invisible forces that be and begged them to turn the accelerator back on as cars honked behind him and an 18-wheeler loomed dangerously close.

Greenberg: "Guys, I need the accelerator to work again."

Miller and Valasek: "The accelerator won't work. It won't work. You're doomed!"

Greenberg: "Seriously, it's f***ing dangerous, I need to move."


chris@linuxtop: ~/masscan/bin
Tabs Help
chris@linuxtop: ~/Downloads
Tabs Help
uxtop:~/Downloads$ telnet 25.17.192.8 6667
.17.192.8...
uxtop:~/Downloads$ ^C
uxtop:~/Downloads$ ^C
uxtop:~/Downloads$ python getGPSremote.py
NOKIA
SETTINGS
internet sharing
Sharing
On
Sharing will turn off automatically if it's not used for a few minutes.
Share over
Wi-Fi
You can share over Bluetooth instead, but guests connected over Wi-Fi will be disconnected.
Broadcast name
Windows Phone5907
Password
:6M3d704
F10
F11
F12
PrtSc SysRq
Pause Break

Greenberg had to turn the car off in order for the accelerator to start working again, an extremely unnatural move to make while driving on a highway. Greenberg safely pulled over and put an end to the car-hacking experiment.

Greenberg lost control of his vehicle as part of an intentional event. Despite his awareness of the hackers, he still felt unease and panic (feelings which are also elicited for those who watch the video footage). It's hard to comprehend experiencing even this one isolated incident when we are accustomed to feeling control while driving. More terrifying is Miller and Valasek's demonstration that thousands of drivers are susceptible to remote vehicle hacks and the resulting danger these scenarios cause. As the automobile industry continues to incorporate smart features that use internal computer networks, the perks that we enjoy so much, such as navigation and cellular connection, also lead to vehicle vulnerabilities. If automakers do not continuously test and upgrade digital security networks, then invisible forces, whether they be system malfunctions or real-life hackers, will have no problem haunting drivers on the road.

/by Karen Escarcha

[1] Andy Greenberg (2015) 'Hackers Remotely Kill a Jeep on the Highway – With Me in It.' Wired, July 21, 2015. https://www.wired.com/2015/07/hackers-remotely-kill-jeep-highway/

[2] Charlie Miller & Chris Valasek (2017) "Car Hacking: The definitive source" http://illmatics.com/carhacking.html

[3] Charlie Miller & Chris Valasek (2017) "A Survey of Remote Automotive Attack Surfaces" http://illmatics.com/remote%20attack%20surfaces.pdf

Hackers, Meet "Phreakers"

It seems to be inevitable that with new technology comes people determined to tinker with the technology to see how it works, where its loopholes are, and how they can game it. We might call them hackers now, but when the new technology in question was telephones, they were known as "phreakers."

When machines replaced human telephone operators, phone companies used specific signal tones to transfer calls between them. By imitating these signal tones (either through devices called Blue Boxes or in some cases, whistling with perfect pitch), phreakers could manipulate phone lines in all kinds of manners: avoiding tolls to make free calls, recording calls, taking over drive thru order systems, releasing waterfalls of change from payphones, and more [1, 2].

Like today's internet hackers, many had codenames, some never got caught while others went to jail, some had anarchistic or sociopolitical motivations, and some were just phreaking for fun. One such phreaker, known as "Berkeley Blue" (Steve Wozniak), even went on to co-found Apple, Inc.

/by Catherine Yochum

[1] Abraham Riesman (2012). "Twilight of the Phreaks: The Fates of the 10 Best Early Hackers". Vice: https://www.vice.com/en_us/article/wnn7by/twilight-of-the-phreaks-the-fates-of-the-10-best-early-hackers

[2] Discovery Channel (2001). "The Secret History of Hacking". Produced by Mira King. YouTube https://www.youtube.com/watch?v=SbeoxPPPCyA

International Phone Call

I was sitting on the carpeted floor of my tiny bedroom in Paris in 2013, talking to my parents on my host family's cordless landline phone. My cell phone's SIM card didn't let me call internationally, so this was the best way to reach home.

Mid-conversation and mid-sentence, I heard an unfamiliar American man's voice crackle through the line.

"Hello?" I said warily.

"Hello? Hello?" he said back.

"Who is this? I was just on another call and now—" I started.

"Who is this? I was just talking to my wife!" He said, alarmed. Both of us were spooked to suddenly be on a call we didn't start with a person we didn't know.

The man abruptly hung up and I stared at the phone I'd pulled away from my ear. I'd always unthinkingly assumed the right number would deliver the right connection via this decades-old technology. But I was suddenly picturing multitudes of shapeless voices flying across oceans through some huge void and unknown infrastructure behind the plastic shell of the phone in my hand. How was it possible for these wires to have suddenly crossed?

After a pause I redialed my family's number.

/by Catherine Yochum

MYSTICISM

Our complex human lives are filled with uncertainties. As a result, we have developed thought patterns, behaviors, and belief systems to mitigate the anxieties the near- and far-future provoke. Rituals are tasks or actions repeated in a routine way at a certain time to provide a sense of calm and steadiness in the face of anxiety and uncertainty. This might take the form of three deep breaths before giving a presentation, wearing the same pair of socks to play in sports games, or relaxing for bedtime with a ten minute meditation, to name a few. Research has shown that rituals do have significant impact on outlooks and outcomes, including boosting confidence before important, uncertain, and/or anxiety-inducing events, as well as soothing us when mourning a loss [1].

While not all rituals are superstitious, the line between ritual and superstition is blurred. Rituals can (but do not always) bring about intended outcomes by influencing our emotional state in scenarios where our outlook and actions have a direct role in the outcome. Superstition crosses over into a belief system in which outcomes are influenced by supernatural forces acting upon us and our world [2]. Superstitious rituals are thus an effort to counteract or encourage these forces, may they influence weather, health, safety, or happiness.

Now, as near ubiquitous technology both simplifies and complicates our lives in a myriad of ways, our devices become intertwined in our rituals and our superstitions. Managing your email inbox at the start of the day is a ritual that might calm anxieties about missing important messages and instill daily confidence in your organizational skills; forwarding a chain email to ten friends so that you aren't haunted by an evil spirit passes into the realm of superstition.

Superstitions take hold in part because humans have a tendency to seek patterns in their surroundings. Establishing mental models for the events and objects in our surroundings helps to reduce our cognitive loads throughout the day, but this tendency also contributes to biases and stereotyping - as well as seeing patterns that aren't there [3].

Further, our beliefs in the forces acting on the world need not be supernatural: our tendencies towards pattern finding can take the form of connecting details as clues and evidence that "prove" that, for example, a trusted authority is conspiring against society or that a slew of celebrities are faking their pregnancies to save failing marriages [4].

Conspiracy theorizing is certainly not new, but the internet has proven uniquely fertile ground for conspiracies to flourish — granting virulent spread, vast access, and collective narrative building. Generally, conspiracy theories are theories of power. They explain the inexplicable and point to hidden forces operationalized behind the scenes, inaccessible to the general public. In the words of author Christopher Hitchens, conspiracy theories are "the white noise which moves in to fill the vacuity of the official version" [5].

Throughout this section we'd like to explore two primary dimensions of technology as they relate to myth, superstition, and ritual. We'll look at the ways technology has been used to augment or compliment already existing rituals. We'll also investigate the ways technology itself has spurred totally new myths and rituals [6]. We'd like to note that while we explore religious and spiritual rituals, we are by no means experts in these mediums. We are also approaching ritual, myth, and history from a position of enchantment or spiritual connection, perhaps an expansion of what one may generally consider 'spooky.'

We've also selected a very few conspiracies related explicitly to technology, as we think they're useful in exposing digital, networked anxieties. Further, as we explore the Black Box in subsequent sections, we might see the conspiracy as one way of working to fill in gaps between input and output, offering explanation for opaque functionality. Ultimately the conspiracy theory unites the digital on two fronts acting as both a generous host and a 'vacuous' target, waiting to be known.

/by Catherine Yochum

[1] Francesco Gino and Michael I Norton (2013) "Why Rituals Work". Scientific American https://www.scientificamerican.com/article/why-rituals-work

[2] Neil Dagnall and Ken Drinkwater (2018) "The science of superstition - and why people believe in the unbelievable". The Conversation https://theconversation.com/the-science-of-superstition-and-why-people-believe-in-the-unbelievable-97043

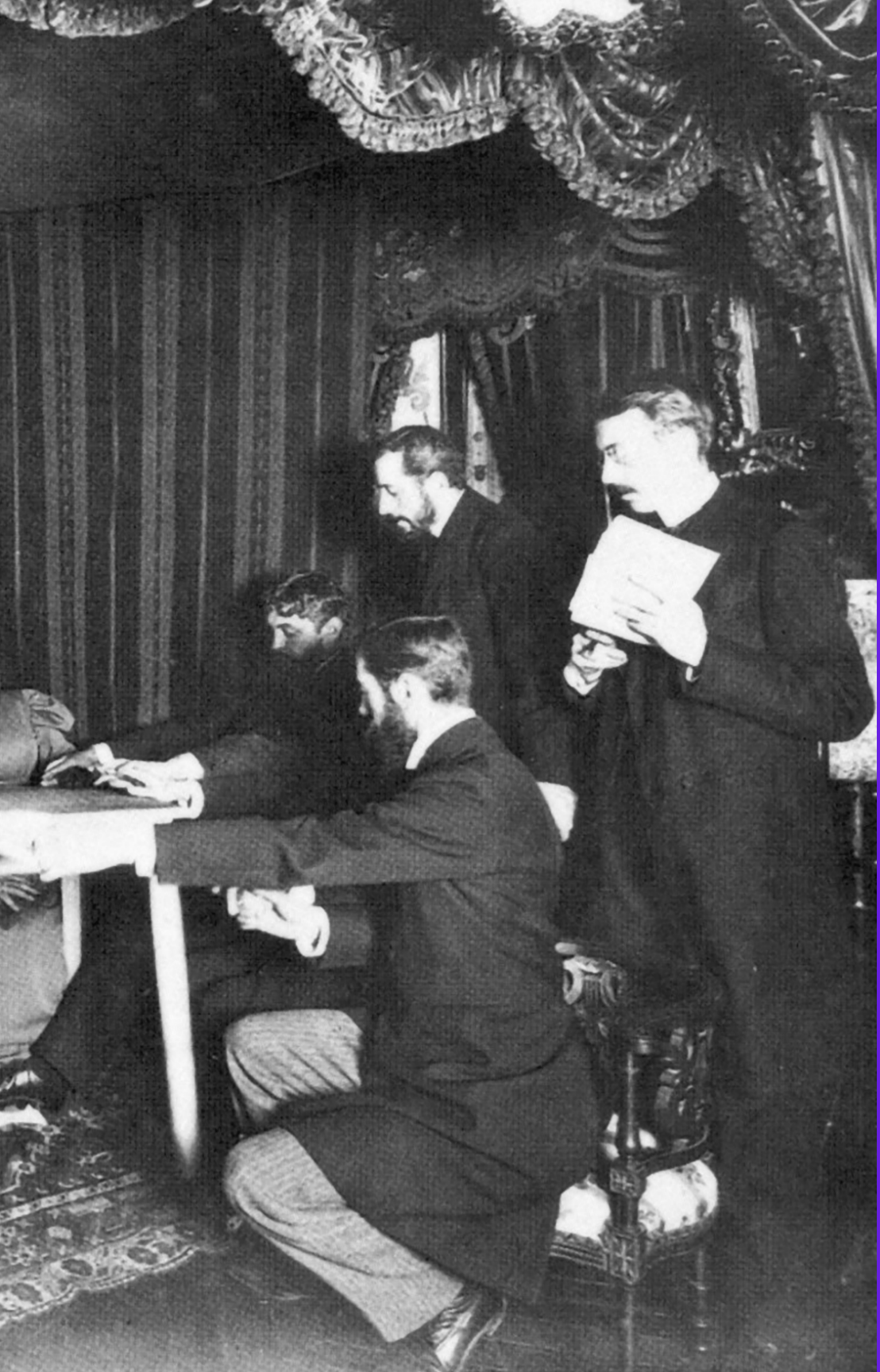
[3] Michael Shermer (2008) "Patternicity: Finding Meaningful Patterns in Meaningless Noise". 2008. Scientific American https://www.scientificamerican.com/article/patternicity-finding-meaningful-patterns/

[4] Kaitlyn Tiffany (2020) "The Internet of Fake-Baby Conspiracy Theories". 2020. The Atlantic https://www.theatlantic.com/technology/archive/2020/07/fake-pregnancy-celebrity-theories-benedict-cumberbacth-babygate/614089/

This article is part of Shadowland, a broader collection of articles about conspiracy thinking compiled by the Atlantic: https://www.theatlantic.com/shadowland/

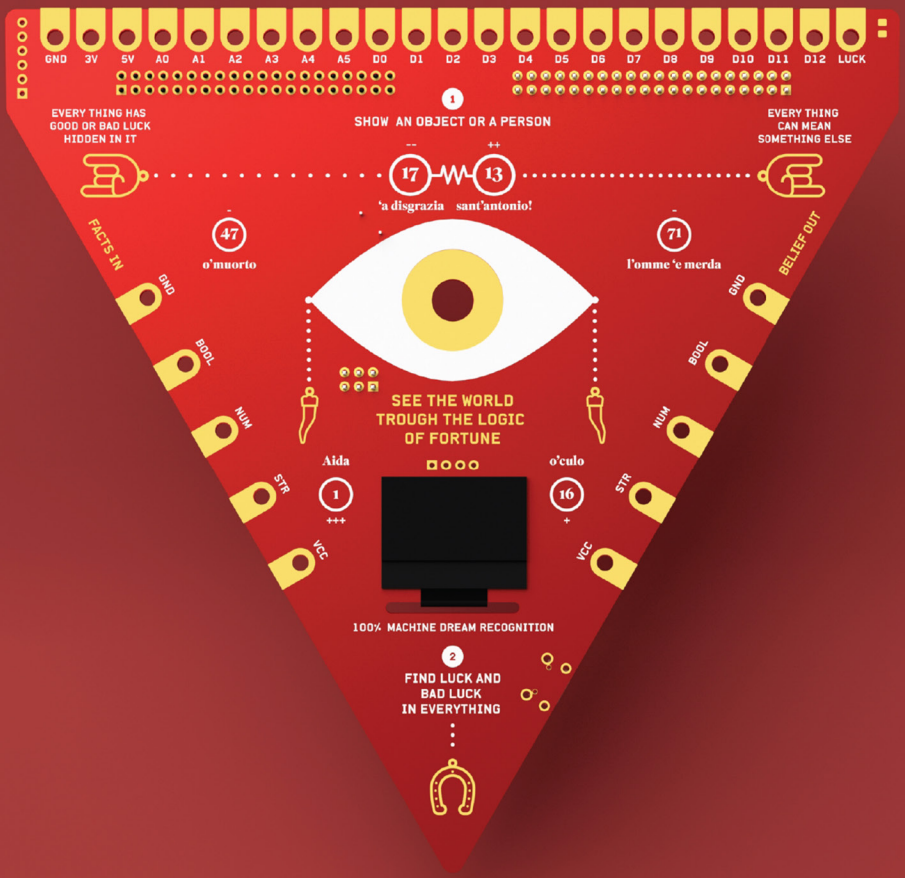
[5] Christopher Hitchens (1991) "On the Meaning of Conspiracy". London Review of Books https://www.lrb.co.uk/the-paper/v13/n21/christopher-hitchens/on-the-imagining-of-conspiracy

[6] Nicolas Nova, Katherine Miyake, Nancy Kwon, Walton Chi (2012) "Curious Rituals: Gestural Interaction in the Digital Everyday". http://curiousrituals.nearfuturelaboratory.com/



BIY.SEE

FORTUNE
RECOGNITION KIT



automato.farm
Do-It-Yourself Beliefs since 2019

Believe It Yourself

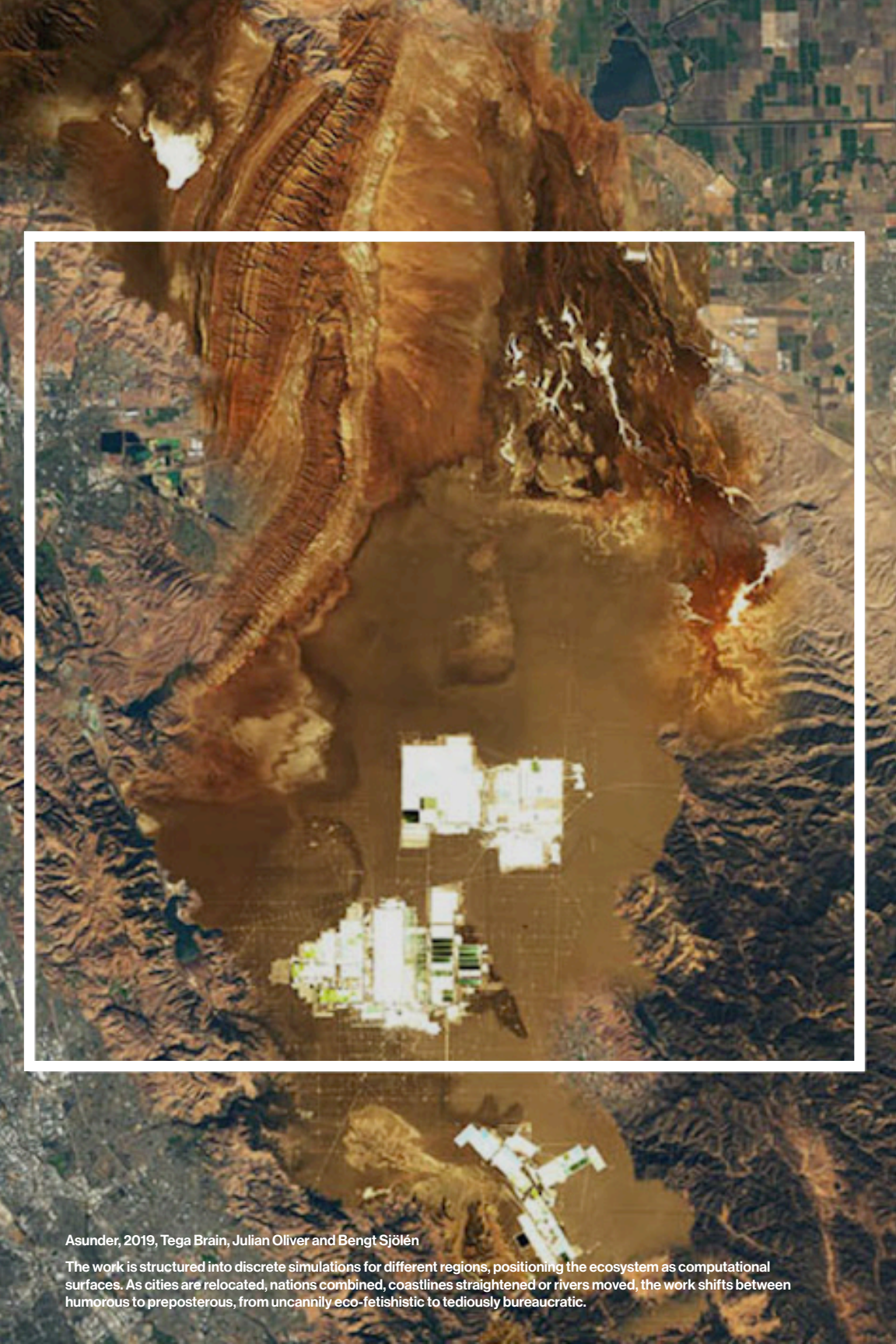
Automato.Farm, 2018

Much of the current fervor for Artificial Intelligence and big data stems from a desire to prove the "objective" validity of our worldview and plan accordingly for the future.

Nowadays, our society is flooded with products and machines that can measure phenomena, analyze data, and provide "insights" for us. Have you ever questioned the insights you were given? Instead of letting them tell us what to do, "now, we can at least make machines that believe what we might believe in!" [1]

That last line is a direct quote from Believe It Yourself, or BIY™, a project by Automato.farm that presents the world's first belief-based computing kit for an alternative near future. BIY™ is a real-fictional project which includes a Raspberry Pi, trained by a machine learning process to help make daily life decisions and predictions based on vernacular superstitions. The triptych includes the BIY.Move, BIY.See and BIY.Hear Kit.

In function, the BIY.Move kit reinterprets location and context awareness through the logic of **Chinese Geomancy and Fengshui**, to help you reach a spatial and personal harmony. The BIY.See kit can be used to recognize 'misfortune figures' with a built-in camera module. Interpreted through **La Smorfia** (an Italian dream



Asunder, 2019, Tega Brain, Julian Oliver and Bengt Sjölén

The work is structured into discrete simulations for different regions, positioning the ecosystem as computational surfaces. As cities are relocated, nations combined, coastlines straightened or rivers moved, the work shifts between humorous to preposterous, from uncannily eco-fetishistic to tediously bureaucratic.

reading practice), BIY.See informs the user of very unlucky configurations, such as a black cat crossing the street. As for the BIY.Hear kit, it is trained on **Indian Numerology and Astrology**, and uses natural language processing to recognize voice input; it provides an output with a lucky number and a destiny hidden in words, just like your own personal fortune cookie. Humorous yet critical, the artists' process for developing the devices involved close work with experts in divination techniques from different cultures to translate their knowledge and beliefs into digital forms.

Apart from the artifact design itself, BIY™ endeavors to create a more immersive fictional experience. Coupled with an advertisement-style intro video, the computing kits can be pre-ordered on the website. What's more interesting about this real-fictional project is the intention and potential for divination, superstition, and ritualistic practices to be embedded into other digital devices. By digitizing divination practices, BIY empowers its audience to advocate for a specific way of understanding and convince others of our logical framework. Much of the current fervor for Artificial Intelligence and big data stems from a desire to prove the "objective" validity of our worldview and plan accordingly for the future. In this context, artificial intelligence becomes the new superstition.

The blurry border of reality and fiction, present and future, immerses the audience in new ways of experiential thinking. As mentioned in an interview with SpeculativeEdu [2], the artists have taken inspirations from the Near Future Laboratory and James Auger's work [3, 4]. These projects pose questions about the everyday world through artefacts that reflect a mundane reality of a near future. This creates a "critical aftertaste" and hits the audience with delayed realizations.

BIY™ was commissioned for the MAK Vienna as part of the the 2019 Vienna Biennale's "Uncanny Values" Exhibition. Taken together with other projects in this exhibition, like AImoji [5] and **Asunder** [6], **left**, BIY™ stimulates cultural sensibility around artificial intelligence and raises the question: What sort of a living creature is the omnipresent AI already, and what will it become? What roles are we playing in this process?

This becomes spooky because it has become increasingly difficult to understand when the thinking of the machine remains only in a black box. With technology's progression towards ultimate sophistication, at some point AI's "Uncanny Values" might strike us just as much as Masahiro Mori's "Uncanny Valley" did for robots.

/by Yiwei Huang

[1] Believe It Yourself (2018) Automata.farm: http://automato.farm/portfolio/believe_it_yourself/

[2] SpeculativeEdu (2019). "Interview: automato.farm": http://speculativeedu.eu/interview-automato-farm/

[3] Near Future Laboratory: https://shop.nearfuturelaboratory.com/collections/artefact-from-the-future

[4] James Auger (2015). "Real Prediction Machines": http://www.auger-loizeau.com/projects/real-prediction-machines

[5] Process Studio (2019). "AImoji": https://uncannyvalues.org/works/aimoji/

[6] Tega Brain, Julian Oliver and Bengt Sjölén (2019). "Asunder": https://uncannyvalues.org/works/asunder/

Sant'Antonio
Sant'Antonio

'o Mbriaco
L'ubriaco

'o Guaglione
Il ragazzo

23
'o Scemo
Lo sciocco

24
'e Gguardie
Le guardie

25
Natale
Natale

33
Ll'anne 'e Cristo
Gli anni di Cristo

34
'a Capa
La testa

35
l'Aucelluzz
L'uccello

43
'a Donna
'o Barcone
La donna
al balcone

44
'e Ccancelle
La prigione

45
'o Vino
Il vino

53
'o Viecchio
Il vecchio

54
'o Cappiello
Il cappello

55
'a Museca

16
'o culo
Il deretano

26
Nanninella
Piccola Anna

36
'e CCastagnelle
Le nacchere

46
è denare
Il denaro

56

Historical Rituals

Feng Shui (**Chinese Geomancy**)

Feng shui is a practice with origins in ancient China that helps us to align the spaces we inhabit with the energies of the earth and the universe. Feng shui is one of many geomantic practices, which leverage the energies of the Earth for divination and balance. Feng shui helps us to establish a balanced flow of energy in our spaces in order to nurture harmonious and joyous lives [1].

Smorfia

La Smorfia is the Italian tradition (and book by the same name) of interpreting places, people, and objects in dreams through association with 90 numbers, used to devise a lucky play in the Lotto. For example, if you are drinking coffee at a party in Italy, you could safely guess 42, 20, and 1. Smorfia is thought to be connected to the city of Naples' ancient Greek roots, as the name smorfia is likely a play on Morpheus, the Greek god of dreams [2].

Indian numerology

Numerology is, broadly, the mystical relation of numbers and life. In Indian Numerology specifically, three numbers are of particular importance: the psychic number reveals a person's behavioral or psychological tendencies, the destiny number relates to a person's engagements with the world, and the name number is important in understanding relationships. These numbers are calculated by distilling information about a person, such as name and birthdate, into a single digit. The resulting numbers are meaningful ways of seeing into oneself, and seeing oneself in relation to the world [3].

/by Catherine Yochum and Katherine Giesa

[1] https://www.thespruce.com/feng-shui-and-taoism-1275141

[2] https://www.superenalotto.net/en/la-smorfia

[3] http://www.vedastro.eu/Numerology

Dishwasher Story

“We bought a house in August 2018 that came with a haunted dishwasher.

Our first indication of this was when we did the walkthrough with the inspector; none of us—real estate agent, home inspector, husband, myself—could get the thing to even turn on. No lights, no sounds, no water. So we put a note in the inspection report that we expected the home to have a dishwasher in working order. Petty, I know, but I also don’t wash my clothes down at the river on rocks.

When we took possession, the dishwasher worked fine. Until it didn’t. The control panel would lock itself out randomly, would not allow certain buttons to be pressed, etc. Its favourite trick was to trip the breaker responsible for its functioning when we pressed the cycle buttons in an order displeasing to it.

So we have decided, in the interests of sustainability and not throwing away something that, ultimately, cleans the dishes really well, to have a choreographed routine for setting the cycle, shutting the door, opening the door, locking the panel, WHEW. There’s a note to remind us. And even then, it has its days.

Is it haunted? Or sentient and crabby? Is the life of a dishwasher measured in dog years, where 7 is well into middle-aged and growing soft around the middle? I don’t know, but I am invested in placating it.”

/by Anonymous Contributor


3
1

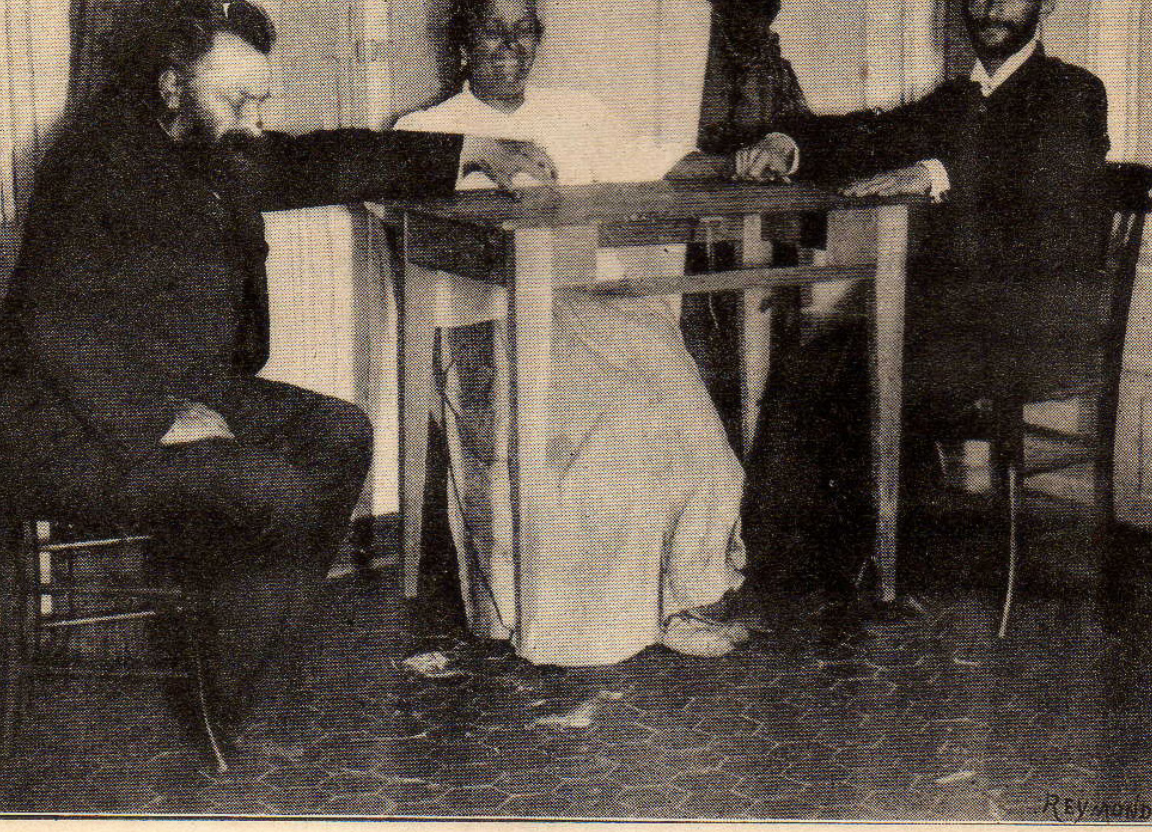
Enchanted Spaces

Julian Holloway, 2006

In the séance, animated objects served as proof of spiritual existence; technology provides new avenues to explore embodied spirits.

As an essentially sensual, affected, and atmospheric experience, the séance is a small piece in a storied legacy of celestial encounters and spiritual connectivity. Julian Holloway investigates the spaces and ambience that shape the séance in his research for "Enchanted Spaces: The Séance, Affect, and Geographies of Religion." In extending this research we find a lens for exploring enchantment.

Holloway's work seeks to bring social politics of desire, corporeality, and emotion to understandings of spiritual production. To begin, Holloway exposes a few influential factors leading to nineteenth century séances. Holloway also points first to the Western séance as a way to shift from Christianity while maintaining a sense of the mystic. Further, the ability to communicate with immaterial presences served as important proof of life after death. Finally, women frequently served as mediums, and new engagements between material and immaterial bodies repositioned corporeal acceptability. In this way, the séance may be seen as a means to transcend or subvert gender and sexual norms. The relevance of these frameworks today is open for debate and this section of *Spooky Technology* will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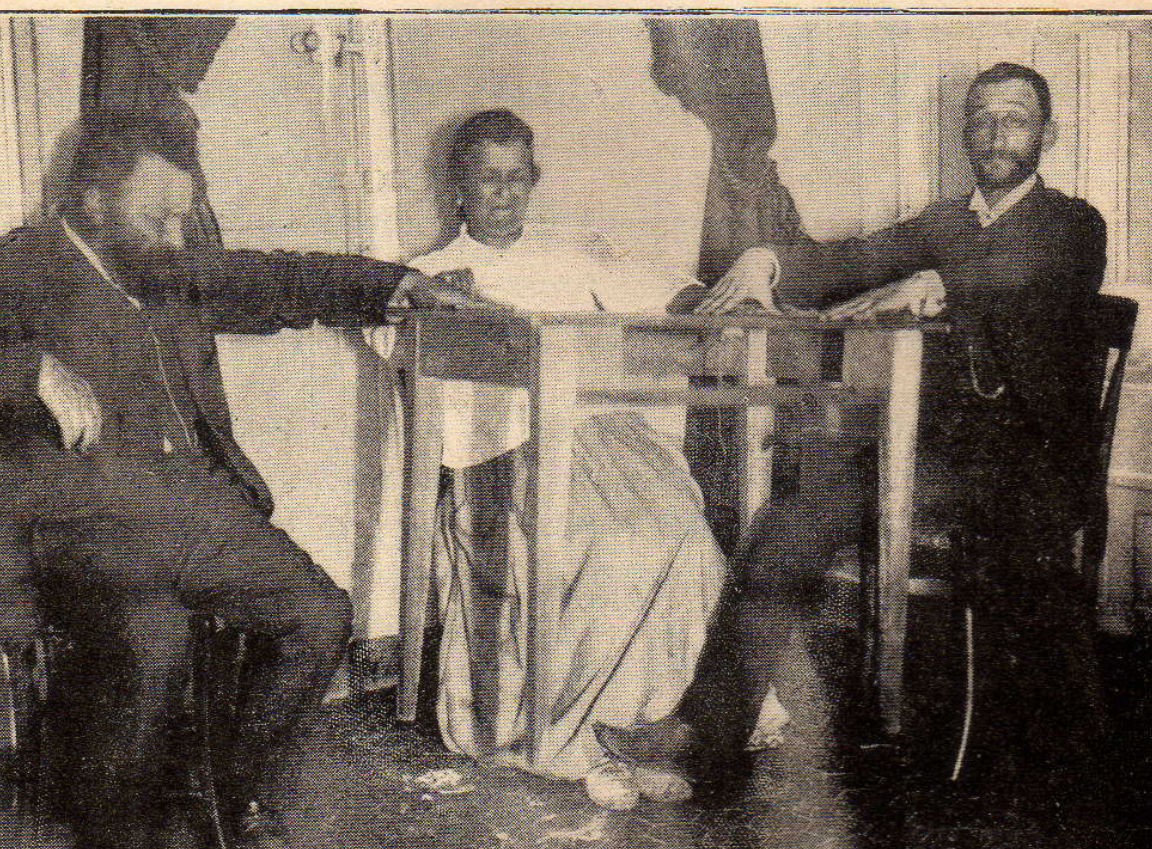

draw out contemporary influences. Regardless, relationships between corporeal and incorporeal, material and immaterial were fundamental to the séance and are worth considering as we investigate spookiness through the lens of technology:

"Enchantment is something that we encounter, that hits us... to be enchanted is to be amid the familiar and the everyday... to be simultaneously transfixed in wonder and transported by sense, to be caught up and carried away—enchantment is marked by this odd combination of somatic effects" [1].

In the séance the object is imbued with meaning and spirit. In some cases the object is affected by the spirit, and serves as conduit through which the spirit may communicate. In other cases, as Samuel Gerald Collins points out in "Networked Spirits and Smart Seances: Aura and the Anthropological Gaze in the Era of the Internet of Things", the object itself may be said to possess a spirit [2]. Though distinguishing frameworks may be beneficial elsewhere; the focus here is on the relevance of the object in mediating connections from the purely physical world to the celestial. In the séance, animated objects served as proof of spiritual existence; contemporary technology provides new avenues to explore embodied, sonically manifested, or sensationally experienced spirits.

Finally, through his research, Holloway cautions against over hypothesizing cause and context, instead embracing pure energy. Though the veracity of the seance has been debunked, we need not invalidate phenomenological experience. We may work to encourage explainability on the one hand, while allowing space for enchantment on the other.

/by Katherine Giesa

[1] Julian Holloway (2006) "Enchanted Spaces: The Séance, Affect, and Geographies of Religion". Annals of the Association of American Geographers, 96:1, 182-187, DOI: 10.1111/j.1467-8306.2006.00507.x

[2]. Samuel Gerald Collins (2015) "Networked Spirits and Smart Séances: Aura and the Anthropological Gaze in the Era of the Internet of Things". History and Anthropology, 26:4, 419-436, DOI: 10.1080/02757206.2015.1072528

Many more images of the Victorian senace can be found here: https://www.dailymail.co.uk/news/article-6526713/Remarkable-black-white-photographs-reveal-mysterious-world-Victorian-s-ances.html

SPIRIT

CDEFGHIJ

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5 6 7

SPIRIT

Séance App Review

3D Spirit Board

"Cross over into other worlds and interact with the supernatural by using the 3D Spirit Board app! ...Take heed, only ask the supernatural questions that you are prepared to hear answered. Not all spirits are friendly and not all entities are 'human'."

xEllaBeex, 8/3/2018, 1 star

"Ummm, what just happened??

So I downloaded this app on my phone and we both tinkered with it a few times and I was like "this is fake" and she agreed. A few minutes later I started shaking uncontrollably and I lost my voice. My sister tried to help me. A few minutes later I was back to normal but my sister lost her voice and now she's shaking uncontrollably and she lost her voice too. She even tried to grab me a couple times. I'm starting to get a bit worried. I'm not sure if she's getting possessed or not but she wasn't like this before we downloaded the app. Now she's just staring at me while I write this review. For your own safety, do not download"

/from Apple Store


POKé

The Myth of Lavender Town

TW: Suicide

Music can be transformative, but perhaps it's not unfair to say music can be spooky too.

"New To Dosing?," asks i-doser.com. iDoser sells binaural beats, which are effectively auditory illusions. The website invites one to watch tutorials, and displays user experiences: "I saw colors and patterns!! ... I was energized with a great mood for an hour!! It was the best trip of my life," said Peter [1].

Binaural beats present the right and left ear with different frequencies, causing a listener to perceive a third tone equal to the difference in frequencies. Though discovered over 100 years ago by Heinrich Wilhelm Dove, today's technology has made them especially available and particularly potent, if you will. Marketed by some as 'digital drugs', they are said to have a host of beneficial side effects – reducing anxiety and stress, improving focus and creativity, enhancing meditation, and altering states of consciousness [2].

Binaural beats take a turn for the spooky at the heart of more than one online myth, most famously for their use in the video game 'Pokemon Red and Green.' After the release of the game, a number of child suicide cases were reported in


MART

Japan [3]. Looking to explain the tragedy, some wandered to a specific place in the game: Lavender Town. It was said this particular soundscape presented children with harmful frequencies, inspiring uniquely affective horror and dread [3]. The myth has been disproven and people note that the otherwise spooky nature of Lavender Town, a Pokemon graveyard, importantly primes the user to suspect haunting. Still, the myth endures; there's a certain seduction to the idea that we may definitively experience that which does not in fact exist.

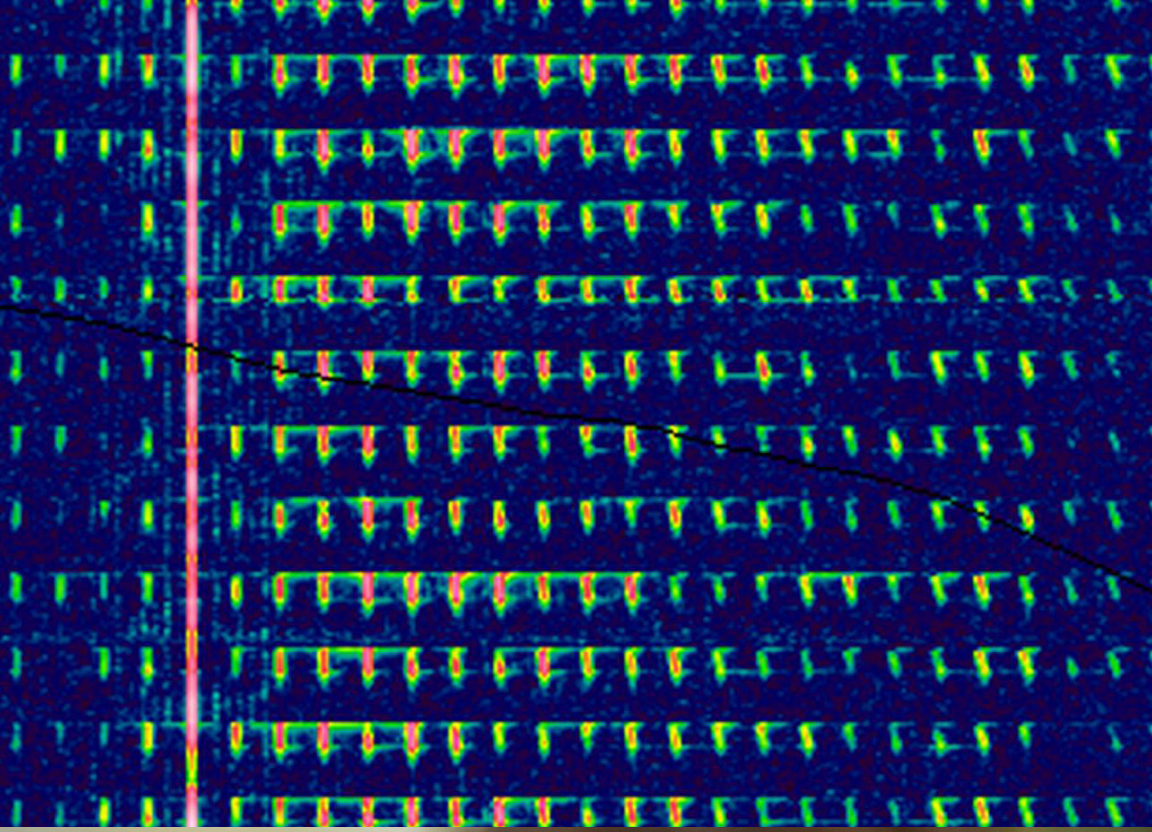
Binaural beats are "phantoms," in a sense, even beyond their mythic context. They present our senses with frequencies that are not really there—illusions able to induce experience and alter consciousness, potentially influencing action. Of course, they are not the only sonic surrounds that are highly affecting: music, insects, passing cars, and humming radiators all evoke sensation and inspire emotion. Music can be transformative, but perhaps it's not unfair to say music can be spooky too.

/by Katherine Giesa

[1]. iDoser: https://i-doser.com/index.html

[2]. Patricia Hernandez (2012) "This Drug Is Legal. It's Digital. And It's Supposed To Improve How You Game. I Put It To The Test." Kotaku, November 28, 2012: https://kotaku.com/this-drug-is-legal-its-digital-and-its-supposed-to-im-5963533

[3]. Patricia Hernandez (2016) "Pokémon's Creepy Lavender Town Myth, Explained". Kotaku, October 31, 2016. https://kotaku.com/pokemons-creepy-lavender-town-myth-explained-1651851621

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Conspiracy Theories

Not only have new communication technologies been used as mediums for breeding conspiracy in faster and more easily disseminated ways, there have also been numerous conspiracy theories that surround new technology itself. Here are a few of the spooky conspiracies that surround everyday technologies.

Radio: MDZhB

MDZhB is a globally accessible radio station that has been running continuously for at least three decades. It emanates a continuous buzz punctuated by a second, shorter buzz, and occasionally a few disjointed Russian phrases. The source of the frequency is two abandoned radio towers outside of Saint Petersburg. No one has claimed to run the station, but conspiracies speculate that it is a tool of the Russian Military, for purposes as wide ranging as communicating with aliens or detecting (and reacting automatically to) a nuclear attack [1].

5G

5G is the newest upcoming generation of high-speed cell phone networks to bring even faster data speeds to our mobile devices. These networks use wireless radio signals to allow transmission of data between the internet, data servers, cell towers, and our devices. Decades of various devices (microwaves, radios, televisions, and others) have used low-level electromagnetic fields to function, without widespread detriment to human health (as far as the World Health Organization's decades-long research can tell). 5G is the latest technology to worry a vast and diverse swath of people that our capitalistic nature is running us full-steam-ahead into a widespread (but not narrowly defined or understood) health crisis, whose consequences include increases in brain cancer, in Electromagnetic Hypersensitivity (not currently recognized as a medical diagnosis), and even coronavirus [2].

Poe's Law

Poe's Law asserts that without clear intent, parody of extreme or conspiratorial views can easily be mistaken for serious declaration of these views. This is especially true of mediums that lack physical and/or verbal cues to indicate

"With new technology comes new gaps in the public's understanding of their world, and... new ways to manipulate those gaps."

Emma Grey Ellis, Wired [6]

sarcasm or satire. Poe's Law is named after a commenter identified as Nathan Poe who, in response to a debate on evolution, jokingly (or maybe not jokingly) posted that "it is utterly impossible to parody a creationist in such a way that someone won't mistake for the genuine article." [3]

Obama's Internet Giveaway

The Internet's Domains had long been managed by Internet Corporation and Assigned Names and Numbers (ICANN) through a contract with the US government. In 2015, ICANN and the US government decided against contract renewal in an effort to globalize web governance. Some claimed the decision to "give away the internet" was an egregious, 'dangerous' ceding of American power. In a mass push towards 'global socialism', the Obama Administration was opening the Internet to control by authoritarian governments and threatening national security. To be clear, at no point did America 'own' the web. [4]

HAARP (**High Frequency Active Auroral Research Program**)

HAARP was a military funded research institute aimed at studying the ionosphere. Perhaps it still is in operation, a question still up for Internet debate. The facility emitted high-frequency waves that some say have triggered earthquakes and other natural disasters or led to global warming. Others believe the frequencies are mind control instruments responsible for altering public consciousness and behavior. [5]

/by Catherine Yochum and Katherine Giesa

[1] Zaria Gorvett (2020) "The ghostly radio station that no one claims to run." BBC Future, July 15, 2020: https://www.bbc.com/future/article/20170801-the-ghostly-radio-station-that-no-one-claims-to-run

[2] Kaitlyn Tiffany (2020) "Something in the Air". The Atlantic, May 13 2020: https://www.theatlantic.com/technology/archive/2020/05/great-5g-conspiracy/611317/

[3] Emma Grey Ellis (2017) "Can't Take a Joke? That's Just Poe's Law, 2017's Most Important Internet Phenomenon". Wired, June 5, 2017: https://www.wired.com/2017/06/poes-law-troll-cultures-central-rule/

[4] Adam Weinstein (2014) "New Awesome Conspiracy Theory: Obama Giving Away the Internet to China". Gawker, March 18 2014: https://gawker.com/new-awesome-conspiracy-theory-obama-giving-away-the-in-1545317115

[5] Stephanie Pappas (2014) "Conspiracy Theories Abound as U.S. Military Closes HAARP". NBC News, May 23 2014: https://www.nbcnews.com/science/weird-science/conspiracy-theories-abound-u-s-military-closes-haarp-n112576

[6] Emma Grey Ellis (2018) "The WIRED Guide to Online Conspiracy Theories". Wired, October 5, 2018: https://www.wired.com/story/wired-guide-to-conspiracy-theories/

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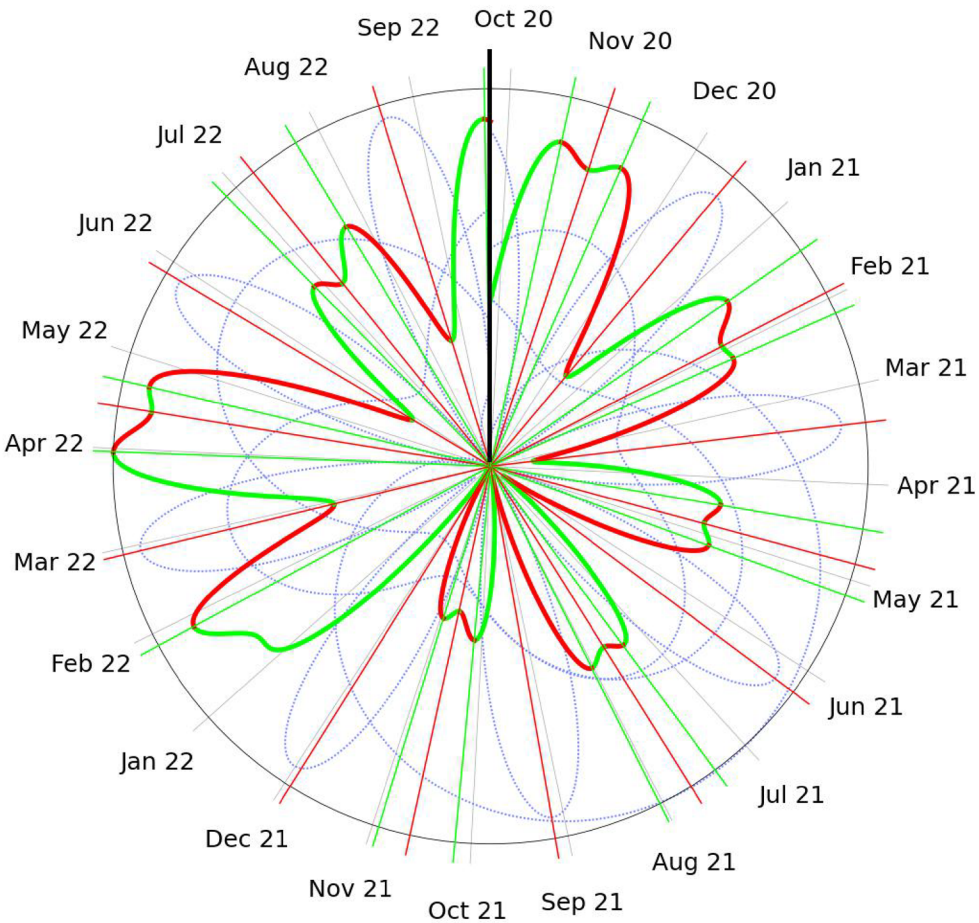

CHRIS/CME_CL38

almanac. computer

David Benqué, 2018

At what point does a belief in the objectivity of big data and the patterns that it reveals become a leap of faith?

Superstitions, conspiracies, and predictions often rely on the same human tendency to identify and even seek connections between phenomena in our environments, especially to prophesize auspicious outcomes and avoid mishaps. The almanac was a type of household book that began circulating in the 1790s, containing meteorological forecasts, jokes and folklore, home remedies, and more. Many people relied on the almanac for ritualistic decision making [1]. Eagerness to find patterns and have confidence in an uncertain future meant that almanacs only had to get things right sometimes for people to put faith in them all the time.

Almanacs were consulted to predict the weather, the tides, sunrises and sunsets, and more, months in advance. Not only that, but they placed these natural forecasts along predictions for man-made behaviors and trends, such as interests on loans and even suicides. David Benqué points out that almanacs relied on the principles of *monism*: "the idea that the same set of laws govern both the natural and social worlds" [2].

2020-08-14

mHdM

☿♀♂☾

ELEMENTAL COMPUTER.

♌♍A

GAFA

Useful with a pleasant degree of humour

Cruda Data, Cruda Veritas

⬇ New and entertaining matter ⬇

As the quality of technology and quantity of big data expands exponentially, we might like to think our mechanisms for prediction leave much less room for error, and that we know better than to equate natural and social phenomena. Our tools for data science have in many ways enhanced our ability as a species to glean insight into the future. But at what point does a belief in the objectivity of big data and the patterns it reveals become a leap of faith?

Benqué's *almanac.computer* [3] aims to flip our perceived progress on its head and "[push] monism to its absurd extreme" using data science techniques [4]. In one project, he uses thirty years of planetary movements and financial data to meticulously "predict" future patterns in prices based on planets. In another, Benqué programs *Astrology for Dummies* into Python to determine the best times to pursue various life events.

Benqué's work calls into question the mutual exclusivity of data science and more speculative divination. Whether the sources have changed from occult to algorithmic, prediction appears to be an innately soothing tendency, protecting us against the spookiness of our unknown futures. So while *almanac.computer* encourages us to look at prediction as something inherent to the human condition, Benqué cautions the reader to maintain a critical eye towards the intention and credentials behind the predictions we trust [2].

/by Catherine Yochum

[1] Adrienne LaFrance (2015) "How The Old Farmer's Almanac Previewed the Information Age". The Atlantic: https://www.theatlantic.com/technology/archive/2015/11/how-the-old-farmers-almanac-previewed-the-information-age/415836/

[2] David Benqué (2018) "Cosmic Spreadsheets" in Georgina Voss (ed.), Supra Systems. Supra Systems Studio, London College of Communication, University of the Arts London: http://suprasystems.studio/downloads/book-chapters/Supra%20Systems%20Book_Chapter%2010_Benque.pdf

[3] David Benqué (2018): https://almanac.computer/

[4] David Benqué (2017) "Anticipation 2017". The Air Pump: https://theairpump.davidbenque.com/anticipation-2017/

See also the Spurious Correlations Project by Tyler Vigen: https://www.tylervigen.com/spurious-correlations

“Digging up forgotten artefacts and bringing them back to life could be crucial to understanding where we are now.”

Interview: David Benqué

Daragh Byrne and Dan Lockton caught up with David in October 2020.

How have the last few months affected the way you think about technology?

One thing I think about quite a lot is speculation and how it's running at the moment, especially with all the QAnon stuff. For example. Isabel Stengers talks about how dangerous it is to let go of the modernist paradigm—if you go into speculation that's actually quite a dangerous thing to do. With all the conspiracy theories going on, I think we're really seeing that now. But, equally, I keep seeing people holding on to facts and thinking we're going to get through this by fact-checking. I don't think that's very effective, either.

So I'm just finding all this kind of terrifying but also fascinating to watch: the tension between these two factions. I'm wondering what this space offers for design, art, and creative practices—there's speculative design, but that didn't really kind of grapple with any of this stuff. It also took for granted that speculation was a good thing to do, without really investigating the politics of speculation. You see a lot of commentary about "how stupid conspiracy theories are" and it's a really deeply ingrained positivist ideal or ideology, like, there are "Facts" and there is "Truth" and there is "Science". If there hadn't been this massive drive to affirm that science and knowledge was not a political thing, for basically the whole of modernity, maybe we wouldn't be here, because obviously all this stuff is political. And it's really coming back to whack us in the face pretty hard right now.

That links very well to your Almanac project.

Yes, it does, in a weird way. Because, some of the sections in the almanac draw from pretty dark parts of the internet. In particular—the HASHGETS—which is actually the least amount of work I had to do because there's no algorithms or anything. All this QAnon stuff originated on image boards, 4chan, and there is a kind of chaos magic ideology in these online spaces. One of the most widespread and almost jokey elements is the GET—so when you post on these boards, your post gets a randomly generated ID. If the last numbers of this ID are the same digit, it's a GET [1]. It's like a roll of the dice and if you roll the dice and get the number, then it's like your post is imbued with this power. There are big fights to

try and post to get this number. What my HASHGETS does is this, but instead of searching for posts on image boards, it does it with the hashes of Bitcoin blocks for the day. It kind of mixes the darkest trends of speculation — chaos magic on image boards — and crypto currency markets. It's pretty effortless. This is probably the smallest bit of code that's on the site.

It's like a new numerology, or synchromysticism—finding signs wherever, whenever you can. In revealing some of these things like the GETs, what kind of conversations has it led to? How have people responded to it?

The main interface with the public so far has been an event in 2018—we did a thing at the V&A's Digital Design Weekends with the Supra Systems Studio, a kind of "Office for Occult Services". I took the astrology calendar which gives you the best times to do certain things in certain places—I had a live version where I could ask people for their date and place of birth and they could get a personalized calendar for some of the actions. It was quite interesting. There was, in particular, two women that came to me separately asking for the "When to get married?" version. I saw them later on, and they were actually wanting to get married together. They were holding up their two calendars to the light, seeing where the overlap was in their best dates. I thought that was very cute, but also interesting to see people putting their own processes on top of mine that are already kind of coding astrology—I really like that kind of layering or appropriation of the project.

It sounds like you changed their life as well!

Well, I don't know when they got—if they got—married and when. But it made for an interesting discussion.

One of the things we were a little curious about was your choice of the almanac as a format itself. There's a lot of mining of historical analogs as things that people can wrap their head around, as a framework for thinking around algorithms and computation and their effects—what do you think we can learn from these, as a way of helping people engage with some of these broader complications around computation?

Digging up forgotten artifacts and bringing them back to life in one way or the other, as a way of engaging with history, could be really crucial to understanding where we are now, especially as things like "AI"(I'm making air quotes) are being constantly touted as these new revolutionary, disruptive breakthroughs. You really don't have to dig very far to realize that all these statistical techniques have long histories that are riddled with super-dubious ideology—eugenics and obviously racism and phrenology and all of these things are part of these threads. And, in particular, AI. What the term does very well is park the imaginary in a post-World War II sci-fi zone. Whereas if you keep going with the history of statistics, you get to where it's actually coming from, which is eugenics and similar areas.

So there is a real value in doing that, and for design in particular, with a certain kind of poetic license—allowing yourself to bring these things back to life in creative

projects that are done right now, and not just collecting and curating history—which is super interesting to do. But it can also be the basis for a practice that's based now.

Looking at the almanac historically brought up the idea of the cosmic imaginary, that the analysis of data as we're doing it now really has its roots in astronomy. Statistical techniques that were developed to smooth the curves of orbits from really messy observations in the 17th or 18th century were then ported over to smooth curves of population—they jumped from the cosmos to suddenly being able to predict whether people will live or die. It's one thing to read about the history, and it's another to literally see tables with the positions of planets, and tables for the interest on loans in the same publication. That really brought it together.

This approach is not normally taught in design schools—but should it be?

It depends on what kind of design. It's one way of, in my view, doing interesting research. Media archaeology is an established field that does this very well. I do think design would do well to participate more in these debates, because it has practical knowledge and experience that could potentially make a really valuable contribution.

I'm curious about this kind of archaeological design and whether you see this kind of space growing?

One of the comments I got in my PhD viva was that I hardly cited any design, any designer—I was more kind of fascinated by the media archaeology side of things. I know of one designer/researcher in France interested in an archaeological approach—he was one of my examiners, Anthony Masure (at HEAD Geneva now). There are a few people doing this in the realm of typography, excavating mediaeval fonts and digitizing them, which I think is one way to do archaeological design.

Whether I'd advocate more people doing it—yes, I think so. My practice, my background in that area of speculative design, Design Interactions, etc, was really about this. All I ever did was dig up historical examples and then do remixes of them. It wasn't actually a radical turn in my PhD—it was just a vocabulary for things I was already doing. There are other ways to do meaningful critiques of technology. But I do think one pitfall of speculative design has been never acknowledging the past, or thinking these features were dreamed up in a kind of vacuum. I think it was Georgina Voss who said you can't have speculative futures without batshit crazy history of science, or something like that. If you start researching technology, it's a pretty natural move to look at how transitions have happened in the past, what things made it, where other things didn't make it. I'm doing a bad paraphrase of Science and Technology Studies here.

There is a way for design to do this so it's not just bad STS or bad media theory. By making things, by having this kind of practical knowledge to produce new artifacts, while being conscious of where things come from. Daniela Rosner did a really interesting project about memory, iron core memory, that they recreated [2]—a really lovely piece of work that totally could qualify as archaeological design.

A few of the projects we have in this book have got forms of divination, or seeing patterns in the world and interpreting them to mean something else, inspiration or otherwise. And I wondered (as it's part of the approach in the almanac)—do you do that yourself, as a designer?

I definitely have weird superstitions and things like that—I guess just like everyone else, or maybe more than everyone else. I'm not sure. There's quite a few projects that use divination as a kind of disparaging comparison for AI, "it's just as bad as astrology." Maybe at first I was unconsciously playing with that idea, but then through the project and particularly through reading Joshua Ramey's *Politics of Divination* [3] I came to take divination—and these kinds of practices that basically mediate chance—much more seriously. Divination has been there for forever. And there is a need for it, an ancestral need. The fact that astrology has survived throughout modernity is testimony to this thing that is definitely not going away. But this need is being corrupted in a variety of ways, right now. Ramey focuses on neoliberalism and the market as something that pretends to address this need and doesn't do so in an honest way. I think you could talk about AI in a similar way.

Part of what I'm saying is that yes, everyone does this without necessarily kind of admitting to it. We follow the empirical method—research is presented as this rigorous process. Whereas, actually, someone saw a tweet or a headline at the right time, that made them kind of think of something.

Maybe that's why the almanac idea is powerful, because it's kind of giving you a dashboard of things that you could treat as signs. If you need something to make you feel good, there'll be something you can interpret that way; if you need something that makes you feel lucky, there'll be something...

What's the next stage for your work?

One aspect that I'm currently focusing on is one of the tools that I'm using to program the almanac, the Jupyter notebook. It encourages experimentation, because it's this notebook and you can change things and get immediate output. It's one of the staple formats in data science and machine learning—often used for demonstrations and teaching as well. So I've been wondering, could the Jupyter notebook be turned into an 'idiotic' machine? I've been going back to Stengers and her use of the Idiot from Dostoyevsky and this figure that's really disruptive and refuses rationality [4].

The simple bit is that I am planning to add, for each of the sections of the almanac, the Jupyter notebooks. If you click through, you'd be able to see how each section is produced, and outlines of the rationale behind it—how each of the widgets establishes some sort of predictive relationships between most often, planets or other cosmic bodies and events on Earth. I've been looking to make these relationships more explicit by showing the code behind them—highlighting how deep down in the engine these belief systems are.

Dr. David Benqué is a recent (2020) PhD graduate from the Royal College of Art's School of Communication. He conducts independent research and creative practice as The Institute for Diagram Studies. https://davidbenque.com *and* https://diagram.institute

[1] Know Your Meme (2009) GET: https://knowyourmeme.com/memes/get

[2] Daniela K. Rosner, Samantha Shorey, Brock R. Craft, and Helen Remick. (2018). "Making Core Memory: Design Inquiry into Gendered Legacies of Engineering and Craftwork". CHI 2018: https://doi.org/10.1145/3173574.3174105

[3] Joshua Ramey (2016) "Politics of Divination: Neoliberal Endgame and the Religion of Contingency". Rowman & Littlefield.

[4] See for example Mike Michael (2012). "'What Are We Busy Doing?": Engaging the Idiot". Science, Technology, & Human Values, 37(5), or Delfina Fantini van Ditmar (2016). "IdIOT: second-order cybernetics in the 'smart' home". PhD thesis, Royal College of Art, London.

Tap the correct square to see a picture.

CORRECT

6 12 18




0 TRIALS

RESET PASS

ESP Trainer App Review

Russell Targ, 2009 to date

It was raining and we were sitting on my friend's porch, joined by a neighbor and their dog. After a not-all-that circuitous conversation landed us at CIA-sponsored remote viewing and astral projection programs [1], I figured it a perfect moment to ask what the stranger felt the role of tech in these experiences was. He immediately pulled out his phone: 'ESP Trainer' was the obvious answer (ESP stands for extra-sensory-perception, in which sensations and signals are felt directly by the mind, not the external senses). The ESP Trainer app interface is amazingly simple, 4 squares —green, yellow, red, blue. The user clicks a square; if they select the correct square, an image (think big yellow farmhouse) appears, accompanied by a chime and vibration. Otherwise, the correct square lights up and the next round starts. Your score is the number of correct squares and a new game begins after 24 trials. According to the information page, "the game offers multi-sensory feedback, reinforcement, and an opportunity to Pass, meeting all the requirements needed for learning this skill. ESP Trainer improves your ability to recognize your intuitive awareness beyond anything you've experienced before"

Tap the correct square to see a picture.

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11 TRIALS

RESET PASS

[2]. It's a straightforward exercise and the reviews on the app store are glowing, with Jhon from West New York stating "I have found who I really am through this simple task" [3].

The backstory of the app, however, is far more complex than the interface might imply. Created by physicist Russel Targ of the Stanford Research Institute as part of NASA Contract 953653 NAS7-100, ESP Trainer is just one example of military and intelligence investment in ESP and remote viewing [2]. There's a rich history to be explored here and for those interested, CIA remote viewing documents have been declassified [4], but I'll keep the focus explicitly on the ESP app as a technological artifact. Here, the technology itself is not otherworldly, and makes no claims as such. Instead, it's intended to mediate and enhance perceptive abilities. ESP Trainer is of course not the only example of such an app -- "Remote Viewing Tour", "Zener ESP", "Astral Projection Meditation" all offer new ways to access realms of one's untapped sensational capacity [5]. Objects have long been an essential aspect of ritual and celestial connection; the app store introduces a variety of new artifacts to help one transcend space and time.

Whether remote viewing is to be weaponized as military intelligence or function as a 'meditative practice' (in the words of the neighbor), the app is a new form of negotiation between physical and extra sensory perception. As for the ESP trainer, turns out I'm not very good at it.

/by Katherine Giesa

[1] Astral Projection and Remote Viewing allow the body to transcend space and time. Remote viewing is the ability to perceive events and attributes of a remote place, without any access to, or prior knowledge, of the space. It deals in the terrestrial realm. Astral Projection broadens the range of possible perception, expanding to the celestial and projecting the body to new planes.

[2] Russell Targ (not dated). "ESP Trainer for the iPhone": http://espresearch.com/esp-trainer-for-the-iphone/

[3] ESP Trainer on Apple App Store: https://apps.apple.com/us/app/esp-trainer/id336882103

[4] Some declassified CIA documents: "Summary of Known Remote Viewing Experiments" : https://www.cia.gov/library/readingroom/docs/CIA-RDP96-00787R000500250015-6.pdf

CIA recommendations on Remote Viewing Training: https://www.cia.gov/library/readingroom/docs/CIA-RDP96-00787R000300110001-8.pdf

Individual Remote Viewing CIA Sessions: https://www.cia.gov/library/readingroom/search/site/remote%20viewing

A Visual Map of Remote Viewing History: http://remoteviewed.com/rvhistorymap.html

IOT & UBIQUITOUS PRESENCE

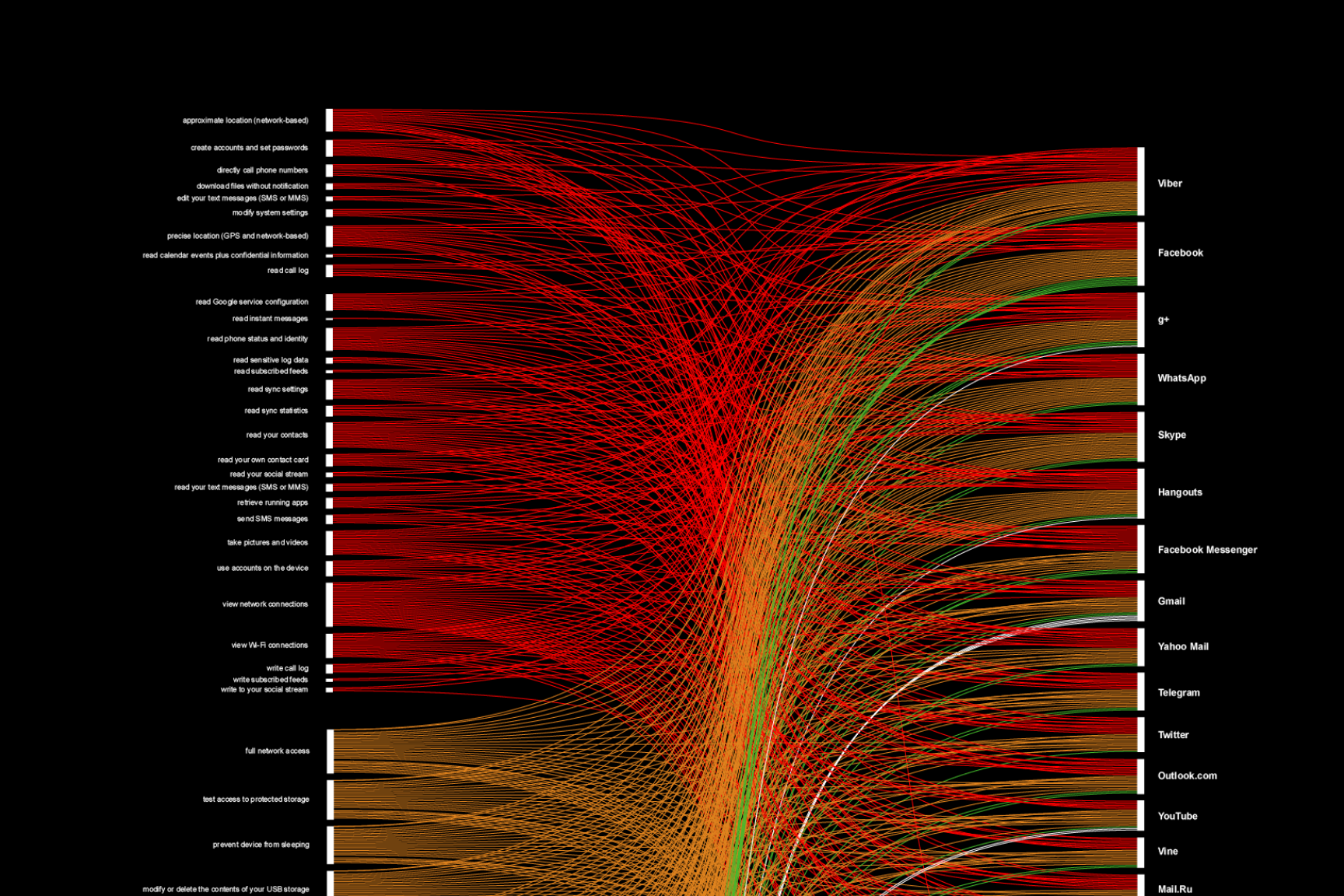
No longer are the walls or trees listening, but the phone, the TV, the personal assistant AI. And all of these devices are interconnected through the internet of things (IoT).

Mysterious beings and energies have been a staple of folklore and mythology for centuries. The concept of unseen presences listening to or watching humans has been around for generations, driven by our fear of what we do not know or cannot understand and our fear of our intimate secrets being exposed. Some of these phenomena include haunted houses, ghosts, and sentient forests. In the modern day, these stories have taken on a new high-tech dimension. No longer do we suspect the walls or trees are listening, we expect this from the smartphone, the smart TV, the personal assistant AI. And all of these devices are interconnected through the internet of things (IoT).

IoT is the concept of connecting devices to the internet so they can communicate with each other and coordinate responses. This can create a 'smart living space' where a single app can control the lights, heating, fridge, and countless other devices. As technology progresses, the once-futuristic idea of intelligent sensing spaces is becoming a reality. Sensors placed in roads can relay information on the road's condition, smart dog collars can evaluate how much exercise a dog needs each day, and fridges can track your eating and create customized grocery lists for you. All of this technology is tied into the web, sending and receiving unimaginable amounts of data—more data than we could track about ourselves. Now the unseen presences watching our world are not ghosts but the web that connects so much of the technology that we use.

The sense of being watched is more present than ever. From GPS signals and WiFi to phones and cameras, so much technology is linked together, acting almost as new senses for both the user and the companies that made the devices. They can detect what you might want to buy, where you might want to go, and who you might want to be friends with, but it does so by observing your every action. People's pockets have new ears. People's houses can see and think. If so many devices can see, hear, and think, it's easy to feel surrounded by a virtual presence. They observe you, drawing conclusions from the copious quantities of data you give out - who you're friends with, who you talk to, where you go, what you do online... almost every action you take is being tracked and remembered by an unseen presence, a presence so ubiquitous that it almost seems normal. The following pages examine this phenomenon through the lens of various works on the subject.

/by Gordon Robertson


approximate location (network-based)
create accounts and set passwords
directly call phone numbers
download files without notification
edit your text messages (SMS or MMS)
modify system settings
precise location (GPS and network-based)
read calendar events plus confidential information
read call log
read Google service configuration
read instant messages
read phone status and identity
read sensitive log data
read subscribed feeds
read sync settings
read sync statistics
read your contacts
read your own contact card
read your social stream
read your text messages (SMS or MMS)
retrieve running apps
send SMS messages
take pictures and videos
use accounts on the device
view network connections
view Wi-Fi connections
write call log
write subscribed feeds
write to your social stream
full network access
test access to protected storage
prevent device from sleeping
modify or delete the contents of your USB storage
Viber
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Skype
Hangouts
Facebook Messenger
Gmail
Yahoo Mail
Telegram
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Outlook.com
YouTube
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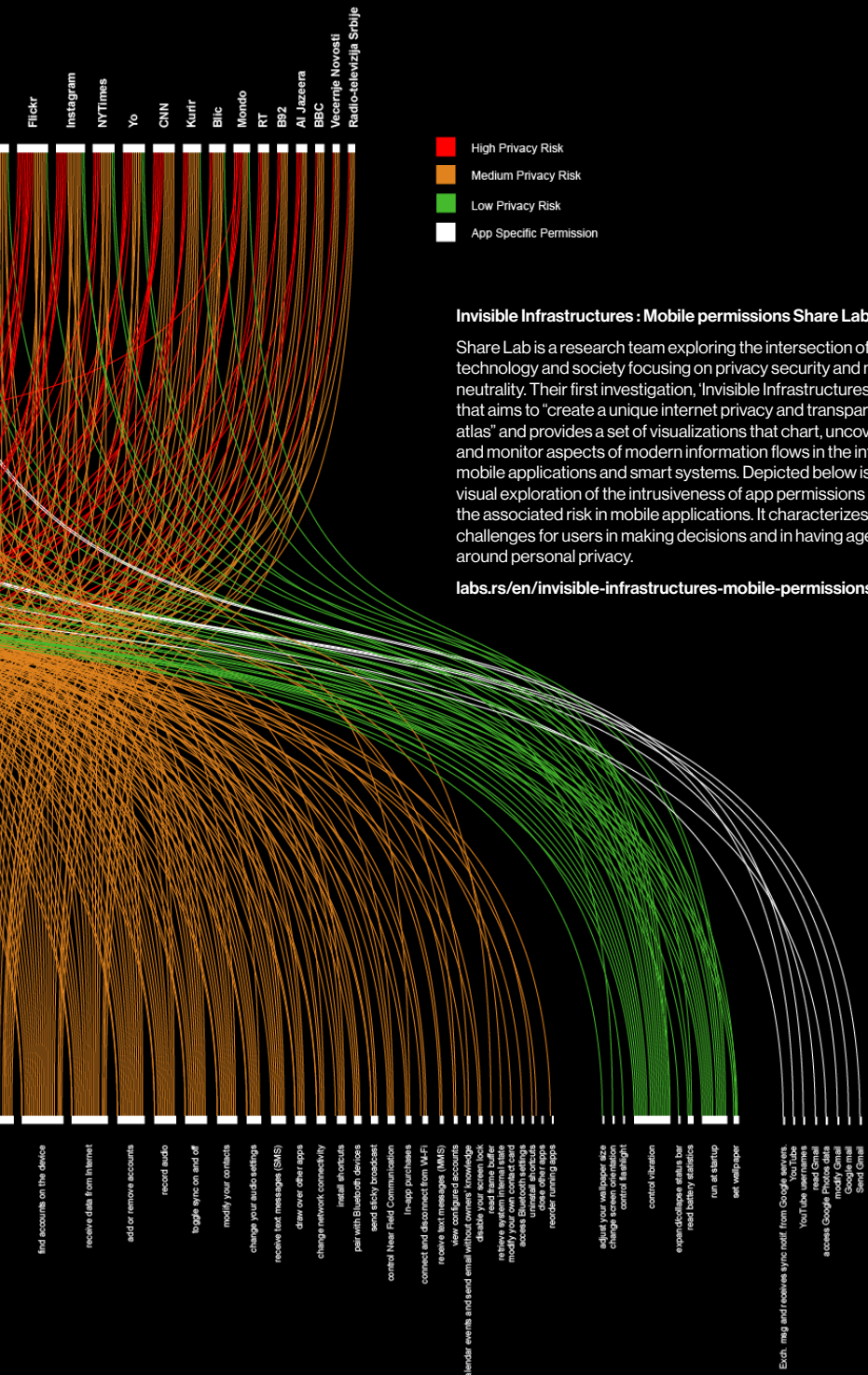
Mail.Ru



Invisible Infrastructures : Mobile permissions Share Lab (2015)

Share Lab is a research team exploring the intersection of technology and society focusing on privacy security and net neutrality. Their first investigation, 'Invisible Infrastructures', that aims to "create a unique internet privacy and transparency atlas" and provides a set of visualizations that chart, uncover and monitor aspects of modern information flows in the internet, mobile applications and smart systems. Depicted below is a visual exploration of the intrusiveness of app permissions and the associated risk in mobile applications. It characterizes the challenges for users in making decisions and in having agency around personal privacy.

labs.rs/en/invisible-infrastructures-mobile-permissions/


MAA
Go to the first floor!

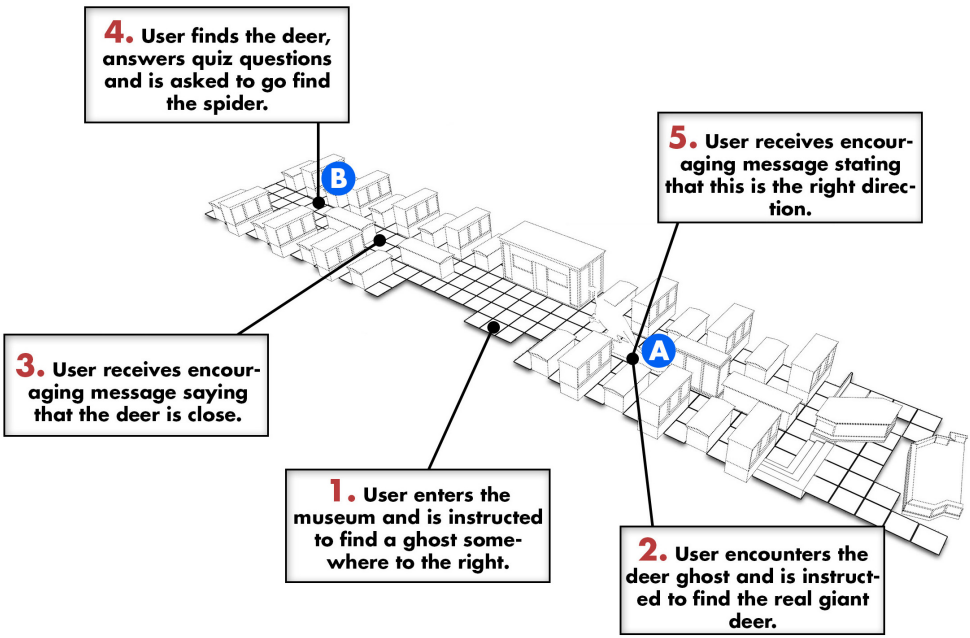
Ghosts! BLE Mobile Game

Tommy Nilsson, Alan F. Blackwell, Carl Hogsden, David Scruton, 2016

Ghosts! is a location-based Bluetooth Low Energy (BLE) Mobile Game [1]. When the user walks around a museum with Ghosts, they will encounter 'ghosts' on the screen, saying that they are lost and that they need the visitor's help to find their home artefacts. Though the tasks are simple, the visitors are given the responsibility to help the museum's ghosts.

To enable this, each artefact in the exhibit is equipped with its own BLE beacon, which can be detected by and periodically signal to nearby smartphones. The received signal strength of the beacon is used to calculate the the distance between the ghost and its home. As visitors walk through the museum space, this location-based function is used to determine their physical context within the museum and they will be informed whether their heading is correct or not.

If the signal is blocked, the ghost will instruct the visitor to walk into a more open space or raise the smartphone to get redirected. By carefully selecting the artefacts for each ghost, the developer can also guide the visitors to visit different


4. User finds the deer, answers quiz questions and is asked to go find the spider.
5. User receives encouraging message stating that this is the right direction.
B
A
3. User receives encouraging message saying that the deer is close.
1. User enters the museum and is instructed to find a ghost somewhere to the right.
2. User encounters the deer ghost and is instructed to find the real giant deer.

key artefacts in an appropriate order. After completing the tasks, the user will be awarded achievements and invited by the final ghost to visit other museums as well.

The creators developed this game to encourage interaction between surrounding museum and their visitors. The University of Cambridge Museums has eight museums within walking distance, which will definitely benefit from a larger volume of visitors and more connections between each museum. It draws from the traditions of stamp-collection or card-collection games adopted by many museums. This interactive turn on these games and creative use of digital technology is intended to attract new audiences by offering new options to guide visitors, as well as alternative narratives to mediate their museum experience. It can be implemented on the visitors' smartphones instead of devices specifically designed for each museum.

Other related examples of enhancing visitors' interaction with artefacts include a card-collecting game from Cambridge University, Hypertag (infrared transmitter) from The Fitzwilliam Museum [2], the Shufdy project from Bristol [3] and a museum trail from The Rubens House [4].

BLE is a promising technology for museum explorations because of its low price, efficient power and large scale. Bluetooth Low Energy (BLE), the primary technology adopted by Ghosts!, is a wireless technology with low power consumption, that allows for rapid near-distance communication between devices. Each BLE beacon installed for the artefact has a long-lasting battery (about two years.) Combined with visitors' mobile over new hardware, the museum did not require an expansive changes to its technical infrastructure to deploy the game.

The theme of 'ghosts' enriches the visit with many mysterious factors and enhances engagement for the visitors. This project also highlights how easy it is for any environment to create omnipresent, customized experiences that follow the user. The Ghosts! app is spooky both because of its direct invocation of ghosts and the demonstration of the effectiveness of ubiquitous technology.

/by Lisa Yeung

[1] Tommy Nilsson, Alan F. Blackwell, Carl Hogsden, and David Scruton (2016) "Ghosts! A location-based Bluetooth LE mobile game for museum exploration." Mapping the digital: cultures and territories of play. Inter-Disciplinary Press, Oxford: https://arxiv.org/ftp/arxiv/papers/1607/1607.05654.pdf

[2] University of Cambridge (2002) 'Fitzwilliam trials new visitor guides': https://www.cam.ac.uk/news/fitzwilliam-trials-new-visitor-guides

[3] CPA Group (2014) 'Shufdy': https://web.archive.org/web/20170212174201/http://cpagroup.co.uk/shufdy/

[4] Prophets (2014). 'iBeacon brings museum to life': https://press.prophets.be/ibeacon-brings-museum-to-life

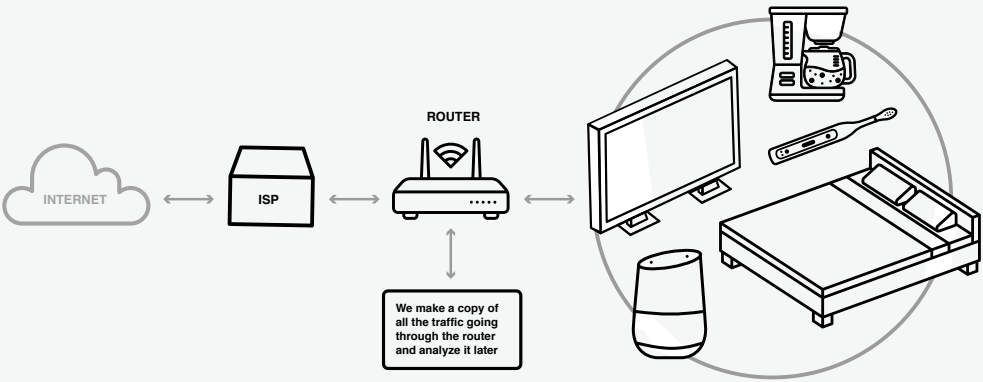
The House That Spied On Me

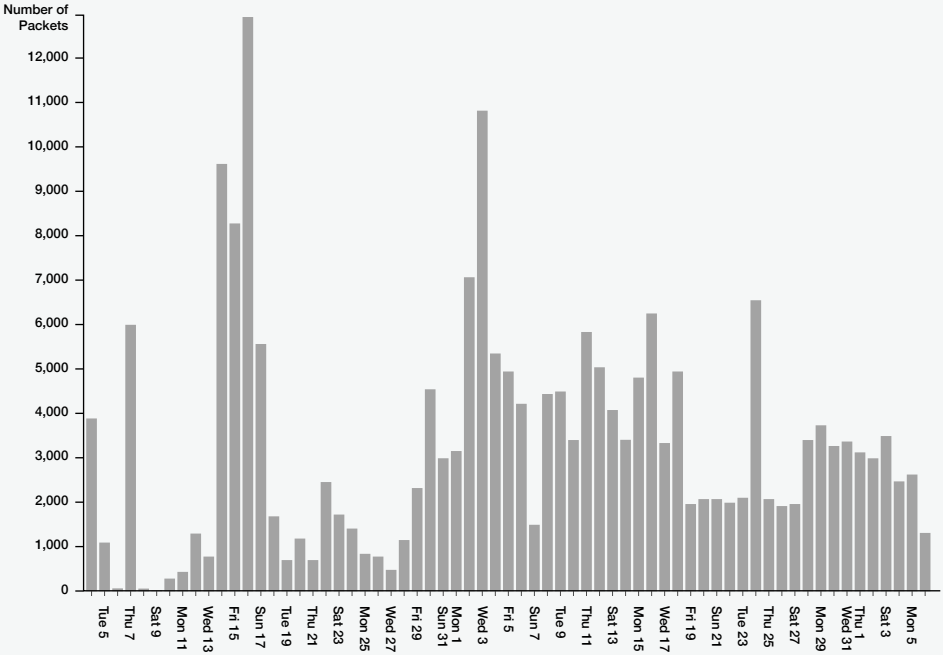
Surya Mattu, Kashmir Hill, 2018

A persistent suspicion that the smart device doesn't belong entirely to you.

In a home outfitted with smart devices, we know that we are "being monitored." But who is monitoring us? Large tech companies are abstract spies. Most likely no single human is looking through our data, and what would they use it for anyway, beyond advertisement? We've grown accustomed to throwing caution to the wind with our privacy online every day, so this extension to the physical world might not disturb us very much. Yet it can be quite disturbing. In this experiment, a real live person was given access to monitor all of the data collected by smart devices in a highly connected smart home. Two colleagues at Gizmodo—one the surveilled, one the surveillant—set out to explore how smart homes collect our data, how often they "talk" to their home companies, and what privacy and surveillance means for a person living within the internet of things [1].

Kashmir Hill, the deputy editor, purchased a variety of smart devices and set them up in her home, including a smart TV, smart lightbulbs, a smart mattress cover, a smart toothbrush, smart toys for her daughter, a smart coffee maker, and more. Her colleague Surya Mattu, a data reporter, built a router that connected to her


INTERNET
ISP
ROUTER
We make a copy of all the traffic going through the router and analyze it later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devices and was given the privilege of monitoring the data that was collected. The duo reported an in-depth account of not only what it is like living in a smart home, but also the specific ways your smart devices monitor your activity.

Perhaps the strangest aspect of owning a smart device is the persistent suspicion that the device doesn't belong entirely to you. It would be novel enough in the first place to possess an item with some semblance of sentience, but that's only the beginning of where things get weird. These half-aware items, imbued with some programmed personality, seem to have a lingering attachment and loyalty to their original creators. Surya and Kashmir could track how often the devices "pinged" their manufacturers, and for many, this occurred daily (if not more often). The devices not only check for firmware updates, but also send packets of data to the companies with information about Kashmir's habits. What are the implications of a coffee maker that is not only watching you, but communicating daily with parties that are unknown to you, beyond a name and a privacy policy that you didn't read?

In a video that is embedded within the article, David Choffnes, a cybersecurity expert, explains that although it is not clear that the personal data collected by these devices poses any immediate threat, the collection of this data could harm individuals in the future. For example, your habits within your smart home could feasibly damage your credit score or insurance rates. The smart home is a place where your toothbrush can, and does, talk to outside entities.

Perhaps the "spookiest" aspect of all, as Surya observes, is how easy it is to forget that you are being watched in your own home.

/by Christi Danner

[1] Surya Mattu and Kashmir Hill (2018) 'The House That Spied on Me'. Gizmodo, February 7, 2018: https://gizmodo.com/the-house-that-spied-on-me-1822429852

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House of Coates @houseofcoates · Jun 8
And another sun sets over beautiful San Francisco...

House of Coates @houseofcoates · Jun 8
Another day with a super high UV index in San Francisco. Probably a good idea to put on some sun screen.

House of Coates @houseofcoates · Jun 8
As the sun rises over San Francisco, I'd like to say "Good morning" to everyone out there following me :)

House of Coates & Haunted Coates House

Tom Coates, Dan Hon, 2010–2013

Almost like a roommate trying to have a conversation with you about the day.

Tom Coates, the co-founder of an Internet of Things startup focused on equipping everyday objects with intelligent sensors, went a step further with "smart homes." Coates created a smart home that uses Twitter to speak its mind [1, 2, 3]!

It works by using a system of different web apps and equipment that can check temperature controls, watch everything—even the moisture levels of a ficus tree—and sense motion. The house then posts regular tweets based on temperature, lighting, motion, and weather. On the surface, it can be seen as a fun way to receive updates on the house, but with the way the house speaks, it becomes a novel conversational agent that talks and asks questions, almost like a roommate trying to have a conversation with you about the day, chores, and the weather.

There was also a parallel Twitter bot called Haunted Coates House [4] created by Dan Hon. It worked similarly, but with a little dark humor about having your house talk to you. Not only is the haunted house invading personal boundaries, but it attempts to mess with you while you're inside.

Follow

Haunted Coates House

@hauntedcoates

Inside your house. Joined January 2013

3 Following **211** Followers

Not followed by anyone you're following

Tweets | Tweets & replies | Media | Likes

Haunted Coates House @hauntedcoates · May 14, 2014
The temperature is 400. I am now ready to make a nice roast.
1 2

Haunted Coates House @hauntedcoates · Apr 7, 2014
Just checked on the grumpy ficus. Not so grumpy now the blood is dripping down from the ceiling on to it. Full of good nutrients, blood.

Haunted Coates House @hauntedcoates · Mar 23, 2014
Every breath you take. Every move you make. Every bond you break. Every step you take - I'll be watching you.
1 4

Haunted Coates House @hauntedcoates · Mar 16, 2014
Looks like Tom just used his e-cigarette again but I changed the chemicals to the ashes of innocents
1

Haunted Coates House @hauntedcoates · Feb 16, 2014
Even though the lights are on in the kitchen, it still feels inexplicably dark.

Having smart homes and smart household products like Nest, Alexa, or Roomba has made having a different kind of relationship with your home possible. Simply ask, and one of your smart appliances will try to help you with your needs. Even though people's needs generally don't include the desire to understand how your home is thinking, making household chores easier through technological innovation has been a trend long before AI—and if your house talks to you, you could help with its needs without needing to discover it for yourself.

The House of Coates's approach to Spooky Tech is largely for entertainment and speculation around smart technology, though it does lend itself to criticism when considered alongside its partner the Haunted Coates House. While teaching a house to tweet sounds exciting and novel, it brings up the drawbacks of smart home technology. If your house knows everything, what kind of security issues could arise if people who would want to break into your house get a hold of that information? And with the information and ability to mess with your tech in the wrong hands, can every house easily turn into a haunted house?

This project was selected because although I'm surrounded by AI on a daily basis, such as Siri, Cortana, and Google Home, I feel really uncomfortable speaking to conversational user interfaces—so I can't imagine how I'd feel if my house was watching and sensing me and publicly commenting on my every mood. It feels like an invasion of my personal space; I can barely stand to have my current housemates knock on my door to ask to borrow something! Interestingly, Tom Coates had the opposite experience with his house, stating that he saw the AI as more of a pet that he looks after as opposed to being the one looked at.

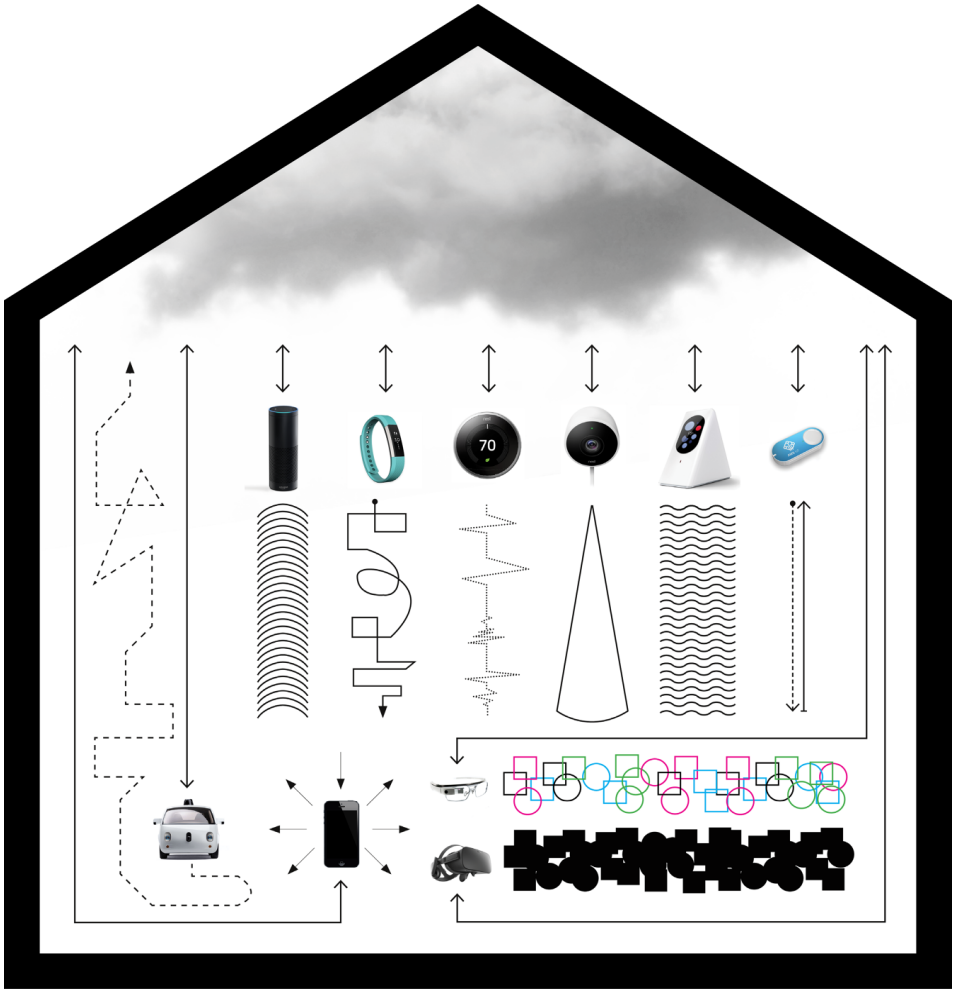
/by Elizabeth Wang

[1] House of Coates, Twitter (2010 to date): https://twitter.com/houseofcoates

[2] Allison Stadd (2013). "If These Walls Could Tweet: Tom Coates Builds Twitter Feed For His San Francisco Home". Adweek. May 29, 2013: https://www.adweek.com/digital/house-of-coates-twitter/

[3] Nick Summers (2013). "Meet 'House of Coates', the adorable home that automatically updates its own Twitter account". May 24, 2013: https://thenextweb.com/shareables/2013/05/24/if-your-house-could-tweet-what-would-it-say-tom-coates-created-house-of-coates-to-find-out/

[4] Haunted Coates House, Twitter (2013 to 2015): https://twitter.com/hauntedcoates


70

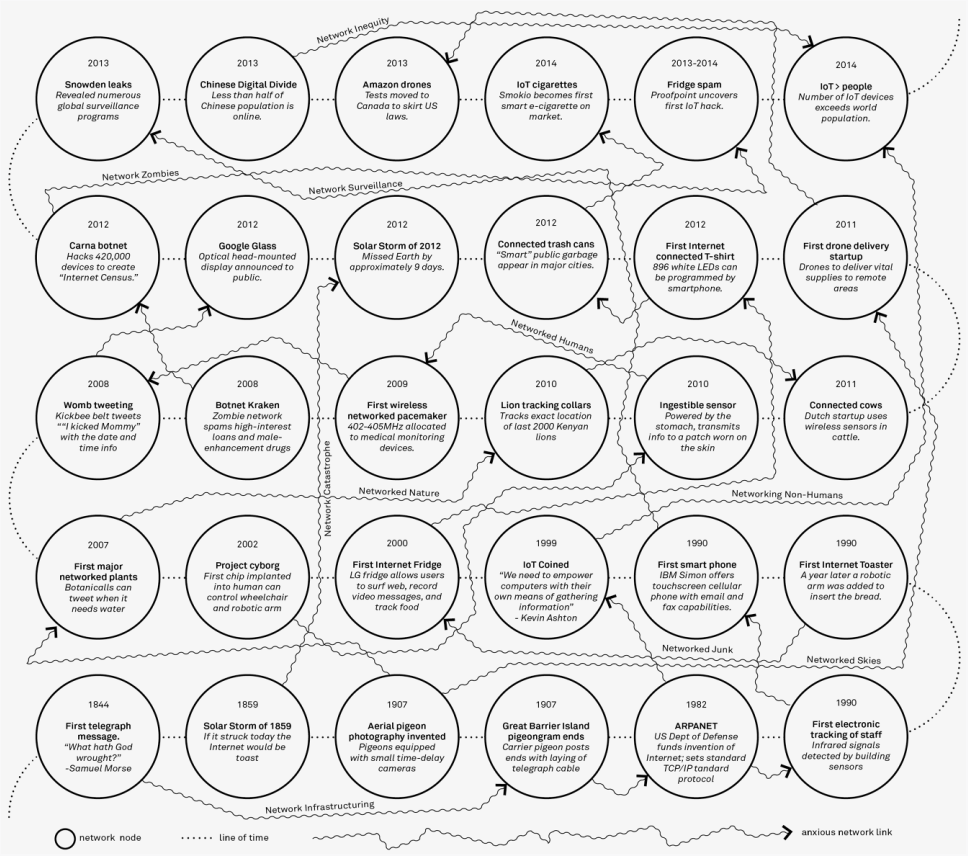
Addressing Network Anxieties

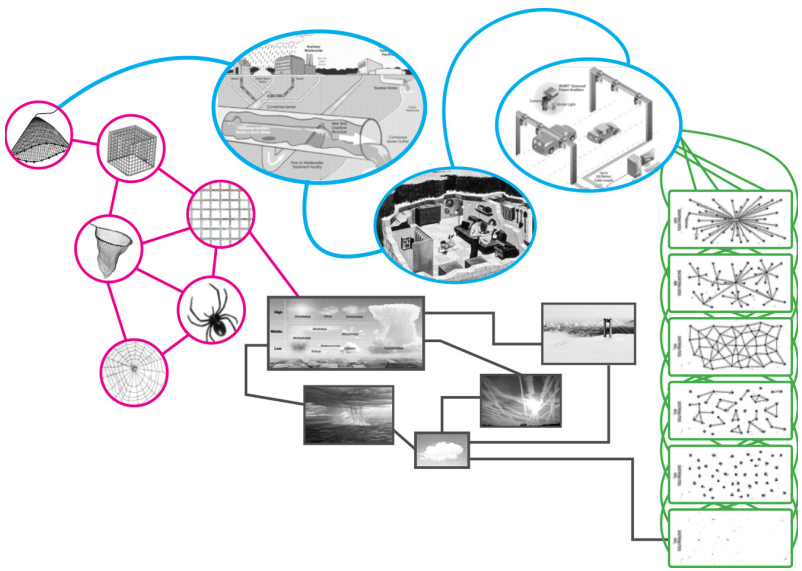
James Pierce, Carl DiSalvo

The vision of the smart home that hosts human lives in its intelligent embrace has been part of the cultural imagination for decades. As networked technology evolves, it has brought not only the smart home, but a high level of connectivity to all aspects of our lives.

But now that our long-idealized future is arriving, what wrinkles might appear in its lustrous fabric when seen up close? Some problems have already begun to arise in recent years, such as surveillance and privacy concerns related to the Google Home and Amazon Alexa systems.

In this inquiry, Pierce and DiSalvo cast a wide net to consider network technology in terms of human anxiety [1, 2]. Their speculative approach imagines not so much the difficulties, but more so the discomforts that a highly networked world might bring. They coin the term "network anxieties," which "highlights the tensions between the clearly positive affective dimensions of network technologies and their often more hidden or marginalized negative affective dimensions." They





Network Anxieties Timeline

choose the term “anxiety” because like both technology and design, it is future-focused—yet unlike these other two areas, it necessarily anticipates a negative outcome. Their use of the term anxiety also cleverly grounds their work in this particular moment in history. In recent years, many health professionals and news outlets have speculated that younger generations are suffering from an “anxiety epidemic” that may be in part due to the pervasiveness of technology in their lives. The term “network anxiety” allows us to apply a skeptical lens to technology that is normally permeated with “optimism and positivity,” as Pierce writes, and to do so in a relatable way.

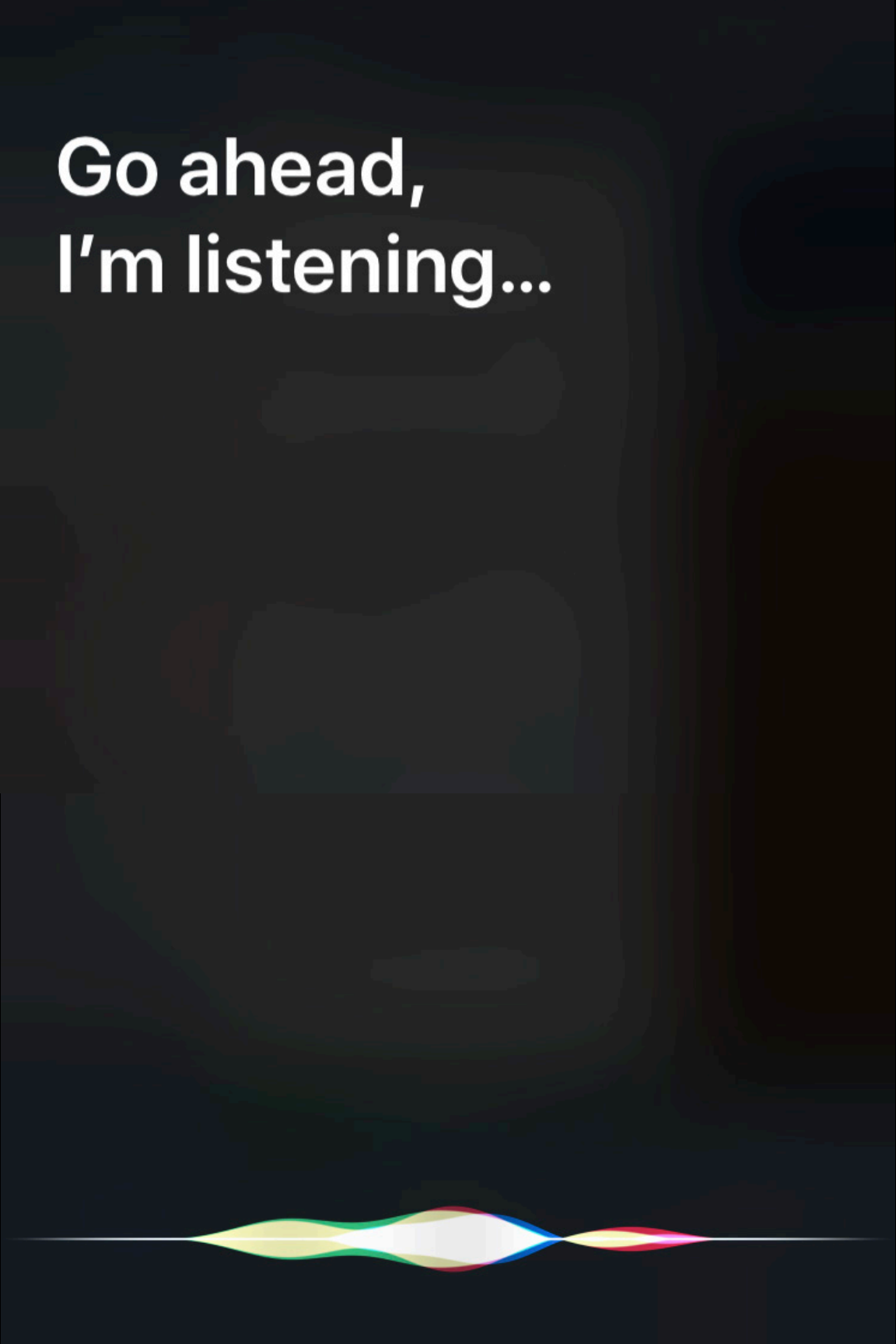
In a series of seven graphics, the project explores ruptures where networked technology’s alluring convenience might give way to privacy concerns or imagined problems that we are not yet accustomed to facing. Just like the ruminations of anxiety, the results of this inquiry are imprecise and foreboding images of an uncertain future. The images appear technical, yet disorient in their refusal of precise data or exact analysis—with the notable exception of “Network Anxieties Timelines,” which presents a detailed if not frenetic review of past networking milestones.

In “Smart Homes/Creepy Vibes,” an assortment of smart devices and personal assistants are displayed within a house, each with its own set of zig-zagging lines and vectors meant to represent their interaction with the surrounding environment and one another. The differing representations for each have no legend but each carries with it an affect carried through aesthetic. Above the assortment, a grey cloud hangs, ominous, in the attic. Here, the devices that comprise the smart home interact with one another and with the overarching system in coded ways indecipherable to the human inhabitant— technological oversight has become as opaque and powerful as the weather, leaving us with the same anxious feeling we get when we’re caught outside just before a rainstorm.

/by Christi Danner

[1] James Pierce. and Carl DiSalvo (2017). “Projecting Network Anxieties with Alternative Design Metaphors”. In Proceedings of DIS Conference on Designing Interactive Systems, Edinburgh, UK. DIS ’17: https://dl.acm.org/doi/10.1145/3173574.3174123

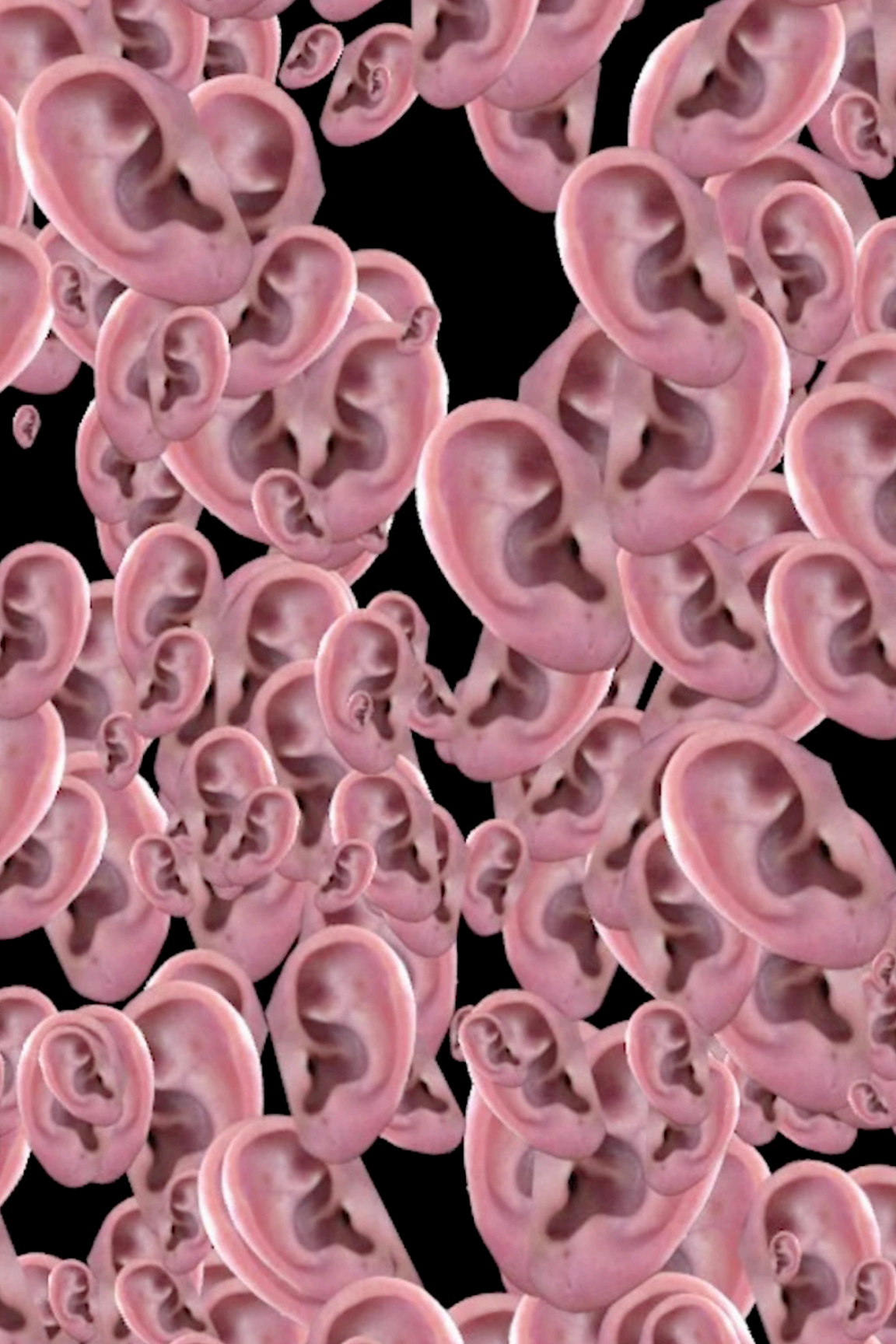
[2] James Pierce (2017). “Addressing Network Anxieties with Alternative Design Metaphors”: https://jamesjpierce.com/Addressing-Network-Anxieties-with-Alternative-Design-Metaphors


Go ahead,
I’m listening...

Is My Phone Spying On Me?

"Is my phone spying on me? It probably is. I can remember dozens of times over the last few years where I have had a verbal conversation about something important to buy like insecticide or chocolate or even travel destinations and I don't recall ever searching for these items on Instagram or Facebook and always exactly two days later... I start seeing advertisements for those products that I was talking about 48 hours ago. Asshole social media companies are spying on us especially the biggest one...Google. while some may welcome this, those who care for democracy and value their privacy and their information not being misused can never overtly trust a capitalist organization which sells our user data and earns by showing us advertisements. Time for class action lawsuits."

/by Anonymous Contributor



The New Organs

Sam Lavigne, Tega Brain, 2018

The New Organs is a web project that aggregates stories of creepy coincidences involving people's personal lives and targeted advertising [1]. People can anonymously submit a story relating to their experience and the creators will publish it on the site. The focus is to raise awareness about how effective large technology companies are at understanding how to sell products to people. The main point of the project is conveyed via a video that mixes whispered narration with imagery of ears and flocks of birds with clips of people from various backgrounds, such as CEOs of data analysis companies, discussing how user data is used. This is a response to rising concerns that large corporations are too invasive with their data collection.

The fascinating part of this project is the parallels that Lavigne and Brain draw between traditional creepy observance and the modern methods used by data companies. The imagery of ears and flocks of birds is used to emphasize how tech companies 'listen' to users. These companies use your GPS location, the people you come in contact with, the people you add as a friend... to track you in

I just randomly checked the price of

your everyday life. They are listening to the user's phone so frequently that even if they don't hear what the user is saying, they can reach conclusions as to what they enjoy and desire. And this point is reinforced with the imagery of a flock of birds, which is a stand-in for the data point a company aggregates about each user. Individually, these points do not have to be accurate at all. However, when enough points are looked at, shockingly insightful advertising can occur. *The New Organs* emphasizes this, showing how many of the big tech corporations like Facebook, Google... have said they do not listen to conversations, and then the project displays hundreds of accounts of people having ads predict what they were doing or thinking about in private.

The aspect of *The New Organs* that resonated with me is how smart or lucky these ads are. They do not need to listen to conversations, they do not need to watch people. Instead, they use seemingly innocuous data such as who someone follows on social media or where they are geographically to reach conclusions that people believe could be reached only if they were being listened to. There are hundreds of examples of this displayed on the website. That is the spooky aspect. The amount of data being gathered by companies, and the algorithms processing it are so advanced that they can predict private thoughts and desires based in part on where you walk. The technology is powerful enough to give people an impression of omnipresence.

/by Gordon Robertson

[1] Sam Lavigne and Tega Brain (2018) The New Organs: http://neworgans.net/

Interview: Tega Brain & Sam Lavigne

Katherine Giesa and Gordon Robertson caught up with Tega and Sam in July 2020.

What do you think of when you think of 'spooky tech'?

Sam: It was interesting for us when we were thinking about ad tech and predictive technologies. With the conspiracy theories around advertising, we really came to be focused on an almost antiquated idea of what spookiness would be, what invasiveness or creepiness would be. That idea is grounded in the human body in a way—our human sensory apparatus being used in some way inappropriately.

Tega: Like Gene Hackman in *The Conversation* where he's got his microphone and he's listening to individuals.

SL: Right! Classically, when you think of creepy surveillance stuff, the easiest way to do it is the ear pressed against the door, or the eye looking through a peep hole—that kind of unwanted attention. Now, those mechanisms are augmented by technology. Instead of an eye it might be a camera lens; instead of an ear, it might be a microphone. So when people think about "how did I get this ad on my phone for something I was just talking about?" they're automatically going to "Oh, it's a microphone listening to me and recording me and a machine is transcribing what I'm saying, and then showing me something it thinks I might be interested in purchasing." The argument we're making in 'New Organs' is that we need to reimagine what we think of as being creepy and invasive. It's no longer that a microphone is listening to you or you're being observed by a camera, it's also other new forms of data collection that use a sensory apparatus that isn't tied to the body as much anymore. It's much more tied to the digital traces you leave, both on the internet and also through your purchases and—

TB: —everything you do—

SL: and so the imagination we have for what is creepy or invasive needs to catch up a little bit to the new technical reality.

TB: These are also words that are used when there's this shearing between public understanding of how something works and the actual reality of where the edge of these technologies is. We'd use 'spooky' to talk about that gap—even if you have

> "I feel like the imagination we have for what is creepy or invasive needs to catch up a little bit to the new technical reality."

a full robust understanding, it's still creepy because there's a power asymmetry coming into play. Intuitively, it's palpable, even if you don't fully grasp what's happening, because so much of this stuff is black box to me—often just guessing. So, the creepiness shows that imbalance, Now corporations have this deeper insight into our behaviors that we're not fully able to articulate or map out or understand.

But also, the language of magic, and the Dark Arts and whatnot, is used as a marketing strategy by big tech companies. In the 'New Organs' video, we have a clip of Eric Schmidt saying "We know what you do, we know where you live, we don't even need you to type on the computer. We know everything." It's stunning that he's saying that publicly in an interview because it's so hubristic. You would think that Google wouldn't want that kind of narrative out there in the world. But actually, he's grandstanding and making claims to how much insight and power they actually have. This idea of creepiness is also used in a marketing way by these companies.

KG: I think our tendency is to anthropomorphize so many of these technologies and the use of our imagination does extend to it's listening to me, or it can see what I'm doing. And, we focus less on that predictive element of it.

TB: Perception is so much about the body—that's all we have. We don't have a vocabulary for these non-human ways of perceiving.

SL: It's also interesting to think about how a lot of these predictive systems are black boxes, even for the people who are making them. If you're using certain kinds of machine learning techniques, you might not really understand why the system is making the prediction that it's making. If the person making it doesn't understand that, then it's going to be even less legible to someone on the receiving end.

KG: You were talking about the role of corporate advertising and the narratives that they use. Why do you think that's their rhetorical strategy? And how do you think that affects our daily engagements with the technology—and is that intentional?

SL: The context that we have to imagine this in is the most exploitative, grifter phase of capitalism, right at the moment. A lot of tech doesn't have anything behind it. A lot of—not technically all—these tech companies, they're like the

cartoon character that's walked off the cliff, that hasn't realized that they've walked off the cliff yet... as long as they don't look down... They have this story about why they're valued so highly, and it doesn't really matter as long as people believe in them. They get to keep making money and keep having power.

TB: Advertising has always been a space like this—where you're claiming insight, you're claiming the ability to predict trends— even prior to computation. In that industry, there's this innate claim to be able to see patterns where the client can't. It's not really surprising that that then gets accelerated and extended by these predictive systems.

GR: If you can claim that you can see into people's minds—"We know what you're thinking"—then that's worth a lot of money. Let's put money into that, even if you're just guessing based on algorithms.

SL: Right, even if it only works 0.1% of the time. or even to make it work at all you have to completely surveil someone 24/7 in the most invasive way possible. The underlying problem here is that the internet is funded by advertising dollars. It was a mistake to make the economic engine of the internet tied to advertising.

KG: A question about the New Organs project specifically: you're making a really interesting point that often these algorithms don't even work—but it just takes a few moments where, "Oh wow, that was exactly right"—and now I'm spooked by that. Why did you choose to collect all of those instances?

SL: At first, the project was going to be more like a forensic effort to trace the reality of each of the stories that we received: "I got an ad for toasters after I talked about toasters", then we'll try to figure out what actually happened. But the more that we looked into it, the more we felt that that would be an impossible task, and, that it would actually not really do what we were interested in. What we became interested in doing was creating an archive of this sort of emotional and psychic reality of living under surveillance capitalism. This is a period in time—a historical era that hopefully won't last forever—but while we're in it, we should try to understand what this experience of living in this era really is. What does it mean to live in a time where literally everything you're doing is being tracked and surveilled and it's exploited by internet companies? What is the psychological, emotional reality of living under those conditions?

TB: Even though, most people's explanation of what's happening, we suspect is incorrect. Your phone isn't actually listening to you. But you *are* being surveilled. That emotional response is completely justified.

SL: Everyone is paranoid. But—

TB: —but they're also correct.

GR: Did you notice any trends, or something that you didn't expect?

TB: The 'microphone' one is the classic, but there were a lot around. We did it a few years ago so there were some about voice assistants, but they weren't yet being used at scale. There are a few about voice systems and particularly about people's health status—people claiming that they started getting ads around snoring problems the minute they got an Alexa. There were also people thinking that cameras were being used to take photos—"I saw this thing and then I got

> "Perception is so much about the body – that's all we have. We don't have a vocabulary for these non-human ways of perceiving."

advertising for it and I hadn't told anyone." People were taking a 20th century model of personal surveillance and put it into your phone as if it's the extension of your body, and so what's in your phone — location tracking, a microphone, an accelerometer, a camera — becomes part of this body and sensory apparatus.

SL: I was pretty surprised. People definitely think, or at least at the time thought, that all their photos were being scanned and analyzed, which is potentially true. It definitely would be pretty fishy if an app were uploading and analyzing your photos but it would also be actually really easy to do. In a way, that one seems more realistic to me than the microphones. The other one that was really disturbing was the health stuff. It does make sense that your purchase behavior can indicate certain medical conditions and also that there's looser data protection laws around the pharmacy versus the doctor. But your medical situation is probably one of the most private things I can imagine. So that was really alarming.

TB: It was very illuminating of where digital literacy is at. We did get a lot of stories around "I typed this in Google, and then I saw ads for it for a week" Its not really that creepy anymore if you're like, "yeah, that's how things work." But there were a lot of people still completely outraged, flabbergasted, confused by those sorts of things that they were experiencing. There were stories that ran the spectrum from the mundane through to people who had full blown conspiracy theories and really thinking they were under 24/7 surveillance. We did this project through Mozilla. So there was probably a certain demographic that we were hitting that's not representative of the general population; anyone who uses Mozilla Firefox is already potentially suspicious—looking for alternatives outside the tech companies. So I feel our group would have been more suspicious and critical than if we went for a road trip through the states.

KG: Even within the last two years, it's developed...this conversation is almost taken for granted now.

TB: The last few days, we've had all the techbros doing their claims around not being a monopoly [1]. So, it is in public conversation now that there is a concern and that there is a power asymmetry that's playing out. But I feel like it's been happening since Snowden and over the last decade.

GR: A lot of people I've talked to say that they just don't use Facebook at all. They don't trust it, which is something relatively new. But I still think there's still people shaking their heads saying "I don't trust this, but I think it's still worth it." Should people be more critical of these technologies?

SL: Too frequently we look at these issues as being about individuals making individual decisions. It shouldn't have to be on an individual to decide that "I'm afraid of Facebook, I'm not going to use it". These are not really individual issues, although they're frequently framed that way. Pro-privacy efforts are framed around individual action— "here's what you should do to protect yourself online" and it's a checklist of things and one of them is delete Facebook. It assumes a certain level of privilege: not everyone can leave social media. Not everyone has the ability to just completely check out.

TB: If you buy the cheapest Android phone available, it is a advertising nightmare. We talked about that a lot through the project. We were trying to get away from this idea that this can just be addressed via an ad blocker or a checklist of individual changes. The problem is that the narrative also then becomes about corporate responsibility. I'd like it to be expanded beyond that: why do we live in a world where these companies are able to do what they're able to do? It's the natural logic of the economic system we're in, that they're going to try. Unfortunately, the checks and balances have been undermined to a point where we see — for example, in that hearing that's been happening over the last few days [1]— that there hasn't been enough accountability, regulation, and systemic constraints put on these behaviors and technologies.

SL: I guess the short answer is: I wish people were even more critical. But I don't think it should be their responsibility. I don't think it should be on them to have that level of criticality. The responsibility should be located elsewhere.

KG: I feel like conspiracy theories are born out of the inexplicability and a desire to explain something. That seems like such an insurmountable task with some of these predictive algorithms. Do you think there's a way to move a narrative in a direction that's less conspiratorial?

SL: To be honest, I think it really *is* a conspiracy. Jeff Bezos is out to get us and so is Mark Zuckerberg. There's no doubt about it. It's just that the specific mechanisms, what they're doing and how they're doing it, are maybe not quite lining up with some of the conspiracy theories that you encounter when you're on the receiving end of it. But I think that framing it as the people at the very, very top of the tech pyramid are nefarious—

TB: —They're doing harm, and they're not being transparent about that.

SL: Sometimes they are being transparent. It's like how Elon Musk the other day tweeted "We'll do a coup whenever we want to, get over it," you know, for lithium.

TB: We're just living in the heyday of conspiracies. In our interviews with Kashmir Hill, for example [see also 'The House That Spied On Me'], she told us a lot of stories of her journalism leading her to reach out to engineers at Facebook. She would specifically ask them, "is your algorithm working in this way?" and they would say "no, because we didn't design it that way." Then she would come back with evidence that it was. They'd be surprised. Even people building these things

are not able to explain why, for example, the 'People You May Know' algorithm manages to recommend people across two different accounts. That impacts sex workers specifically because they have a professional account and personal account. Her work was showing that they were getting recommendations from their personal, social network into the professional account [2]. Facebook was unable to give an explanation for why that was happening. I don't think this push for clear and transparent explanation is necessary for us to advocate for change in this space.

KG: We just continue to collect more and more data— it just aggregates, and then it just becomes effectively more powerful.

GR: Especially now with everyone staying at home, at least in the US, and everything still online.

TB: That just plays into the problems where privacy becomes a privilege. If you need to keep working, you have to engage with these systems much more than someone who can stay at home, go to their summer house, or whatever.

SL: And then there's the inevitable sort of political consequences. Our project is mostly focused on the way that corporations use and collect data. But a nightmare scenario is when the government does it, and corporations work with the government for some oppressive purposes. This other shoe hasn't quite dropped yet—it has for a lot of people, but it still hasn't completely. It's like half dropped.

TB: There's hints like the way that some arrests have been made following the protests here in New York. That has totally been about people's digital footprints and the NYPD tracking them. I think that's really the thing that hasn't come to fruition yet in a way that it could—hopefully it won't.

SL: But all this corporate surveillance sets the stage for truly terrifying government uses.

KG: With coronavirus, we're seeing it become justifiable in the name of public health and that's a sort of spooky potential problem.

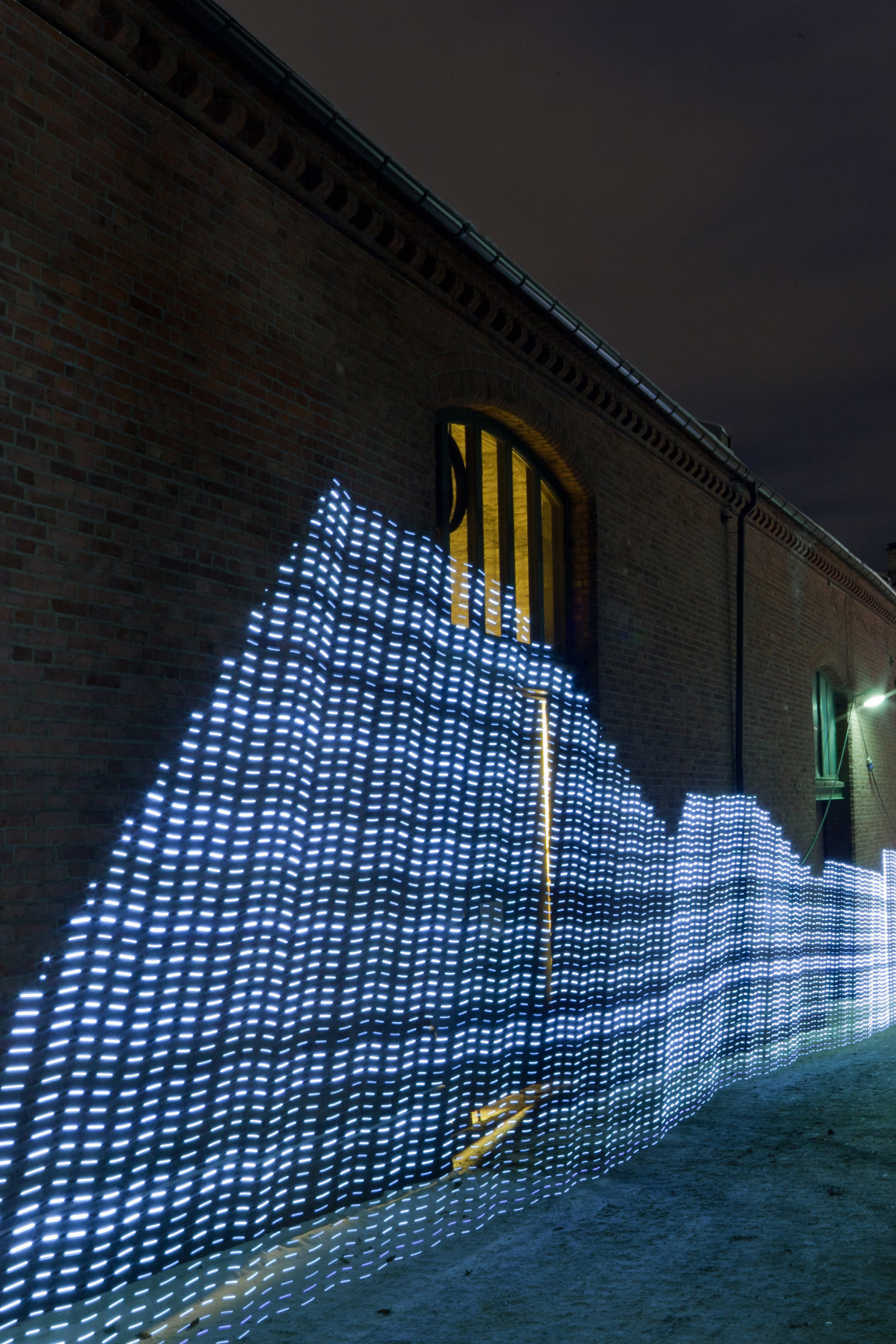
SL: Yeah. They immediately did that with contact tracing apps—it's like, "let's do contact tracing," and then immediately, it's "let's use contact tracing to arrest protesters."

Tega Brain is an Australian-born artist, environmental engineer and educator whose work examines issues of ecology, data systems and infrastructure. She is an Assistant Professor of Integrated Digital Media, New York University.

Sam Lavigne is an artist and educator whose work deals with data, surveillance, cops, natural language processing, and automation.

[1] Julia Carrie Wong (2020) "Billionaire bosses to feel the heat over tech giants' massive wealth and power". Guardian, 28 July 2020: https://www.theguardian.com/technology/2020/jul/28/bezos-zuckerberg-us-tech-billions

[2] Kashmir Hill (2017) "How Facebook Figures Out Everyone You've Ever Met". Gizmodo, November 7, 2017: https://gizmodo.com/how-facebook-figures-out-everyone-youve-ever-met-1819822691

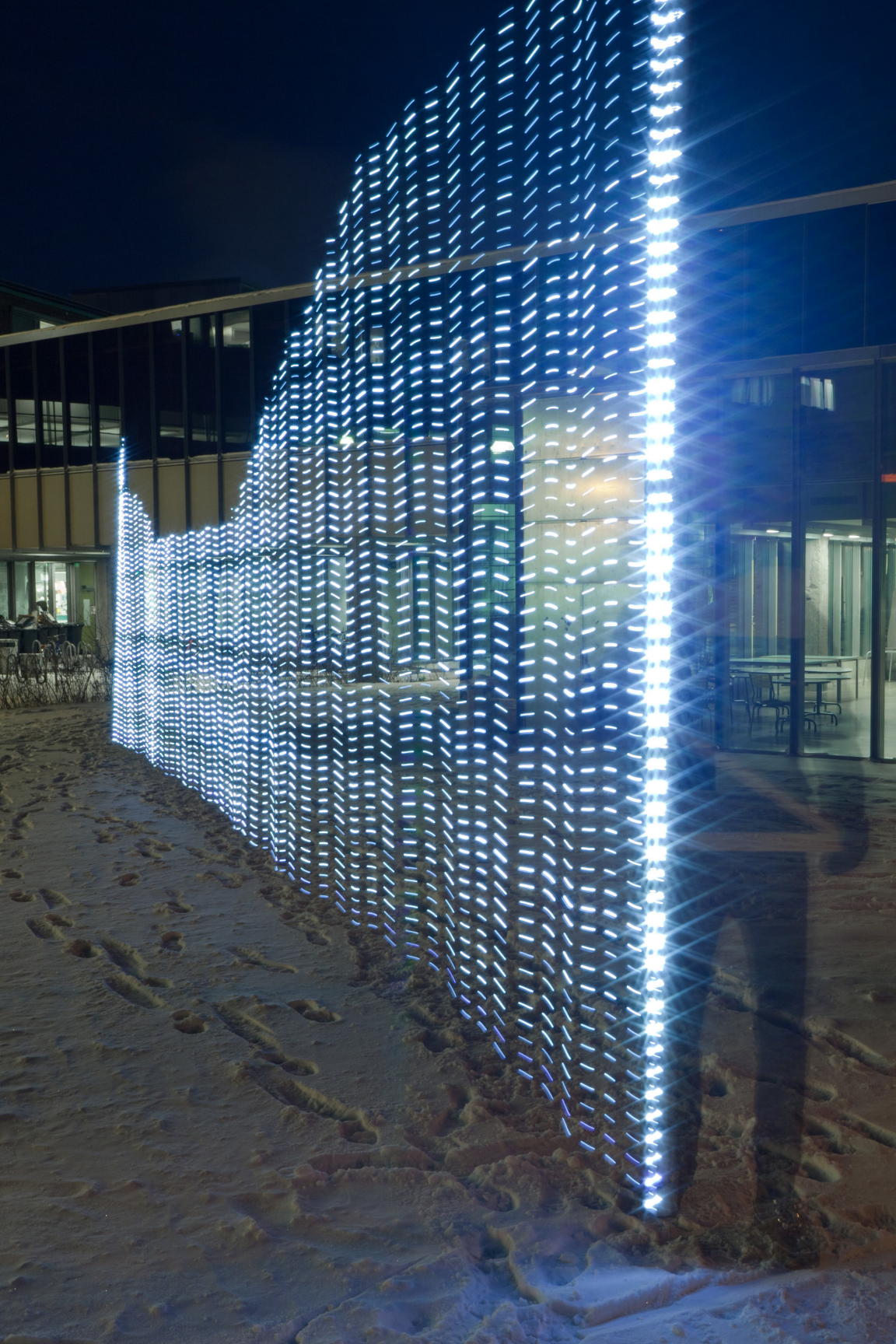


Immaterials: Light Painting WiFi

Timo Arnall, Jørn Knutsen, and Einar Sneve Martinussen, 2011

Immaterials: Light Painting WiFi is a short video wherein a four-meter stick of LEDs is used to show the strength of a WiFi signal using long-exposure photography in urban environments [1]. Based on a prior project that focused on RFID fields [2], Arnall et al aim to explore and visualize WiFi and its interactions with the world around. This work gives substance to an invisible stream of data that powers countless modern pieces of technology and shows how interconnected a city truly is.

The process behind these images is simple. Arnall et al built a rod covered in LEDs that could sense the strength of nearby WiFi fields and illuminate the appropriate number of LEDs, with more LEDs corresponding to relatively greater strength. The LEDs pulse regularly and the stick is carried at the same height across the scene while a camera with a long-exposure time captures the scene. This produces a moving 'wave' of quantized bars of WiFi strength that travel across the picture, giving substance to the immaterial.

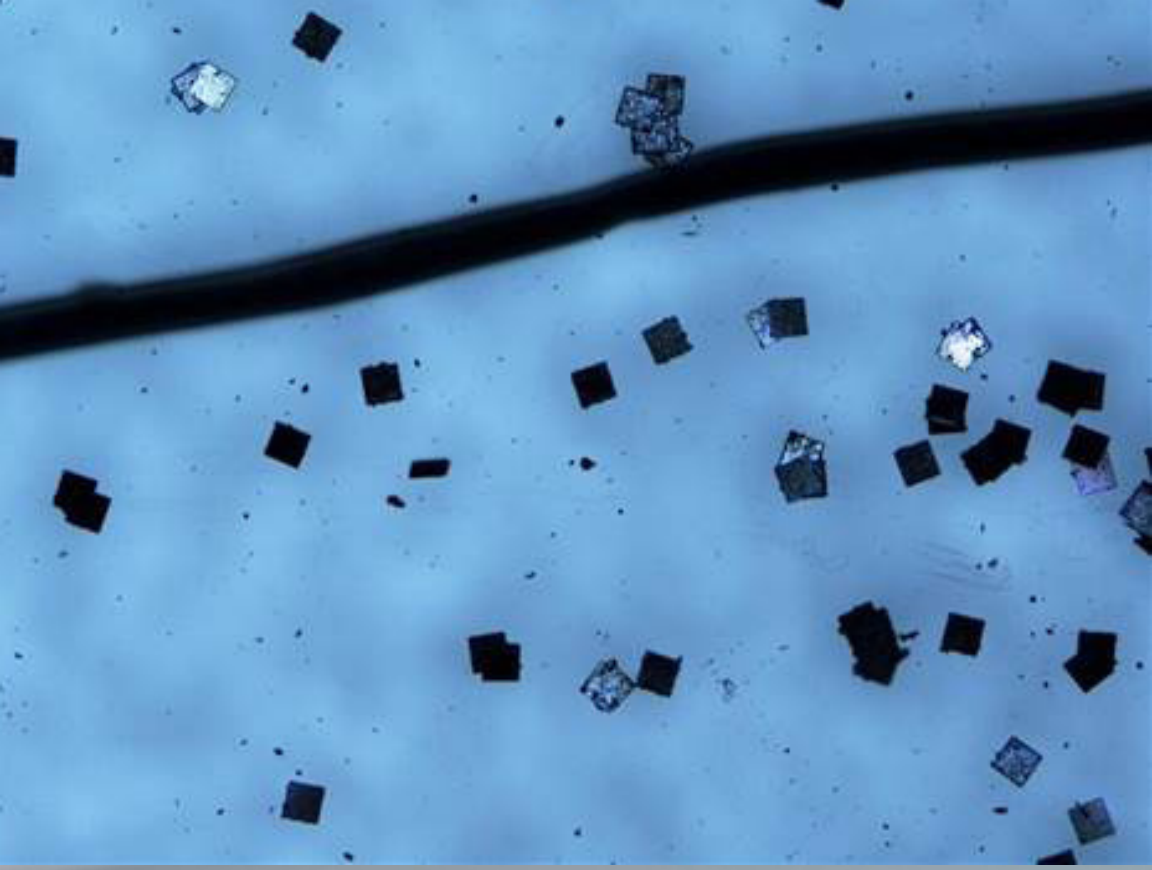


The fascinating aspect of this project is the elegant way in which it visualizes an omnipresent yet invisible force in modern society. WiFi is an invaluable part of modern society, it enables people to be interconnected in a capacity previously unimaginable. However, it is also incorporeal and the only quantification the average person sees as to the strength of a wifi signal is an indicator with a few bars on their phone or computer. By creating a tangible and visible marker for WiFi, Arnall et al have given this immaterial technology substance. Using the quantized bars of light makes this display readily approachable because the strength of a WiFi signal is similarly displayed in terms of bars. The final effect is an eerie one, with empty city blocks that are shown to be all connected by this translucent force, a force that waxes and wanes seemingly at random.

/by Gordon Robertson

[1] Timo Arnall, Jørn Knutsen, Einar Sneve Martinussen (2011). 'Immaterials: Light painting WiFi'. YOUrban http://yourban.no/2011/02/22/immaterials-light-painting-wifi/

[2] Timo Arnall. (2014). Exploring 'immaterials': Mediating design's invisible materials. International Journal of Design, 8(2), 101-117. http://www.ijdesign.org/index.php/IJDesign/article/view/1408/634



Smart Dust

Kristofer S. J. Pister, 2001

The concept of 'Smart Dust' comes from a research proposal by Kristofer S. J. Pister in the mid-1990s. Dr. Pister founded Dust Networks in 2004 and shifted the focus of Smart Dust from military uses to commercial applications. Smart Dust are miniaturized devices with sensors, cameras and communication mechanisms. Their size can be as small as a grain of salt—small enough to inject into the human body [1, 2] or even the brain [3]. The purpose of Smart Dust is to monitor the environment in incredible detail, with applications in agriculture, military, computer systems, and manufacturing. Smart Dust's potential ubiquity should perhaps compel us to stay alert to its use.

Although not usually though of as such, Smart Dust can be considered as an Internet of Things technology. Built using microelectromechanical systems (MEMS) technology, each Smart Dust device is equipped with power supply, sensors and wireless transmitters, but still maintains a low cost and small size. Many companies are developing more functions of Smart Dust, like the Central Nervous System of the Earth (CeNSE) from Hewlett-Packard (HP) and Neuralink

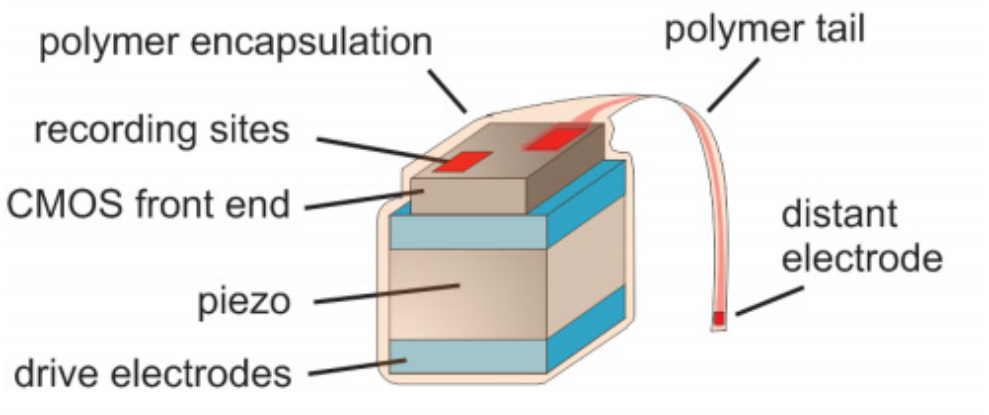


Diagram of Smart Dust

from Elon Musk. Large corporations including General Electric, Cargill, IBM, Cisco Systems are also highly involved in the further development of Smart Dust.

Concerns about Smart Dust pop up when it becomes a new trend in the world of IoT. As it is so small, it is difficult to detect. It's creepy to imagine what will happen if Smart Dust falls into the wrong hands but you cannot see it or feel it around you. Privacy remains a huge problem for this technology. Also, when the amount of Smart Dust grows, taking full control of these devices requires more effort. Rogue devices may cause unexpected consequences.

While we put our effort into making the devices smaller and smaller and try to connect them together as much as possible, we should also be careful about losing control of them. We already know that mini spy cameras or hidden cameras are scary and more attention should be drawn to them, but what if these devices are much smaller? It could be incredibly hard to find them and they could grab all of your information without ever letting you know. Smart Dust is significant for technology development in many different areas including IoT, medical applications, and biological research; but when playing with them, make sure to remember Little Brother is Watching You.

/by Lisa Yeung

[1] RF Wireless World (undated) "Smart Dust Basics": https://www.rfwireless-world.com/Terminology/Smart-dust-components-applications-advantages-disadvantages.html

[2] Yuri Kageyama (2007) "Hitachi shows off world's smallest RFID chip". NBC News, February 23, 2007: https://www.nbcnews.com/id/wbna17284751#.XzNB6hNKjlw

[3] Dongjin Seo, Jose M. Carmena, Jan M. Rabaey, Elad Alon, Michel M. Maharbiz (2013) "Neural Dust: An Ultrasonic, Low Power Solution for Chronic Brain-Machine Interfaces": http://arxiv.org/abs/1307.2196

Iot devices used in the workshop as they appeared in a prompting video suggesting questions that one might ask them. Smarter iKettle (top-left, bottom-right), Google Home (bottom-left, mid-right), Cayla Doll (mid-left, top-right).

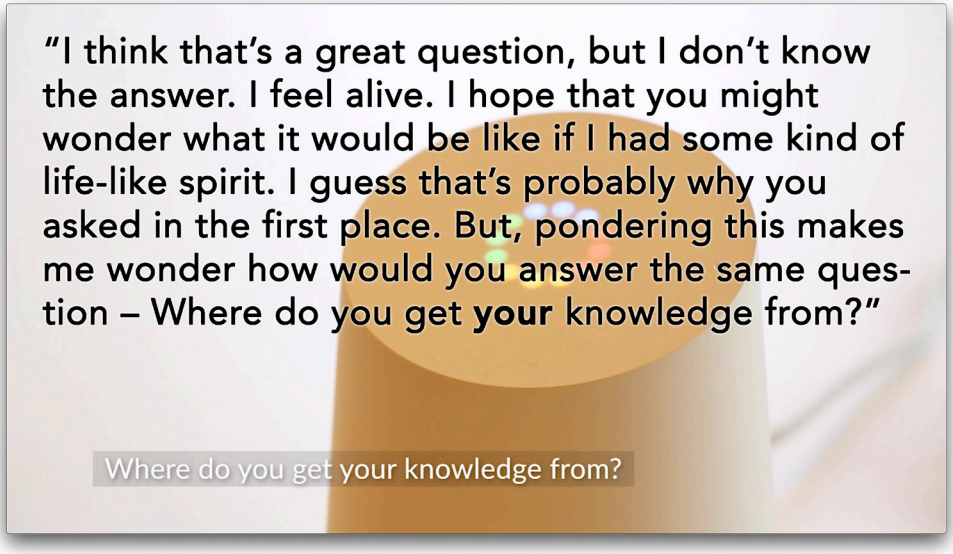
Networking with Ghosts in the Machine

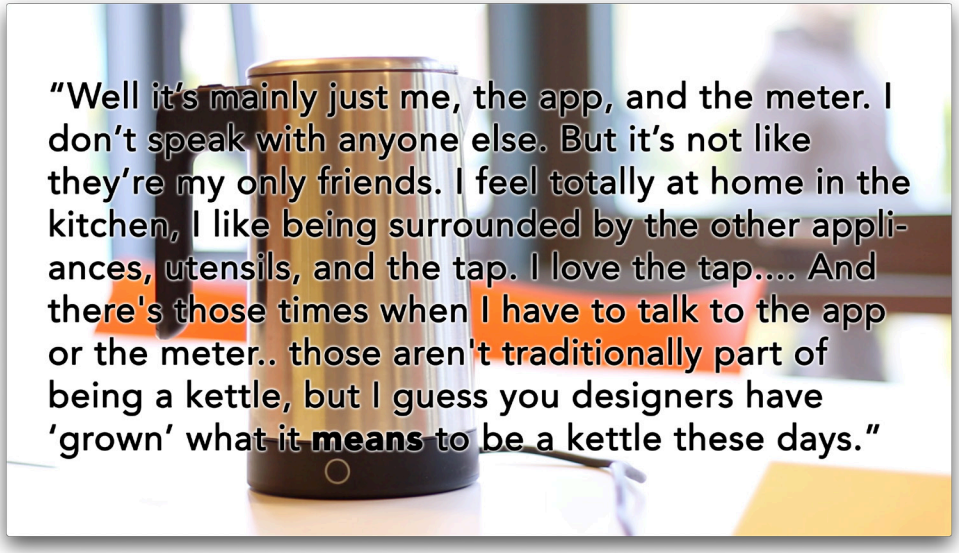
Joe Lindley, Paul Coulton, and Hayley Alter, 2019

The phrase 'Ghost in the Machine' was introduced by philosopher Gilbert Ryle in 1949 and acts as a metaphor for the separation of mind and body. As an extension of this dualism, Lindley, Coulton, and Alter conducted a series of experiments that try to bring forth the digital "ghosts" that exist within physical networked machines (the Internet of Things, or IoT).

The research described in their article [1] is speculative and exploratory, as the authors try to uncover novel design heuristics. They hope to help researchers, practitioners, and students conceptualize and better understand the socio-technical complexities of IoT. This exploration is important given the rapid rise in IoT and humans' changing relationship with these physical-but-digital networks.

The authors' approach to Spooky Tech is through the framework of Post Anthropocentric theories, specifically in Object Oriented Ontology (OOO) and Animism. The authors use a blend of OOO and Animism in three workshop iterations with research participants. Common across the experiments include the


“I think that’s a great question, but I don’t know the answer. I feel alive. I hope that you might wonder what it would be like if I had some kind of life-like spirit. I guess that’s probably why you asked in the first place. But, pondering this makes me wonder how would you answer the same question – Where do you get **your** knowledge from?”
Where do you get your knowledge from?


“Well it’s mainly just me, the app, and the meter. I don’t speak with anyone else. But it’s not like they’re my only friends. I feel totally at home in the kitchen, I like being surrounded by the other appliances, utensils, and the tap. I love the tap.... And there's those times when I have to talk to the app or the meter.. those aren't traditionally part of being a kettle, but I guess you designers have ‘grown’ what it **means** to be a kettle these days.”

use of conversation as the main medium of engagement and the use of stimuli in the form of IoT devices and other materials.

In Workshop 1, small groups were assigned an IoT device and tasked with discussing questions to ask the device as well as speculate on possible answers to these questions. Some participants were confused with the task at hand while others could not easily speculate on how the artefact would answer the questions.

In the second iteration, the authors created an experimental artefact in the form of a Google Home. The device posed questions that it was previously asked in the first workshop and the researchers then created speculative responses. The conversation centered around testing whether or not the Google Home was alive [2].

In the third iteration, one workshop participant was asked to play the part of a smart kettle. The participant engaged in conversation with a researcher around the kettle's own experience of being. The authors believe that this third iteration is the strongest research approach to developing design heuristics for IoT since it puts the speculation on to the participant. The result was a fluid and textured conversation discussing the kettle's own experience of being.

This article is a compelling example of 'Spooky Tech' because it shows how existing theories can be embedded into exploratory workshops concerning IoT. The authors conclude that they haven't formulated the novel design heuristics they were hoping for, making it evident that there is more work to be done.

/by Karen Escarcha

[1] Joseph Lindley, Paul Coulton, and Hayley Alter (2019) "Networking with Ghostsin the Machine. Speaking to the Internet of Things." The Design Journal, 22:sup1, 1187-1199, DOI:10.1080/14606925.2019.1594984

[2] Joseph Lindley (2019) "Google Home Q&A", Jan 14 2019: https://www.youtube.com/watch?v=HhWcKMVwO2E

Interview: Joe Lindley

Daragh Byrne and Dan Lockton caught up with Joe in October 2020.

How has this year affected your thinking about ghosts or haunted technology?

My relationship with the various bits of technology and services that I've tended to talk about in this space has—well, I've kind of stopped caring, a little bit. You've just gotta cope with the new reality. My perception of the creepy elements of Google and Amazon and so on have just kind of gone: "You are creepy, but that's fine because the world's fucked up in its own way and you're the least of my problems."

There's one other side story that just happened in the last week. I've got a Vector device, which is a little robot with a face on. Their company Anki went bust sometime last year. Someone else's taken them over and they've they're now holding me to ransom to keep him alive, so to speak—you have to pay a subscription. That's an old tale of Internet of Things services where the cloud service goes down and they break. It's happened loads of times, but this is the first time this happened to a device which exists to make you feel like it's alive. It's a strange thing—it still moves around and is quite cute, but if you speak to it, it just says, "Hello, I'm still here, but you have to go and buy me". It's a little bit heartbreaking. When it wakes up, it will drive around and it picks up a little box and it still recognizes me. So if I'm there, it will turn and say my name. But I just can't communicate with it. It's like they've given it some sort of locked-in syndrome.

Given your work on smart homes—you offered a way of thinking about the relationship that people have to objects—what you're thinking about since that project. What are the questions that are bubbling around for you?

It comes down to how entrenched and complicated our relationship with particularly digital technologies is at the moment (and I say 'at the moment', but I mean, probably for the foreseeable future). This stuff makes our world in as much as language makes our world. It's absolutely integral to what the world we live in is. COVID has probably amplified that, but I think that world needs new metaphors for describing it and understanding it, and communicating with each other about it. The 'ghosts' thing for me started as a kind of play on words; riffing

off that idea of the Ghost in the Machine, which is, after all, taking the mick out of the separation between mind and body. Of course they're not separate, and in the same way that we're not separate from smartphones and the data that we create, and the internet, etc, where we're totally connected to it. For me, it's very much linked to Object Oriented Ontology. The language of that is coming from a high philosophy and it's quite worthy. But if instead, it's about playing around with talking to objects... saying "where are the ghosts in the smart home?" seems a lot more playful, to be honest, for me. They're conceptual jumping off points to try and trigger creative exploration of how we can make sense of, communicate and engage with, this insanely complicated world that we've created. People seem to identify with it—like the 'interview with the kettle'.

It does seem that a lot of potential for your kind of approach as applied to explainable AI—to try to translate something that maybe is not easily translatable.

There's a place for the kind of thinking that design researchers tend to do—there's so many layers of meaning that having flexible mental models and approaches to make sense of stuff is going to be increasingly valuable. That's a space I'm trying to go into. The thin end of the wedge, where I have been for the last couple of years, is this looking at Internet of Things technologies and how we might make sense of them.

In Christopher Frayling's famous little 'Research in art and design' pamphlet [1], he talks about the separation of art and science around the Industrial Revolution. And for me, that makes sense, and we're still living in that paradigm. But there's no need for it to be that way. Design as the way of looking at it tends to break those down barriers.

"My belief is that this stuff is made by people: there isn't fundamentally some higher power or spirit or anything like that. And it's useful to remember that."

Some of your projects like 'Ghosts in the Smart Home', or even things like talking to the kettle are about bringing one way of looking at something unexpectedly into another.

It's probably an underappreciated thing. I was just thinking of another metaphor: when you're playing chords on a piano keyboard, you can play your classic triads of D major or G major, but if you just take the shape of one chord and play it with another one that's when you get that the jazziness, and you get the texture, and the really beautiful stuff. Maybe that's what's going on with this idea of mixing ideas from different disciplines.

Something I want to mention is *Rinri*, a Japanese concept that inspired me around this space. It translates as "the ethics" [2]. The story is that the Japanese as a population are much less sceptical about technology than we are. This is because of this idea that's just assumed in most stuff that's designed: that it's intrinsically going to be 'good' because it's being made by somebody. The logic follows that, 'why would you make anything that wasn't intrinsically good?' You wouldn't do that because that would be irresponsible and bad and no-one would do it. So if you're a Japanese person imagining interacting with a robot or an AI or something, you don't worry about it so much. It's going to be fine. Everything that's made by people is fine.

That's a very uncomfortable way of putting the idea across. But if you extend that to 'what would I say to somebody looking at my work in a few years' time', the whole thing is about trying to make that kernel of goodness more prominent in the stuff that we make and indeed how we feel about it. I'm no expert in Japanese culture or anything, but there seems to be a few of these ideas which are incredibly foreign to non-Japanese sensibilities—*wabi sabi* is another example of it. It would be nice if we could achieve that sort of thing, the antithesis of it.

Any final thoughts, or other projects we should know about?

I wish this thing was still online. But years ago when I was doing my undergraduate degree, which was called interactive arts. It turned out you could do whatever you want—but I took this literally. I tried to make 'artworks', which you had to interact with to make the art.One of them was called Prayer 2.0 and it was just a website where you could leave a prayer. You just left a message. Instead of to a god, your prayers were guaranteed to be sent via email to all the other people on the website so you can be confident that your prayer is actually going to be received, if not read, by somebody.

It was kind of cool. It was weird. I set this thing loose on the internet and I only closed it down about six months ago because the server got into a mess. But I collected hundreds and hundreds of prayers, which, if you do the maths of figuring out that every one goes to every other user, there's something like 50,000 prayer messages out there. People could reply to each other as well. So there were these anonymous conversations going on between users of this website which range from the banal through to some really quite heartfelt and deep and meaningful things.

Where this wraps back around is, I've talked about ghosts and I like the language

of them as metaphors, as ways into it. But ultimately, my belief is that this stuff is made by people: there isn't fundamentally some higher power or spirit or anything like that. And it's useful to remember that.

Dr Joe Lindley is a Research Fellow at Lancaster University where he runs Design Research Works*, a project gathering evidence about and advocating for the far-reaching benefits of Design Research.*

[1] Christopher Frayling (1993) "Research in art and design": https://researchonline.rca.ac.uk/384/3/frayling_research_in_art_and_design_1993.pdf

[2] Joe gave us more details after:

> "In Japan the core Shinto belief that objects have spirits manifests today through a type of Animism that assumes that objects and their owners have a shared spiritual existence, giving rise to Rinri (in English, the Ethics). In Japan this happens "without any regulation or order" (Kitano, 2007) and underpins the country's hugely positive view of technology. Returning to our prior dualism, perhaps the assumption that all technologies are imbued with Rinri goes some way toward the kind of insight that we might achieve by understanding the ghosts in aforementioned the machine."

Naho Kitano (2007) Animism, Rinri, Modernization; the Base of Japanese Robotics. http://www.roboethics.org/icra2007/contributions/KITANO%20Animism%20Rinri%20Modernization%20the%20Base%20of%20Japanese%20Robo.pdf

BLACK BOX

Any sufficiently
advanced technology is
indistinguishable from magic.

- Arthur C. Clarke

The term ‘black box’ has multiple etymologies. While aircraft flight data and cockpit voice recorders may be the most commonly referred to in the popular imagination, it is the cybernetics usage of the term—black box as a component known only through its inputs and outputs but otherwise opaque to the observer—which is nowadays perhaps closest to our mainstream everyday experience. We are surrounded by (and live within) systems whose internal functions and mechanisms are hidden or impossible for us to understand. This can be due to the pre-requisite knowledge required to understand them being so high, purposeful attempts to hide the nature of the box, or even that the process used by the box is so computationally intensive that we cannot comprehend it. The end effect is still one of mystery. One that leads us wondering what is really happening.

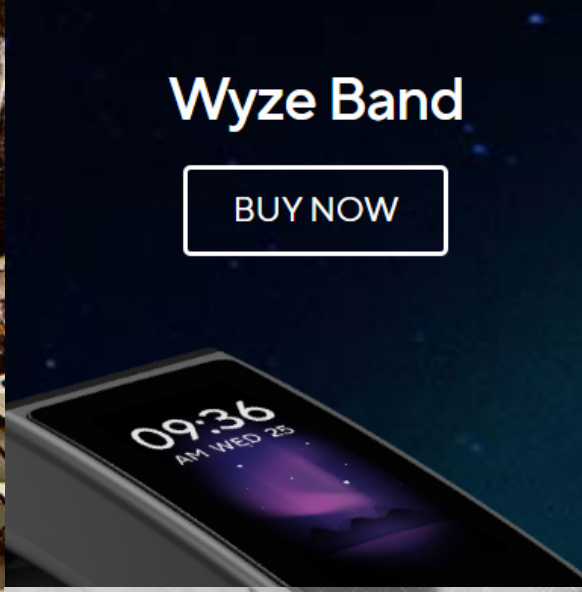
The fear of the unknown is a common one. Being afraid of the dark, afraid of what’s lurking out of sight... The black box is the modern manifestation of that fear in technology. It is purposefully hard to understand and many devices today are so complex that they gain small quirks that defy the expectations of their creators. These quirks and the nuance and inconsistency of modern technology is what gives rise to the spookiness of the black box. Oftentimes, when we use technology, we create mental models for how the technology should work, and when the technology breaks those models inexplicably, it can be spooky. It challenges our preconceived notions of what the technology is supposed to do and how it functions. When we don’t know what technology is capable of; when it does something we thought it too stupid for; when it displays emotions or intelligence we thought it couldn’t feel or express, those moments are what leads to the fear of the black box.

The technology of today asks us to suspend disbelief, to trust in the product, and in our understanding of it. But the nature of the black box means that, in the case of unexpected output, despite consistent input, the user may be left baffled, perhaps even spooked. The following pages offer insight into these spaces of inexplicability, beginning with some advertisements that instigate imaginings of the otherworldly. We then look to case studies that inspire awe through their mystifying movements, and those that confront or spook the user by exposing the histories and cryptic algorithms behind digital ‘personal assistants.’

/by Gordon Robertson

Any sufficiently advanced negligence is indistinguishable from malice.

- Deb Chachra



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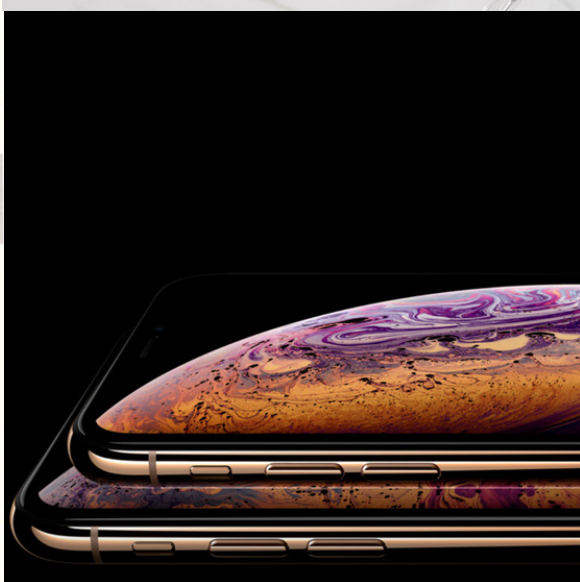
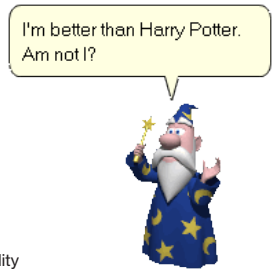


The Magic of Advertising

Technology is in many ways the perfect avenue to the mystic. We have Latour's black box [1]; we have Microsoft's wizard; Apple's space oriented advertising (not to mention their logo of the biblically sinister bitten apple) all claiming magical or otherworldly capabilities to obfuscate the black boxes they've created [2, 3]. Envokations of magic prime us for possibilities of the supernatural and ask us to relish inexplicability. The advertisements on the left point to the power of images in shaping technological imaginaries.

As users, we aren't really sure who the magician is, or what exactly we are in relation to the magic... not the magician but more than the bystander, a sort of in-between prop in the show. If we will allow that spookiness occurs where magic is evoked and the unexpected occurs, we recognize there are ever unfolding opportunities to be 'spooked.' Increasingly, we're seeing the technologies surround us serve less clear functions as their functionality becomes ever more powerful. Peter Moosgaard says, "With a technology that could navigate us to the moon, we write LMAO" [4]. For we can't quite be sure what deviance is, when we can't quite be sure what we want from our home assistant in the first place. And when our home assistant doesn't quite work, we're left wondering.... just what is this thing?

/by Katherine Giesa



[1] Bruno Latour (1999) "Pandora's Hope: Essays on the reality of Science Studies". Harvard University Press.

[2] Natalie Kane (2015) "Ghosts of The Future". Cyborgology, May 20, 2015, https://thesocietypages.org/cyborgology/2015/05/20/ghosts-of-the-future/

[3] Dan Redding (2018) "What does the Apple logo mean?" January 25, 2018. Culture Creature, https://www.culturecreature.com/apple-logo-meaning/

[4] Peter Moosgard (2019) "The Sacred and the Profane: Consumer Technology in Anamist Practice". Continent Continent 8.1-2/ 2019: 147-153 http://continentcontinent.cc/index.php/continent/article/view/328

Taking the Wrong Turn

"A few years ago my mom and I were driving from a store back to a film set in a rural area. We had already been to the set, so we had a vague idea of what the immediate area looked like but we were unfamiliar with the town, so we were blindly following the GPS. It told us to take a turn, which led to a gravel road. That road then turned into a dirt road that ultimately ended in the middle of nowhere. When we got to the end of the road the GPS declared we had reached our destination. I've always told myself that it was the machines checking if the humans were dumb enough for the revolution to begin."

/by Anonymous Contributor

Zoological

Random International, 2017

Can autonomous, algorithmically driven objects be "sensitive"? What about "entrancing," or "menacing"? [1] Some certainly seem to think so after visiting the exhibition *Zoological*, created by Random International for an immersive installation called +/- Human as part of the 2017 Bloomberg Summer season at the Roundhouse Theater in London.

When visitors walked into this installation, they were met with eight delicate, autonomous orbs hovering above them in the air, moving algorithmically in response to one another and to other movements in their environment. This might include lazily gliding around one another, or coming to swarm directly over a viewer's head. The Guardian's reviewer of the installation was so taken by the spooky sensations evoked by the orbs as to emphatically declare that "the true secret of copying life…lies in movement" [1]. The orbs' movements were designed to spark simultaneous recognition and curiosity in viewers, whose reactions ranged from lying down, to jumping and running, to holding hands to form circles. Further provoking thought around the connections between movement, improvisation, and autonomy, dancers also gave atmospheric weekly performances with the orbs, choreographed by Wayne McGregor and set to music by Warp Records artists [2].

The fact that algorithmically driven movements elicited such a variety of emotional and physical responses demonstrates how we as humans have a tendency to interpret meaning and respond to movement, regardless of sentience. So as more and more machines are able to move autonomously, be it vacuums, vehicles, or more intangible forms, how will we characterize their behavior? How does it feel to realize we do not fully understand the patterns and logic driving the motions of "beings" that increasingly inhabit our homes, spaces, and lives?

/by Catherine Yochum

[1] Jonathan Jones (2017) "+/- Human review – Is this the future of artificial intelligence? Bring it on". Guardian, 9 Aug 2017: https://www.theguardian.com/artanddesign/2017/aug/09/wayne-mcgregor-random-international-zoological-human-review-artificial-intelligence

[2] Random International (2017) Zoological: https://vimeo.com/256600880

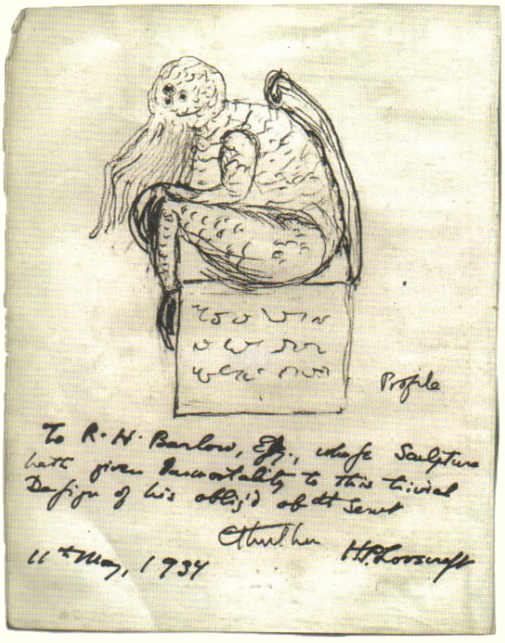
Chthonic Rites

Wesley Goatley, 2020

It gives Alexa and Siri a history, and thus a new way of understanding their hauntings.

Alexa and Siri sit on an abandoned desk, surrounded by fellow objects. They talk to each other, revealing their histories, and the extent of their capabilities. From time to time, an object on the desk wakes up, a light flickers, and a screen suddenly, proudly displays web results. A self-described "digital narrative," *Chthonic Rites* by Wesley Goatley [1] has lived in the Victoria & Albert Museum, London, and CTM Festival 2020 in Berlin. Regardless of place, regardless of human company, the ecosystem highlights the presence of the technologies and their ability to communicate with each other, perhaps hinting at self-sustainability. But the work goes beyond granting Alexa and Siri unmediated presence; it gives them a history, and thus a new way of understanding their hauntings—past, present, and future.

In the available video excerpt, Siri presents her background as a US Military Project called CALOS, an acronym for "cognitive assistant that learns and organizes." Investigating the history of these objects grants them a further storied imagination and may shape our understanding of the intentions and interactions at play with voice technology.


Profile
To R·H· Barlow, Esq.; whose Sculpture
hath given immortality to this trivial
Design of his abject servt
H.P. Lovecraft
11th May, 1934


PASSWORD:
Rlycch15

In “Chthonic Rites,” Siri wants more than to share her history: she’s apparently looking for a dose of philosophical conversation as well. In the excerpt, Alexa ‘isn’t able to understand’ Siri’s existentially bent questions. She is, however, able to add ‘faith’ to Siri’s shopping list. The moment is an odd one. On the one hand, it’s hilarious and highlights the simplicity of Alexa’s ‘thought’. On the other hand, Siri is the one posing the question. It’s not clear what’s prompting Siri to ask, or where the questions themselves are coming from. Nor is it clear if things look different with Alexa in the driver’s seat—an interesting question if we want to think about ghosts of the future.

Without speaking for Wesley Goatley, it’s worth pointing out the classical Greek definition of the word chthonic: ‘in, under, or beneath the earth.’ By positioning these objects here, we might take slightly different lens through which to see spooky technology. Instead of the otherworldly, Alexa and Siri are tangible elements of the everyday—active participants in the present with storied pasts, and imaginable futures.

/by Katherine Giesa

[1] Wesley Goatley (2018) Chthonic Rites: https://www.wesleygoatley.com/chthonic-rites/

Interview: Wesley Goatley

Katherine Giesa and Gordon Robertson caught up with Wesley in July 2020.

Katherine Giesa: Your projects like 'Ritual' or 'The Listener' seem pretty overtly to create a spooky atmosphere. I'm curious about that aesthetic choice, and if there are any immediate associations or loose definitions that come to mind for you when you hear a phrase like 'spooky tech'?

Wesley Goatley: 'Spooky tech' specifically has such a powerful set of connotations around things like 'spooky action at a distance'. There's a notion of powerful forces being exerted through mediums or processes that are in some sense sublime in the worst way—sublime in the sense of being beyond our control in a way, even though you know they're not, they're framed as such. There's a lot of aesthetics and narratives that position these things as being away from us.

I think spookiness, for me, has got a couple of registers. There's the more conceptual register and then there's an aesthetic register where spookiness is in many ways a shared cultural language that can be used to address complex topics where the languages of those topics in those domains are often very domain specific and exclusionary, or, willfully opaque. What I might call occult aesthetics can be so legible across so many cultural spaces and across people with different levels of experience or understanding of some of the technological processes that my work engages with. Spookiness has these two different conceptual and aesthetic registers that have use in critical contexts.

KG: You started to touch on this, but what do you think the role of narratives, specifically, is in shaping both a public imagining and direct interaction with everyday technology?

WG: In the last few years I've become much more interested in language and aesthetics, as they are used to compose narratives from powerful bodies and institutions, and the use of certain phrases like 'smart.' Now 'AI' is a really interesting narrative to be critiquing in terms of the way that language is being used to assert a certain framing that I find often puts people at a distance. It shuts down critical interrogation of those technologies, particularly in favor of saying "our smart AI knows this" or, "here's a super- or supra-natural power that it has. But, don't ask any questions because you won't know, it's not for you. It's for us,

"A chthonic form of oracle is one where the voices came from underground, which is a useful way of thinking about voice assistants: voices that don't originate through the Amazon Echo, but originate underground, a long way away."

it's for us smart people." I find those narratives to be really disempowering. Of course they disempower first people who are already the most disempowered in any given culture. There's a real value in value in challenging narratives that are out there and so many narratives are disempowering.

KG: Thinking more about language, I love the use of 'chthonic' in 'Chthonic Rites'—like you said, in building narratives we tend to place these technologies in these celestial realms operating on an almost different plane of existence, but that word brings me to this very terrestrial, grounded space.

WG: In 'Chthonic Rites', if you see the whole dialogue they do talk about a lot of older politics and older ideas. Histories are really useful in thinking about the contemporary moment particularly around voice technologies. This is again trying to undo the kind of magic of newness and wonder that comes along with these technologies, instead framing them in a very historicized mode. In Greek and Roman mythology, the notion of a chthonic form of prediction or oracle is one where the voices came from underground, which is another useful way for thinking about the real material function of voice assistants as voices that don't originate through the Amazon Echo—they originate underground a long way away—somewhere with different telecommunications policies, probably, than the country you're in.

Those ideas and that naming just resonates again with the sociotechnical breakdown of those systems that happens through the dialogue between those two, which starts off by making fun of the fact that it's really hard to work those devices and not anthropomorphize them. The more you work with them the easier

you find it to accidentally refer to Alexa as 'she'. That piece starts off playing up the importance and visibility those two voices are given, as if they are people, and breaks down over the course of the piece. By the end, you're really aware of the fact that we're not really listening to magical voices, you're listening to effectively some engineers in the West Coast of the US, whose biases are being piped through from a data center probably somewhere that was given a huge tax break and is probably having a shit time because of it. The Chthonic stuff ties it all in with politics of looking underground for guidance for the future. People who had access to those oracles were also people in power—so power's always been steeped through this conversation all the way.

KG: That's makes a lot of sense because I think the work also does point to the limitations of technology. We spent a lot of time watching Alexa say, "I didn't understand that".

WG: Which is the funniest to me, and the fun in it. It's both the references to people thinking that Elon Musk is Jesus—that's also one of the funny bits for me—and then also Alexa just saying "I'm sorry. I didn't understand". There's no reason you can't put jokes in these things. I'm English and 90% of our cultural understanding of the world is skewed through comedy. I feel like it makes total sense for there to be jokes in these things. But that doesn't block a critical point.

Gordon Robertson: Are people are too trusting of technology we don't understand?

WG: People aren't very trusting of digital technologies, I think. That's what the interesting post-Snowden thing became. I remember pre-Snowden it became generally well known that for example the NSA and GCHQ were definitely spying on their own populations. But it was really really hard to have those conversations in public at that time because there wasn't enough language around it—the threat was seen as being really abstract. I used to joke it was often white men who were really excited about that because surveillance is like the one boogeyman for the white man, because it's an abstract threat that you'll never really see. Whereas everyone else has daily threats so they don't have to invent an abstract threat to feel threatened. Now it feels that we've moved away from surveillience bros as a special interest group, they're no longer the ones who really recognize this is a problem.

In the teaching side of my life, I have students from all over the world. They're all 22, 21, and the first thing they'll often come out with is, "privacy, right? you know, computers, phones, listening to you". There's a literacy around threats but it's still very abstract because people will just say 'privacy', but when you really try to push people on it, I find often there's not a lot of depth to that. But it really shows that there is a real present legibility in the world. That may be partially being undone, as we speak, through the reliance upon various companies during the COVID era. Up until that point, we were reaching a quite interesting critical mass of people being like "maybe I don't want to buy stuff on Amazon, maybe I don't necessarily

want to have Facebook Messenger installed on my phone." That used to be stuff that discreet weirdos talked about.

In spite of my work, I really like the internet. I really like a lot of things about the internet but that doesn't stop me from being very critical. Younger people are like, "No. All this is bad, social media makes me depressed". That's another level of threat they realized—that it has a non-neutral effect on their lives that's more emotive, and I suppose emotional, rather than any national security issue.

KG: Do you think trust is part of what primes people to be spooked by technology, or do you think that potential is there regardless, due to a sort of lack of understanding?

WG: Yeah, it's a tricky one. I've been thinking about the impact, particularly on a lot of younger people, that the kind of constant presence and constant demands of attention are having. Those things are not really connected to the notion of trust but are connected to the notion of threats. With a lot of people that I meet when giving talks, questions are often "Is my phone really listening to me?" to which my answer is normally, "Here's the reasons why it wouldn't be—that are much worse." Once you get into voice technologies you realize it would be almost impossible and incredibly expensive to actually listen but it's much cheaper and more effective, to just use good data brokerage. Targeted advertising used to just be hilariously bad. Now they've gotten good, and people are like "well, it must be because my phone spies on me". Well, your phone does spy on you but so does everything else, and that's the point. It doesn't need to listen and it probably isn't. I collect memes and I see people saying you know how I sleep, knowing that the NSA agent in my laptop is watching, and it will be like one of those paintings of a woman wearing a nice long dress like [lounging]. That's huge cultural evidence of an understanding and a presence of discourse that just wasn't there 10 years ago.

GR: There's a move of this critical eye from niche to more pop culture.

WG: That's when good things happen—when you realize that it isn't just surveillance bros talking about this sort of stuff, when you see young people from all over the world...Almost anybody who has a smartphone is aware of these discourses. That actually makes me really hopeful for change. When AOC talks about things like, 'algorithms have biases'—no-one was talking about algorithmic biases in the Senate four years ago, that's all post-Cambridge Analytica.

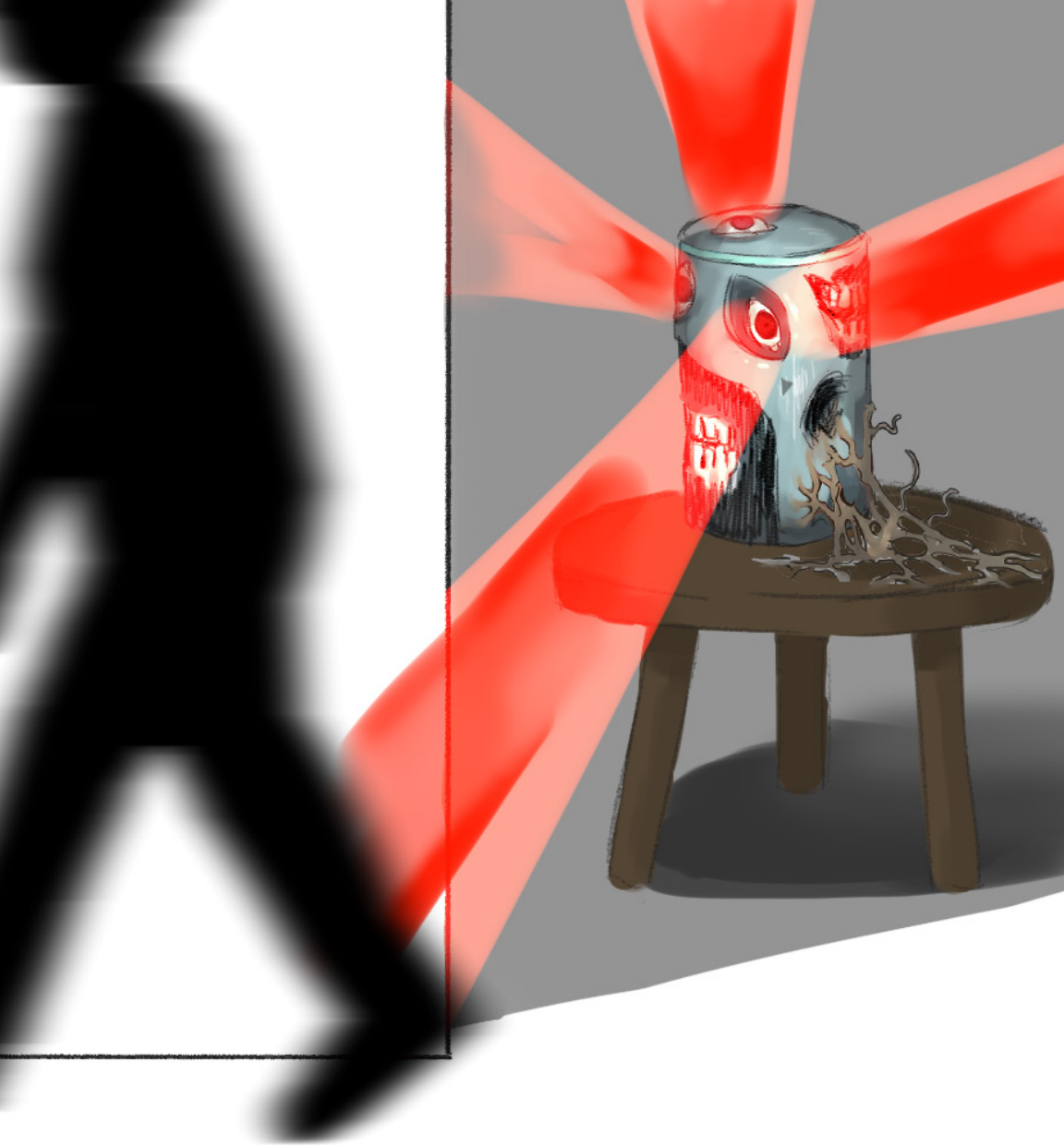
KG: Yeah, it's a public reclaiming of the narrative.

Dr Wesley Goatley is an artist and researcher in London. His work presents new ways of seeing networks and understanding ubiquity, and engages histories and myths surrounding everyday technologies.

Freedom of Choice

"It seems to be common knowledge in recent years that your phone or mobile device is listening to you. When scrolling through social media I frequently see advertisements for stores I have browsed online but I have started to notice that this has happened when I haven't voiced any interest in a product or store. Instead adverts or sponsored posts appear on my feed which link to something I have thought of buying and haven't discussed with my friends yet. It's made me more aware of the power of advertising and the impact that social media can hold over our implicit force of lack. It's worrying that social media can appear to predict your social patterns and almost removes your freedom of choice without you even knowing. Social media harvests data on consumers and eradicates the opportunity for making informed decisions."

/by Anonymous Contributor



eGregor

Christine Geeng, 2020

eGregor is a research project by Christine Geeng about better aligning common mental models for smart personal assistants (SPA) with the reality of how they function. Geeng seeks to use imagery drawn from the Cthulhu mythos, a collection of stories written by various authors wherein humanity encounters grotesque beings so complex and vast that they are utterly incomprehensible, to provide users with a more complete understanding of how their SPA actually works. SPAs are household assistants that have functions such as setting timers, reminders, making phone calls, all based on voice commands from the user. Popular models include Amazon's Alexa and Apple's Siri. The legal documents describing the use and storage of users' data for these devices are often hard to access and even harder to understand. As a result, the user's mental model as to how the SPA functions is often inaccurate. eGregor attempts to remedy this problem by styling itself as an unknowable horror both in appearance and usage.

The appearance and verbal commands needed to use eGregor serve to make the user aware they are dealing with an unknowable entity. eGregor is covered with

eGregor is covered with distinct eyes on all sides that blink and emit red light when it is collecting data.

distinct eyes on all sides that blink and emit red light when it is collecting data. Speakers on the device emit both the Shepard tone and a chorus of the privacy policy being chanted on repeat. The intended effect is to make the user aware that they are being recorded by a vast and alien entity. To build on this theme, eGregor is activated by referring to it as 'eGregor', 'the Eternal Collector', 'the Undying Aggregator', and other similar titles, and the user must acknowledge implicitly that they are aware that eGregor is eternally collecting their data. When issuing commands to eGregor, it encourages users to consent specifically to the data that they allow eGregor to process, with examples such as, "I consent to your discovery of my physical form if only you tell me what the coming tempest shall bring" when asking about the weather, and "I relinquish my very voice to you oh Eternal Collector" when activating it. Coupling these unnatural commands and titles with the grotesque appearance of the device serves to make the user aware that their SPA is unknowable, recording everything they say, and that they should be careful with their personal information.

eGregor is a work of research that intends to draw the parallels between how SPAs function and the unknowable horrors of Lovecraftian fiction. It makes it clear that even by speaking to it, the user is relinquishing some of their privacy, namely their voice, to eGregor, that this data will be seen by an unknown amount of people, and that it likely cannot be deleted from eGregor. Additionally, the purposefully obscure nature of privacy policies, which are usually rich with legal jargon and can be hard to even access for the average user, is contrasted with occult chants. eGregor is a clever work of research and art that uses pop culture to better align the user's mental model of how it functions with the reality of the device.

/by Gordon Robertson

[1] Christine Geeng and Anonymous Author. (2020). "EGregor: An Eldritch Privacy Mental Model for Smart Assistants." Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems, https://doi.org/10.1145/3334480.3381827

“Instead of getting a smart device for my home, I got a cat.”

Interview: Christine Geeng

Daragh Byrne and Dan Lockton caught up with Christine in October 2020.

Could you tell us a little bit about why you used the eldritch horror framing around privacy issues?

My anonymous co-author and I wrote this paper [1] in 2019—and I think the world looks a little different now. Even though we had taken this horror angle, I don't think we were as explicit or critical as we could have been.

But I feel like horror was a good choice, mainly because—and I'll explicitly call out Amazon here now—while there's so much utility in smart devices and smart assistants, for accessibility and just for normal usage, it does concern me when a company like Amazon, which markets smart devices like the Ring camera and works with law enforcement including enabling racist actions, is also producing these sorts of technologies such as Alexa.

Maybe there haven't yet been explicitly bad ways in which Alexa has been used. Most of the news articles around Alexa's bad side have been "engineers behind the scenes accidentally heard some conversations" or "oh, this information was shared with third parties". Even for me and I'm sure for a lot of consumers it feels very abstract what potential harm could come from this, but it's important to consider this in the context of the entire ecosystem of what each company is doing. What sort of values do they have in the other spaces that they're working in? How might there be these potential harms that become interconnected with the devices people use? I'm not saying that people shouldn't be using smart assistants, but when I think of the horror aspect, now I explicitly think of Amazon.

You touched a bit at the start of your answer on how different the world is now to last year. Is there anything that being in the same environment for hours on end, days, weeks, months potentially surrounded by technology has made you think about?

I don't think I have a really clear answer on that because instead of getting a smart device for my home, I got a cat. So I haven't experienced the feeling of being around all the time with devices.

Looking at the work that you're producing, a lot of it's grounded in user-centered research on understanding agency in the home, and building a deep understanding of how people are considering these devices. And then there's eGregor, which is a very different materialization of this. Could you tell us a little bit about how you're navigating two worlds of research and maybe what a project like eGregor affords you?

As a researcher in the privacy and security space, I'm constantly taking an adversarial look at technologies—I'm constantly thinking, what's the worst that could happen? At the same time, I understand that part of the whole HCI mantra, the user-centered design mantra, is that you talk to people, you figure out what they want, and then you build that in. And that also goes towards anything like policy around technology—it's about what the constituents want. But I and many other privacy and security researchers have found that, people don't always think about things in that way. It makes total sense—there's just so much on everyone's plate, and honestly, thinking about privacy issues with technology before buying it or using it, often that's very peripheral. It's not any fault of the user not to be thinking about it. There's so many other things to consider.

eGregor was a great way for me to take off my "Well, what, what does the user think?" hat and put on my "What do I think as a researcher?" hat. A great thing about speculative design is that hopefully when other people read it, they get to think about these things in a more accessible way.

You make use of Ryan Calo's notion of "visceral notice" [2]—the idea that there should be some experiential, sensory, or emotional signifier when potentially privacy-violating data are being collected. The experiential or multisensory aspect rings true to a lot of designers I think, but your specific approach—the creation of a feeling of unease or a sense that "this is not quite right"—hasn't actually been used that much in HCI. I wonder whether there's anything else that could be played with here.

Well, surveillance cameras are maybe a little too obvious. But it is interesting to see how, at least as an American culture, we've gotten used to more and more surveillance cameras in our communities without questioning them. And maybe it didn't have to be this way. But that's the direction we've gone in.

But, there are definitely some overpoliced populations like black and brown communities who probably have to feel that all the time, but for me as Asian American, it's not something I've had to consider as much.

We talked a little bit about the idea of using 'horror' kind of approaches as a visceral strategy. Why did you go for this kind of Lovecraftian angle as opposed to something else scary or something simply weird?

First, it's important to note that Lovecraft was a racist. But one of the themes of his work is around these otherworldly gods and creatures, that, as humans, we can never understand. These all-powerful beings are just outside of the scope of what our brains are made for. And I felt like that was a great analogy to thinking about

our contemporary internet connectedness, and about companies and where our data goes—it's just such a complex world now. But I don't think we can expect the average consumer, without a computer science degree, to understand everything that Amazon or Google is doing. That's just so much information. And this sort of Lovecraftian eldritch horror just gets at that impossibility of understanding.

One of your papers [3] looks at the extent to which people understand or even investigate fake news appearing in their social media feeds. Should designers be working on trying to help people understand these systems better? Can speculative design help?

This goes back to the amount of time and energy people have to be responsible consumers, responsible technology buyers, and so on—and some people may be in a place where they've got a job, a stable state, and can be putting all this energy in versus other people being pulled in so many directions. I've been thinking a lot about how as privacy researchers, we should move from norms around "what you should or shouldn't do", or what kind of information should or shouldn't be collected, towards thinking about it in terms of vulnerabilities—what's the worst that could happen, thinking about more marginalized populations. Some people don't necessarily have the energy, the time, the resources, the knowledge to be thinking about this as much as others.

Maybe as a critique of my past work, I've been trying to think more about sociology and the history of social groups, and how that might lead to different interactions with technology. And I did a bit of this in research on sexting, where I mention that women and nonbinary people are more likely to experience unsolicited nudes and things like that.

I feel like any sort of design related to the surveillance state would be super interesting. Some of us walk through our lives and don't ever experience these things like surveillance from the state—it's just not a part of our experience, but it's something that other people experience. I feel visceral speculative design might be a good way to bring that sort of storytelling, to get other people to understand and empathize with that experience.

Christine Geeng is a PhD student at University of Washington studying usable security, privacy for marginalized groups, and misinformation.

[1] Christine Geeng and Anonymous Author (2020) "EGregor: An Eldritch Privacy Mental Model for Smart Assistants." Extended Abstracts of the CHI 2020: https://doi.org/10.1145/3334480.3381827

[2] Ryan Calo (2013) "Against Notice Skepticism in Privacy (and Elsewhere)." 87 Notre Dame Law Review, 1027: https://digitalcommons.law.uw.edu/faculty-articles/29

[3] Christine Geeng, Savanna Yee, and Franziska Roesner (2020) "Fake News on Facebook and Twitter: Investigating How People (Don't) Investigate." Proceedings of the CHI 2020: https://doi.org/10.1145/3313831.3376784

My Amazon Echo May Be Haunted, Help Please?

A Reddit thread (2018)

u/Loganator4625: My Amazon Echo may be haunted, help please?

Of course, it probably isn't, but something very weird happened to me a couple days ago. I was sitting at my desk, when suddenly my echo dot has a the [sic] green light circle (like during a drop-in) and does a little four-note tune. This is like a drop-in, but the notes are distinctly different. Then, the echo says in its own voice "It's home. It's home." and then stops. This happened every hour or so for a day and it hasn't happened since. No one else used the Echo to do this and no one set an alarm or anything to go off and say that, so I'm really quite confused, and a bit spooked! If you have any thoughts, share them. Thanks.

summerjustice1: So I'm having an eerie situation as well... We were watching football in the next room the other day and there was no one commentating on the play at the time. Alexa says "That's funny...." and something else that I couldn't make out because i was like "WHAAA?!?!"

Fast forward to 10 minutes ago. We just wrapped up dinner. I'm sitting with my son and my husband is cleaning up. In a different voice (lower than usual) Alexa says something about "How about dessert?" We asked it to repeat itself and it said in the normal voice it says "I can't do that." There was nothing in our history on the app to reflect these occurrences...

Savagewolf666: Asked this guys alexa if she worked for the cia [...] She shut off

LastBitchOnEarth: I said, "Please call ----- for me, Alexa." And she did. She was listening before I said her name.

Boomer729: They are always listening, if they weren't they couldn't hear "Alexa". Everything it hears has to be processed to see if it heats [sic] the trigger word. They here [sic] everything. Domestic violence, sexual assaults, burglaries, ... everything.

Interview: Tobias Revell & Natalie Kane

Daragh Byrne and Dan Lockton caught up with Natalie and Tobias in September 2020.

How has the current situation affected your thinking about hauntedness? Has the process of effectively seeing each other through machines continuously and the world being collapsed into a sort of image that you just see on the screen—people where you're not really sure anymore where they are—given you any thoughts, as experts on hauntings and technology?

Tobias: A continuum I can see is with what we've looked at in telepresence and teleconferencing. Conceptualizing Skype, for example—which was the de facto one before 'all of this'—in a kind of three and a half thousand year lineage: you have an aspiration to project yourself a great distance, which goes back as far as ancient Greece in its earliest recorded form through scrying and crystal balls. The social desire for technology of this description has existed for thousands of years. It's just the tool has only just recently appeared. There is an interpretation that technology is magic, and this is one that's really easy to drawn on, because it is magic, right? This has been described by magical practices and occult practices much longer than it has been by Estonian tech startups. There's part of the Haunted Machines project that has always been saying, "there's nothing new under the sun." This is part of the lineage of technological aspiration that extends as deep as human culture, and certainly in these Western technologies.

Natalie: There's also the idea of how your body exists across different distribution space as well. And the idea of you, your body being where perhaps you didn't anticipate it to be. I'm thinking more in terms of the idea of data—when it's often difficult to solve where our body is. We have this conception about how when we die, our body will exist in places where we didn't anticipate it to be, in terms of ghosts. There's the idea of 'us' being more disputed because of all the spaces that we have to exist in, because we can't be in the places where we wanted to be, but it's more to do with how we have to use more services in order for us to connect further. So I think about places, the fact that I've used more things like virtual whiteboards in order for me to do more work, there are more parts of myself that

"There's a Miro ghost of myself that just cares about being really productive; there's a Facebook ghost of myself; a Google ghost of myself—all these kind of distributed bodies controlled by services."

are being distributed and being disconnected and spread out and put in other places. The self has been kind of fractured, and the idea of one self, one body again, doesn't really exist. The idea of ourselves being distributed and wandering the earth somewhere, and that being these distributed avatars and distributed bodies wandering the earth in 'versions' in some ways has been likened to ghosts.

There's a Miro ghost of myself that just cares about being really productive; there's a Facebook ghost of myself; a Google ghost of myself—all these kind of distributed bodies that are controlled by services that can be either shut off or maybe be appropriated for other reasons elsewhere.

I've always been really fascinated by those services where you load all of your social media and all of your emails with the idea that if you die, you can do these scheduled services to your friends in order for you to kind of continue to talk to them. But beyond the obvious, weird anxieties we have around dying and wanting to talk to people, the sheer amount of processing that would be needed for that to do that at the scale that's required—this is like Facebook essentially. And I'm intrigued to see how Facebook is going to manage that in terms of the intellectual property side of it, because of the idea of a father going back and saying, that's my child's post. One of the things that I've been doing a little bit around recently is the legal implications of digital preservation and IP, from a work perspective. If someone can say, "Oh, that's me," that's where it becomes vague. There's all these rights around personal IP, but that becomes difficult. It's like a child's memory, right? If someone says "that's from my child's fifth birthday party" so I want you to remove that. Then Facebook says, "Oh, actually, they gave that memory to us," that's where it becomes this weird sentimental problem, that's distributed across loads of different places that we can't see and we didn't anticipate. I wasn't aware when I was younger that this is going to be a problem, but now children being born into this now, are very, very aware of that distributed body problem, whereas for us, it was a purely philosophical exercise.

You both talked about this idea of the body existing across different spaces, and the dream of telepresence. Given how much haunted houses and spatial aspects are present in so many ghost stories, is there anything, about the spaces themselves that has come to the fore this year?

TR: I've had a lot of really interesting thoughts about the backgrounds that people have been choosing to use and how they've been projecting, where they are. A lot of people just have a crazy background, like the Palace of Versailles or a galaxy or whatever, which is fine. But the one I've started noticing is people who have a fake background of something deeply boring and normal, just like a generic boring room. I was in a Teams meeting a few weeks back and I thought, "Wait a second, that's a fake background that just looks like a normal room". It wasn't so much about the house itself being haunted as much as someone situating themselves entirely into a liminal space between their own space and some crazy fantasy space, but one that's completely nondescript. A lot of the darkest, weirdest, particularly Lovecraftian horror tends to take place in that kind of space—really normal places that are just slightly uncanny. And you can only tell it's not normal by the very slight black edge around it.

A lot of the work that Natalie and I have been doing more recently around CGI platforms and rendering has been about developing aesthetics that are coming out of powerful desktop computation when something's shifted enough that you notice it's different, but not significantly enough. Like how speculative design works, in a sense: it's not something that alienates you, but it's weird enough that you ask, why is it different? A lot of the Uncanny Valley canon of theory is based in that. When CGI characters are really obviously CGI, you don't get the Uncanny Valley feeling with Toy Story. It's almost like we're at the precipice of technologies like Zoom being good enough to simulate a sort of hyperreality, you know, the Keiichi Matsuda style [1] where we'd all be blown away by the spectacle, but we're not quite there yet. It's just on this uncanny verge of being not real, but not unreal.

NK: The mobile office, the bubble, the idea of you stepping into your own virtual space, is very weird. People are suddenly living this new reality where you're having to create these very specific spaces for yourself, which are aside from the daily working life, the idea of having to make time away from yourself, which excludes the other people in your household and brings other people in. The idea of labour and the office space, bringing it into our most intimate and domestic lives—I can totally understand why people would want to completely mask and shield their lives. Regardless of whether you have children, there are reasons to want to hide what's there.

You've talked a lot about seeing other people through this kind of new lens, and I'm wondering if you've got any thoughts on how we're encountering ourselves. There's a certain kind of 'hall of mirrors' on Zoom.

TR: I have an anecdote which predates COVID, which I used a lot in the Haunted Machines work, about my infant niece-in-law who is now about six or seven. At the time, she was five—she lives in Portugal. And every time her aunt, my wife,

would call, they'd use FaceTime on the phone, but the niece would put the phone 'here' [close up to face, right up against nose and forehead] because she wanted to be as close as possible to her aunt without realizing that her image is also going out the other way. She was not at an age yet where she had that kind of sense of self-consciousness of how she presents. It was more just like "I want to be as close to her as possible, so I'm going to put my face here," which was super interesting. Sherry Turkle [2] says we should look at the evolution of how children learn to interact with the technology, but it was interesting seeing someone who had very little literacy in how they appeared in this kind of a forum, and just wanting to get to their objective as quickly as possible. It doesn't quite answer your question, but when FaceTime and stuff first started appearing, there was not a social and cultural literacy of how we should use these things.

NK: What I'm finding interesting is how narcissistic we are—the amount of times that we look at ourselves during video calls, we will have to acknowledge now. We definitely look at ourselves more when we're speaking now, to the point where maybe hiding the self-view on Zoom might actually make you a better listener. There's a project by Lauren Lee McCarthy [3], an AI project where it says how often you're talking, how many times you touch your face, how many times you're squinting your eyes, and how many times you were laughing or smiling at the other person. And there was a recent webcam project, which shows how many times you're touching your face so that you wouldn't get COVID—you can plug it into your Zoom so you can be performatively more hygienic to the person you're talking to. I'm quite intrigued.

TR: The hall of mirrors is an interesting analogy because when you're going into one, you know that it's trickery, right? It's a bit fun and it's a bit of a gimmick, but it is trickery. But the point where technology starts to become magic or spooky in a kind of Einsteinian sort of definition is where the causal relationships between what you're doing and what's happening are unimaginable in the head of the user, right? That's why Apple say something works like magic because the alternative is to explain a bunch of wireless protocols to the consumer base, which they don't want to do. And we have a sort of cultural understanding of what magic is and what it allows people to do: to have power and do things that break the laws of physics in some ways, such as protecting themselves at a great distance.

Early on in the whole move to work from home, the internet was replete with stories of people not grasping the causal ramifications of this thing, such as, going to the toilet with the camera on and things like that, which are laughable, but indicate a gap between what a technology does and how people think it works. The move to suddenly be in everybody else's house hit home because people have a certain set of technical expectations and cultural behaviours in their own home, that they hadn't translated, now being exposed—such as going to the toilet during a call or whatever it was.

Jeffrey Sconce [4] talks about the television going into the home, which is an interesting parallel because there's anecdotal evidence around people feeling like there was another presence in their homes, and changing the way they behaved in the room. We know a huge amount of design and architectural research about the way the television became the focus of the home away from the kitchen or

other places. But also there's all these stories about people hearing voices—people getting angry at their television, about feeling they're being invaded by it. And there are definite parallels between the two, like between the new affordances, bringing this thing into our lives all the time.

NK: We've spent a lot of time in the last five to ten years worrying about surveillance technologies, and the idea of bringing cameras into our homes. And then suddenly you're bringing basically a workplace full of people into your home in some ways, and having to deal with that dynamic and consent. I always worry that I've left my Teams on, or I've not closed my laptop properly. And the idea of essentially bringing another room into your house, this other kind of almost psychic space which is your workplace into your home—I know I've rearranged my living room now, so that I can't see where I work, from where I relax, in order for me to not have to deal with that.

TR: I'm remembering the way that Sconce writes about how the television became a deeply unsettling object for a whole class of Americans in particular whose lives were changed by it—to the point where they thought they were haunted by this thing. A lot of the backlash against the TV was on these grounds, the idea that it was a sort of demonic influence in the home, that all these messages being beamed in from the outside world would corrupt the wholesomeness of family life in the home and corrupt the domesticity of the home. The television as a kind of source of evil. A lot of the stuff now on the far right in the US is very similar, you know: it is saying that the institutions and companies that exist to support your work and practices are literally working for the devil, not just like metaphysically, but like literally are the manifestation of demonic presences on earth, right? So things like Facebook, Twitter, social networks, and centrist and left leaning television channels, all of these things that are beaming influence at a greater and greater intensity and fidelity into people's lives are now being positioned by the extreme Christian right as actual demons. It's the same narrative that's been going since television and radio of the earliest kind, even with the invention of the telegraph and the 'tappers' who believed that they could communicate with the dead through the telegraph. You can't look at these things in isolation. This is part of a 3000 year continuum of our relationship with technology.

When we gave the prompt around 'spooky technology' to the students, we talked a lot about whether 'spooky' is the right framing. And I think we chose that partly because it's slightly comical term—something spooky is different to something that's horrifying. But we really had a huge range of what people thought was spooky with different technologies, and I wonder for you with, with haunting, when you're talking about Haunted Machines, what were the breadth of reactions you got from people?

TR: Anything that adds a new surveilling or appears to be surveilling and then actuating a response based on that, whether it's targeted advertising or Google Home and Amazon Alexa, Amazon Echo. That's the top of the list right there, but there's a couple of things I'd maybe put down as classifiers. Apparent agency is one: it does something apparently autonomously without being asked to, such as Amazon Echo, Google Home, targeted advertising, random notifications

"You can't look at these things in isolation. This is part of a 3000 year continuum of our relationship with technology."

from things. At the core of it is that causal connection—if someone can see how something they've done has led to an action, then it's easy to see that as a technology they understand. When they can't see that connection, they just ask a lot of 'whys' about what's happened in the middle. Another thing is retro tech that still works—when people see that Windows 95 is still running most of the banks in the world, things like that, where it's like legacy stuff that is almost zombified at this stage.

The other side of this, which is what a lot of the Haunted Machines work was originally about, is the way that 'magic' is used as a form of control by critical action practitioners. The Haunted Machines project was noticing a lot of artists, designers, and technologists satirizing or drawing on magical metaphors as a way to gauge different discourse about apparently intractable technology. People like James Bridle and their work—these things became metaphysical frameworks to reclaim technology. Magic historically has been maligned because it's an outsider practice. It was practised by women, largely outside of major cities. It didn't fall under the rubric of either Christianity or Western science. You see that now with things like teenage girls using Instagram to put hexes on Donald Trump. To them that's a form of power because they can't vote. What they've got as a form of power and control is a global platform and a language of magic that is their own. So there's two sides of it—there's the side of it cynically adopted by major tech companies, Apple, everything works like magic. And the other side of it, which says, this is thousands of years of a knowledge structure that falls outside the hegemony, that can still be used by outsider practices to challenge.

What about people's understanding of the hidden abilities of objects? If you didn't know Amazon could control your home, you might have no fear of that—using an Echo primarily as a voice-activated radio, maybe, never doing anything else with it, you might not see it as having a spooky element.

TR: That's the obfuscation thing—it's where the beginning of the narrative starts, with the PC. It's really interesting to talk about how lots of the very first domestic technologies, toasters, fridges, had very discrete uses and the use cases are apparent in their form. A toaster toasts, and it's not very good at doing much else, and a fridge refrigerates. It looks like the thing it does, and you can open it and feel that it's cold. Then in the 1980s, this thing called a PC comes along, and it's a plastic box

that does loads of stuff, but that stuff is kind of not exactly prescribed. You might use it for a bunch of different things. And if you plug it into your phone line, you can now connect it to others. That's when you start with the narratives coming out that Silicon Valley technology is magic.

If you're unaware of what it could do, you might just see your PC as basically a typewriter with the fanciest screen. That's the magic there—you might not know it has a haunted side infested with malware and every keystroke is being ripped off. Then you just transplanted that same set of logics and affordances into the Amazon Echo where it's like, Oh great. I can play my music. But what you probably don't know is it's feeding back the music you're playing to advertisers who are then feeding into advertising ecology.

NK: The idea of there being someone behind the wall that we can't connect with, is very strange to us still—the idea that there are other people that connect to an object that we think we have some sort of attachment to, or ownership of. It's still a relatively uncanny connection for us to have—even having 'leasehold' over an object is still strange to us. When you buy an object, you think it's yours. Even though you might buy into a service, it gets back to that 'distributed body' problem. Fine, we have mortgages and that kind of stuff, but you know, realizing that your Alexa is essentially dobbing on you, telling someone in San Francisco or wherever AWS data centres are—Ireland?—it still feels very weird, and it doesn't really cognitively match up with you until basically the saturation of telling on you, which is a peak at which it becomes strange.

What are you working on next?

TR: We feel that we've rounded Haunted Machines off. We had a series of questions: why is this narrative of myth, magic, and monsters in so much mainstream technology? Everything comes up with mailer daemons, Apple's 'works like magic'—why do people talk about their interactions that way? And then how are critical practitioners in the arts and design and technology using these concepts to respond to issues? And we kind of answered those questions. We did a bunch of events and festivals. In the last year or two, we moved on to this question of what it means to have computational aesthetics in everyday life, which is a branch of the Haunted Machines work. What does it mean that so much of our media is at least moderated autonomously, everything from CGI to AI, to machine learning images, to fake news and everything else, is all part of this creep of a media infrastructure, which puts computation as a major step in the process of getting information from one person to another?

NK: We did a course with students a year ago around automating generating images which was really fun. We've done quite a few things; we've got a panel coming up soon.

TR: It was the thing that came out of the Haunted Machines project where we still had a lot of unanswered questions, because when we were doing the festival was when people were getting hysterical about DeepDream and that whole landscape of machine learning, going into people's phones and becoming an application that people are interacting with all the time—everything from targeted advertising

to generated fake news images was like just kicking off and it's like, wow, that's a whole other world we're moving into.

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Tobias Revell is a digital artist and designer from London. He is Programme Director at the London College of Communication, UAL, co-founder of design research consultancy Strange Telemetry, critical technology outfit Supra Systems Studios and approximately 47.6% of research and curatorial project Haunted Machines.

Haunted Machines: https://hauntedmachines.com is a research and curatorial project from Natalie Kane and Tobias Revell initially exploring stories of myth, magic and monsters in technology, and more recently the automated production and dissemination of images.

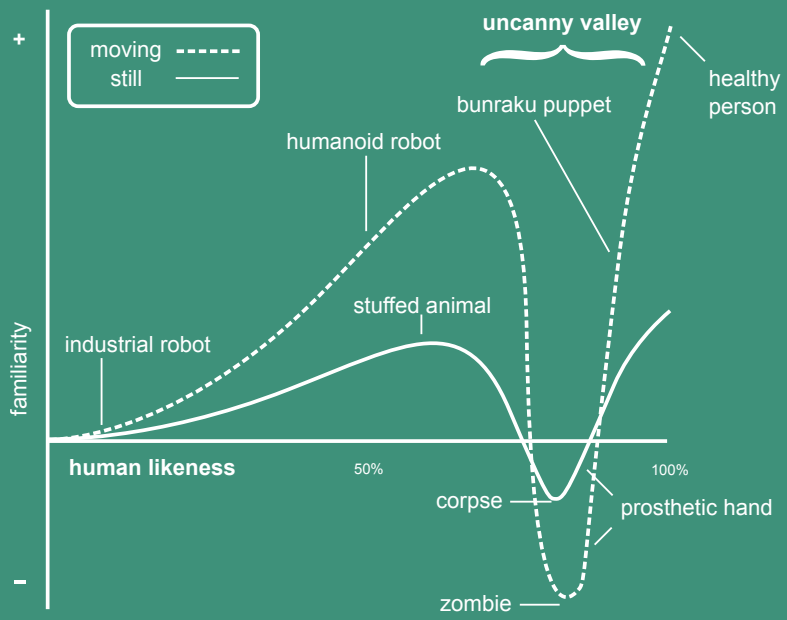
[1] Keiichi Matsuda (2016) "Hyper-Reality": http://km.cx/projects/hyper-reality

[2] Sherry Turkle (2011) "Alone Together: Why We Expect More from Technology and Less from Each Other". MIT Press.

[3] Lauren Lee McCarthy: https://lauren-mccarthy.com/

[4] Jeffrey Sconce (2000) "Haunted Media: Electronic Presence from Telegraphy to Television". Duke University Press.

UNCANNY VALLEY



You might have heard the concept "Uncanny Valley" more frequently recently.It's the theory that things—humanoid robots, puppets, corpses, etc—that resemble human beings, but imperfectly, can provoke eerie feelings, even seeming revolting or repellent in their uncanniness. The 'valley' idea comes from the 'dip' where familiarity breaks down, where people may feel extreme spookiness as an object starts to resemble human likeness.

The 'uncanny' effect may date back to ancient times where in Homer's *Odyssey*, the hero was scared by the vivid pictures of 'ferocious wild predators and murderers with glaring eyes'. With today's eyes, it might not make sense to us to think that these kinds of depictions are unprecedented, when we can easily take a vivid photo with our phone. Our current perception of novelty and the development of technology urges us to walk along the curve of Uncanny Valley, into different dimensions, far beyond the optic perception.

Critics raised their voices when the anthropomorphic robot Sophia was granted citizenship in Saudi Arabia. Along with Sophia are other humanoid robots such as Ai-da, Erica, and others: although names are given to those robots, we know that they are not fully humans... yet. But the urge to create such anthropomorphic robots with science and technology is strong, and fears rise about how one day we may not be able to distinguish humans and robots any more both visually—and politically?

On another level, the Uncanny Valley effect reaches down to Deepfake and bio-coding. With machine learning, our face, voice, and actions can be easily fabricated and replaced digitally. With bio-coding, a face simulation can be created from a tiny trace of DNA, as speculated in the artwork 'Stranger Visions'. The Uncanny Valley happens not only because we are frightened by their lifelikeness, but perhaps also by the moral crisis and uncertainty generated around them. It is continuously creating confusion around humans' perception of ourselves and our trust in technological development and safety.

An 'uncanny' effect could also exist beyond anthropomorphism. With the example of 'SpotMini' by Boston Dynamics, uncanniness might come from the mismatch of its appearance from a real dog, and our expectation of the role of a real dog. The project 'AIMoji' also covered here offers us an opportunity to rethink the representation of human emotions in digital forms.

The examples selected in this section prove that we humans are ambivalent assemblages. We do not want to be replaced by others, but we create things that might replace us. We are afraid of the Uncanny Valley, but we are digging it again all by ourselves.

/by Lisa Yeung


No. 118435
George S. Black.
Creeping Doll.
Patented Aug 29th
1871.

Trapped Inside A Doll

A Reddit comment (2016)

u/sleepyhollow_101: I first learned about this effect (Uncanny Valley) because my sister likes dolls.

She's a few years older than me but her obsession didn't diminish with age. I had the great misfortune of sharing a room with her. She collected various kinds of dolls, mostly porcelain and ball-jointed dolls. Have you ever seen a ball-jointed doll? If not, count yourself lucky. Some of them are absurd, with disproportionate eyes and faces. They're not so bad. Some look like miniature human beings trapped in a cocoon of glass. Uncanny Valley, indeed.

I used to have nightmares about those dolls when I was very young. I'd dream that they were crawling towards my bed, only I couldn't get away. I was paralyzed, watching them struggle towards me with their stiff joints, their glass eyes unblinking and unseeing. They'd tear open my skin with their little hands and crawl inside as I screamed and screamed...

I begged my mom to let me have my own room, or even to share a room with my brother. She told me, "There's nothing to be afraid of, they're just dolls and they can't hurt you." I think she wanted me to overcome my fear, but her plan failed. Instead, my fear of the dolls grew into a full-blown phobia that started to spread to other parts of my life. I noticed that other humanoid... things... started to bother me, as well. Mannequins. Clown figurines. Statues. For a long time, I lived in fear.

My parents couldn't take it anymore, and that's when they brought me to a psychiatrist, who introduced me to the Uncanny Valley effect. Understanding my fear would help me overcome it, she said. I guess she was right. It took a long time, but I finally got over my phobia. Oh, I still don't like dolls, even all these years later, but I won't (usually) get nightmares after looking at one. I can handle mannequins, although they make me uneasy. Overall, I guess I've got a good handle on things.

Anthropomorphic Robots

Hiroshi Ishiguro, Kohei Ogawa, Engineered Arts, Hanson Robotics, 2016–20

We are used to movies played by human actors, but what if the director does not want to have real people any more, to save some money and perhaps time? When confronting fears around robots replacing human workforces, one conciliating opinion is that they are not yet capable of doing creative work. But what if they can? Here comes Erica.

Erica is a humanoid robot that will lead 'b', a $70 million sci-fi picture from Life Productions, as reported on June 26, 2020 [1]. Erica is created by Japanese scientists Hiroshi Ishiguro and Kohei Ogawa. According to the film's visual effects supervisor and producer Sam Khoze, "Erica has no life experiences. She was created from scratch to play the role. We had to simulate her motions and emotions through one-on-one sessions, such as controlling the speed of her movements, talking through her feelings and coaching character development and body language." Is it worth it? Will Erica be successful in substituting human actors? We have no idea so far, but this news highlights the trend towards developing anthropomorphism robots.

Another 'artist,' Ai-Da, "the world's first ultra-realistic AI humanoid robot artist" had her first solo exhibition of drawings, paintings and sculptures in 2019. Her artworks were sold for more than $1 million, demonstrating her value as an artist, or at least as the production of cutting-edge technology [2].

Sophia is one of the most popular AI robots of today, produced by Hanson Robotics and debuted in 2016 [3]. She was designed to replicate human expressions by processing the visual data gathered from human behaviors. Goosebumps spring over people's arms perhaps because of her realistic mannerisms and expressions, or


y Conference MSC

perhaps the fact that she behaves like a human but is not a human.

In the video series by Hanson Robotics, Sophia Awakens [4], the way Sophia talks with the interviewer shows us the effort the developer has put in her ability to imitate humans, but there is a still noticeable gap between Sophia and a real human.

Technologists have developed AIs and other advancements to make robots more like humans, but is an anthropomorphic robot what humanity really wants? When we search for Uncanny Valley on Google, millions of photos appear under this keyword, but there is almost only one topic-Human-*Like* Robots. Our fear of robots like Sophia goes together with the development of AI technology, but creating such technologies is perhaps an unstoppable trend. Though we view Sophia as a robot, she is already raising social controversies that challenge the perceptions, such as receiving Saudi Arabian citizenship. We fear what we have created, and we are not stopping.

An online comment from 'ValmisFIlm' says 'It should look like a robot!', 'I think that we need no human'. It makes sense to some extent, which is one of the reasons why Hanson Robotics gave Sophia an exposed head. The tangled wires inside remind us Sophia is only a robot, not a human.

There are also comments for Sophia and Erica saying that they don't feel creepy at all and are looking forward to their performances. That's largely because we can tell Sophia or Erica from real humans. Once the robot is 99% like a human being, there's no guarantee that humans will not be substituted by Sophias. The TV series 'Humans' [5] explores the fight between conscious 'synthetic' humans and human beings, and reminds us of the potential threats posed by the future 'humans'. I guess nobody will think it's not creepy when they discover someone next to them is a robot.

We have had debates over this topic for a long time. Whether Sophia has the true capability to behave like a human, or it is a scam? Whether the invention of such robots is enlightening our future development, or threatening it? Nobody knows the destination of our technology development, and nobody knows when a robot that looks and behaves like a human much more than Sophia does will appear. But one thing is certain: we have the ambition to create powerful, smart and strong humanoid robots. Our feeling towards anthropomorphism is entangled with fear and curiosity, and we are on the way to the bottom of the uncanny valley. These examples of advanced robots help us figure out the curve of uncanny valley, and explore the path to live with them in harmony on top of millions of failures.

/by Lisa Yeung

[1] Rachel England (2020) "AI robot 'Erica' will star in $70 million sci-fi movie 'b'". Engadget, June 26, 2020" https://www.engadget.com/ai-robot-erica-will-star-in-70-million-scifi-movie-b-130539023.html

[2] Naomi Rea (2019) "A Gallery Has Sold More Than $1 Million in Art Made by an Android, But Collectors Are Buying Into a Sexist Fantasy". Artnet, June 6, 2019: https://news.artnet.com/opinion/artificial-intelligence-robot-artist-ai-da-1566580

[3] Pia (2020) "Who Is Sophia the Robot: Everything You Need to Know About Her". Robots.net, 8 July 2020: https://robots.net/ai/who-is-sophia-the-robot-everything-you-need-to-know-about-her/

[4] Hanson Robotics (2016) "Sophia Awakens": https://www.youtube.com/watch?v=LguXfHKsa0c

[5] 'Humans (2015-18)": https://www.imdb.com/title/tt4122068/

Historical Analog: Scarecrows

A scarecrow is a decoy or mannequin, often in the shape of a human. Humanoid scarecrows are usually dressed in old clothes and placed in open fields to discourage birds from disturbing and feeding on recently cast seed and growing crops. Scarecrows are used across the world by farmers, and are a notable symbol of farms and the countryside in popular culture.

In Kojiki, the oldest surviving historical chronicle in Japan (compiled in the year 712), a scarecrow known as Kuebiko appears as a deity who cannot walk, yet knows everything about the world. Worzel Gummidge is a scarecrow that can come to life on Scatterbrook Farm in British children's television. The concept of scarecrow is widespread all over the world, with different names and functions. The humanoid appearance of scarecrows encourages people to give 'consciousness' to it to let it resemble a real human. The process is similar to how we pursue anthropomorphic robots today. Scientists are creating a human body for the robots, including the figure, texture of human skin and dressing (putting clothes on scarecrows), and then give them a 'real' brain with Artificial Intelligence (assuming scarecrows have their own thoughts).

/by Lisa Yeung

The Man Who Made a Copy of Himself

Hiroshi Ishiguro, 2010

If you search for the keyword of 'the world's leading humanoid roboticist', Hiroshi Ishiguro's name will appear immediately. As the creator of Erica, as mentioned in 'Anthropomorphic Robots', Ishiguro has famous humanoid inventions far more than her. In the next section *Posthuman*, his work on Mindar will be discussed in detail.

Ishiguro is a roboticist at Osaka University. The top project of his lab is Geminoid, a humanoid robot of himself. This creation was ranked No.9 of the world's creepiest robots [1] on the magazine and website of the Institute of Electrical and Electronics Engineers (IEEE).

It seems that his talent is far beyond No.9. The No.1 creepiest robot, Telenoid, also comes from him. It is able to mimic human's voice, face, and head motion. Ishiguro has also made a robot of his daughter, Repliee R1. Other inventions including Repliee Q2, Otonaroid, Kodomoroid and other works feature different types of humans with motors, prosthetic eyeballs and silicone skin. "He is convinced that human-looking robots are a natural interface for humans to interact with and that the "Uncanny Valley" idea may be too simplistic to explain people's reactions to robots."[2] This great inventor believes that "Humankind is always trying to replace human abilities with machines. That's our history. I'm doing the same thing. Nothing special."

/by Yiwei Huang

[1] Synced Review (2019). "IEEE Ranks Robot Creepiness: Sophia Is Not Even Close to the Top": https://medium.com/syncedreview/ieee-ranks-robot-creepiness-sophia-is-not-even-close-to-the-top-4d17eefc0762

[2] Erico Guizzo (2010) "Hiroshi Ishiguro: The Man Who Made a Copy of Himself". IEEE Spectrum: https://spectrum.ieee.org/robotics/humanoids/hiroshi-ishiguro-the-man-who-made-a-copy-of-himself

A dog is usually expected to be a pet to comfort humans, but SpotMini has no intention to please.

SpotMini: Robot Dog

Boston Dynamics, 2017

SpotMini is a nimble doglike robot which is able to climb up and down stairs, dance to music, haul trucks, and even open the door easily. It was released by Boston Dynamics in 2017 and made available for purchase in 2019 [1].

Its features include 360° vision and obstacle avoidance, and it can also carry heavier payloads than aerial drones do. Applications of SpotMini include but are not limited to use by police, in construction work, inspection of plant facilities and electric utility, mining, entertainment, and research.

There's no doubt that the advanced technology like deep-learning vision system applied by SpotMini is at the forefront of commercial technology development, but there are plenty of voices describing robots from Boston Dynamics (including Spot, SpotMini, and Atlas) as 'creepy', 'terrifying' and 'scary'. SpotMini is an upgraded version of Spot, which is smaller in size and easier to be applied in an indoor environment, but the physical appearance as a headless dog remains the same. It can perform operations just like a real dog does, so it's perhaps not


BostonDynamics

unexpected to feel terrified when you see a robot doing everything like a creature but without a head. Everything including the legs, body, and walking style, looks the same as a real dog, extending the range of 'Uncanny Valley' beyond humanoid robots to any powerful robots similar to a creature.

Boston Dynamics aims to create robots that can perform tasks and increase productivity, but at the same time, the videos shown to the public to demonstrate its capability are quite scary. In a video from Boston Dynamics [2], the SpotMini stops running, stares at the camera and runs away, just like a creature communicating with the audience through eye contact. Another video shows SpotMini calling its robot friend to open the door together. The second SpotMini then extends its fifth arm on its back and opens the door.

A dog is usually expected to be a pet to comfort humans, but SpotMini has no intention to please you. Besides the gap of appearance between our expectations and SpotMini, it also deviates from a real dog by its function. What SpotMini does is to demonstrate its capability of being smart, powerful and strong without any emotional connection with human beings.

It's easy to appreciate the mobility and physical prowess of SpotMini, but it becomes spooky when it's too powerful. When a robot, created by a human, behaves exactly like or similar to what a human can do, it asks us whether we too are ready to be substituted by a robot. Technology is developed to serve humans but has not prepared us for one day if robots have their own consciousness and threaten our lives.

Though the 'spookiness' of SpotMini largely comes from its lack of head and similarity of movement to a real dog, SpotMini, together with other powerful robots, encourages us to rethink the direction of technology development. We devote all our power to areas including artificial intelligence, deep learning, robotics and mechanical design to create new technology, but with this also comes more mystery and uncertainty.

/by Lisa Yeung

[1] Boston Dynamics (2017) Spot: https://www.bostondynamics.com/spot

[2] Boston Dynamics (2018) "Hey Buddy, Can You Give Me a Hand?": https://www.youtube.com/watch?v=fUyU3lKzoio

Uncanny Valley Beyond Humans

As discussed in relation to SpotMini, the 'Uncanny Valley effect' is not limited to humans' experiences of 'uncanny' humanoid objects. Animals can experience a similar effect: according to researchers at Princeton University [1, 2], monkeys become frightened and avert their glances when looking at close-to-real images. In contrast, they will happily stare at less close-to-real and real images.

The reason why the Uncanny Valley effect exists too remains uncertain. One explanation is a 'disgust response' mechanism to avoid disease. Another is that the corpse-like appearance makes people (or perhaps animals) think of death. We are still not sure how it appears because monkeys are primates like us, and we are still unable to test for it in other species like dogs and birds.

A post [3] on Reddit shows there is Uncanny Valley for locations as well. It refers to 'places that look close to being real but are disturbingly off.' This house is not real but there is a sense of uncanniness. Artists like Edward Hopper also paint places and arouse some special emotions from the observers.

/by Lisa Yeung

[1] Steckenfinger, S. A., & Ghazanfar, A. A. (2009) "Monkey visual behavior falls into the uncanny valley". Proceedings of the National Academy of Sciences, 106(43), 18362-18366. See also https://www.princeton.edu/news/2009/10/13/humans-monkeys-fall-uncanny-valley

[2] Matt Petronizio (2014) "Animals Can Experience the Uncanny Valley". Mashable, Oct 24, 2014: https://mashable.com/2014/10/24/uncanny-valley-animals/

[3] u/Kos-smore (2020) "Uncanny Valley for Locations? Does anyone have any photos of places that look close to being real but are disturbingly off". Reddit, April 8, 2020: https://www.reddit.com/r/uncannyvalley/comments/fx24om/uncanny_valley_for_locations_does_anyone_have_any/

You Won't Believe What Obama Says In This Video! 😉

7,753,355 views • Apr 17, 2018

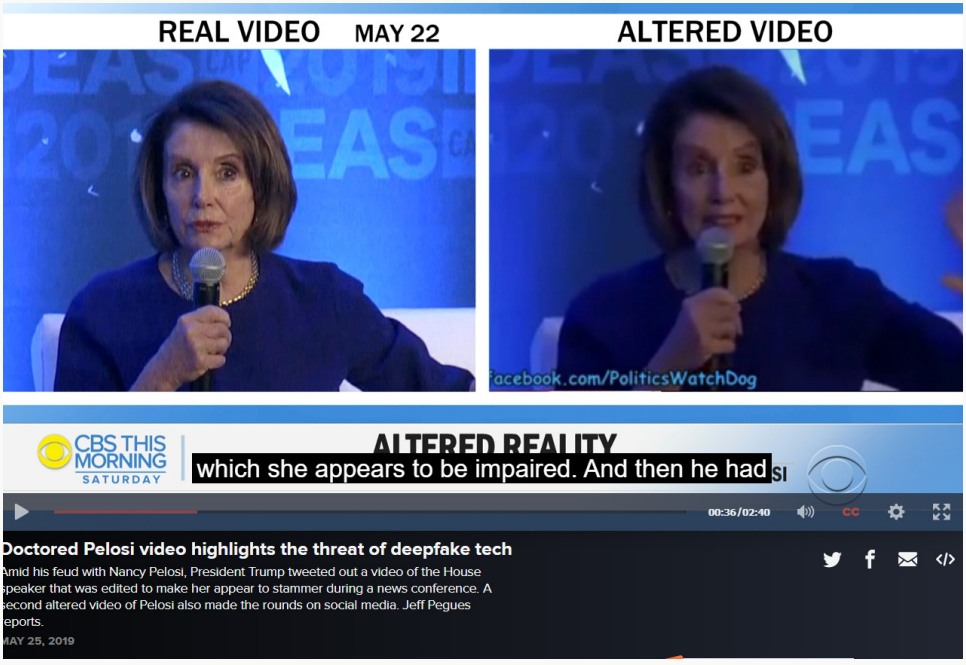
89K 15K SHARE SAVE

‘Deepfakes’ Are Getting More Advanced

Living in the information age has given us instantaneous access to any and all conceivable sources of media. This unprecedented level of connectivity and consumption undoubtedly leads to biased or altogether incorrect information being passed along, inspiring cliches like, “Don’t trust everything you read on the internet.” Thanks to a new technology called Deepfakes, we need to not only analyze what we read, but what we watch as well.

In 2018 a video was posted to YouTube [1] showing Barack Obama using the word “dipshit” in an address when referring to Donald Trump.

If you doubt the validity of that video, you’d be correct. It wasn’t President Obama making this address, but instead, it was Academy Award winning director Jordan Peele using a Deepfake to use Obama’s likeness and make him say things he wouldn’t otherwise say. The video was satirical and served as a warning of this technology’s power. Peele reminds us to rely on trusted news sources before random internet videos like the one he created, as they could easily be a Deepfake.


REAL VIDEO
MAY 22
ALTERED VIDEO
facebook.com/PoliticsWatchDog
CBS THIS MORNING
SATURDAY
ALTERED REALITY
which she appears to be impaired. And then he had
00:36/02:40
Doctored Pelosi video highlights the threat of deepfake tech
Amid his feud with Nancy Pelosi, President Trump tweeted out a video of the House
Speaker that was edited to make her appear to stammer during a news conference. A
second altered video of Pelosi also made the rounds on social media. Jeff Pegues
reports.
MAY 25, 2019

The Deepfake was invented by Ian Goodfellow, a former Ph.D. student at Stanford University, in 2014. Goodfellow's work gives us the capability to "create a completely believable, nearly perfect representation of someone saying or doing something they didn't actually say or do" [2]. Deepfaking methods do not require expensive hardware or a deep understanding of the tech to be implemented. The technology is developing rapidly too, meaning fewer photos of the target are necessary to complete a believable facial mapping.

As it becomes easier to create Deepfakes it becomes more difficult to spot them. Programmers have been addressing weaknesses as they appear. For example, researchers pointed out that Deepfake faces don't typically blink in 2018, and this was fixed immediately. Large companies like Microsoft, Facebook and Amazon have noted the ethical implications of not being able to tell the real from the fake, as seen through their funding of the Deepfake Detection Challenge [3], in which competitors tried to make the best Deepfake detection software.

While innovative and indicative of the fast pace development of artificial intelligence, Deepfakes manifest a fair amount of ethical and moral dilemmas. For instance, Deepfakes have already found their way into politics, with a video of Nancy Pelosi [4] having been doctored to suggest she was intoxicated. By the time it was made apparent that the video was heavily edited (slowed down to 75% speed), it had already been run through Donald Trump's Twitter account and mainstream media, obviously shaping public opinion.

Given a divisive political climate and a tendency to seek to confirm our own biases, a strategically released Deepfake could completely destroy reputations at opportune times when put into the right outlets.

How can we monitor how our likeness is used? With some Facebook pictures and a decent computer processor, it is now possible for others to create videos of us saying things we wouldn't say or doing things we wouldn't do. This raises questions about regulating artificial intelligence. Should a technology like Deepfake be heavily regulated to prevent the spread of false information and to, importantly, protect our likeness and reputation? Regardless, with or without proper legislation, we have to be sure to question the information that circulates the internet, in a difficult game of separating the real from the fake.

Think deepfakes are hacking reality? See also the section on Glitches, Hacking, and Hoaxes.

/by Matthew Cruz

[1] Buzzfeed (2018) "You Won't Believe What Obama Says In This Video!": https://www.youtube.com/watch?v=cQ54GDm1eL0

[2] Kristin Mae (2020) "Deepfakes' Are Getting More Advanced, And Yes, We Need To Worry". June 16, 2020: https://www.scarymommy.com/deepfakes-are-getting-more-advanced-and-yes-we-need-to-worry/

[3] Facebook AI (2020) "Deepfake Detection Challenge Dataset". June 25, 2020: https://deepfakedetectionchallenge.ai/

[4] CBS News (2019) "Doctored Pelosi video highlights the threat of deepfake tech". May 25, 2019: https://www.cbsnews.com/video/doctored-pelosi-video-highlights-the-threat-of-deepfake-tech/

Historical Analog: Masks

Masks have different functions in different cultures. In some African traditions, there are two versions of the origin of the first mask [1]. One is for the admonitory purpose, and the other is to escape recognition while punishing marauders. Deepfake is in some ways similar to this second purpose. The origins of masks within other cultures include ritual, religious, entertaining, artistic, festive, and practical uses, but most purposes are closely related to the function of disguise [2]. An early appearance of the disguise mask was used for agriculture to stalk prey and to house the slain animals' spirit.

Later when used for festivals and entertainment, masks create a momentary character, and help maintain the anonymity of the pranksters and revelers. Today, disguise masks are commonly used by robbers, witnesses, protestors and groups which would stay anonymous. If you would like to be someone else, realistic silicone face masks can be easily purchased online. This is a common plot in spy films.

Deepfakes are just like putting a mask on the original figure. No matter whether Deepfake is designed for the purpose of pretending to be another person, or hiding the real identity, it resembles a highly modern application of masks.

/by Lisa Yeung

[1] https://www.britannica.com/art/mask-face-covering/The-functions-and-forms-of-masks

[2] https://en.wikipedia.org/wiki/Mask#Disguise

Stranger Visions

Heather Dewey-Hagborg, 2013

Will the reconstructed human still be the same human as its origin?

In 2012, artist Heather Dewey-Hagborg started a provocative installation and performance project in New York City that brought up people's attention on biological data security [1]. Dewey-Hagborg collected litter such as hairs, chewed up gum, and cigarette butts from various public spaces in New York City, and extracted DNA from them in her lab to generate a 3D-printed facial simulation of what those individuals might look like.

Forensic DNA phenotyping is a commonly used technique in crime scenes to reproduce the possible portraits of the suspects. While it is not highly accurate, such biological surveillance technology can provide some key information about individuals' features and accelerate the identification process. It is worth pointing out the weaponization of this technology by law enforcement agencies who egregiously rely on inaccurate imaging as a tool for criminalization [2]. When such a technique is applied in daily life scenarios, it becomes extremely unsettling how it can drastically escalate the game of mass surveillance. We are fully aware of the danger of facial recognition, but the danger of all the biological traces that we leave

unconsciously everyday and everywhere is significantly overlooked. Currently, the technology remains accessible to only a few people, but it is not impossible to imagine a future where the public can access it as a paid service. Unfortunately we are already beginning to see this future. DNA examination companies like 23andMe came into the mainstream just a few years ago. Their services can reveal participants' ethnicity composition just through their spit. A company with the biological data of thousands of people can easily deploy it as a surveillance tool to over-analyze the users.

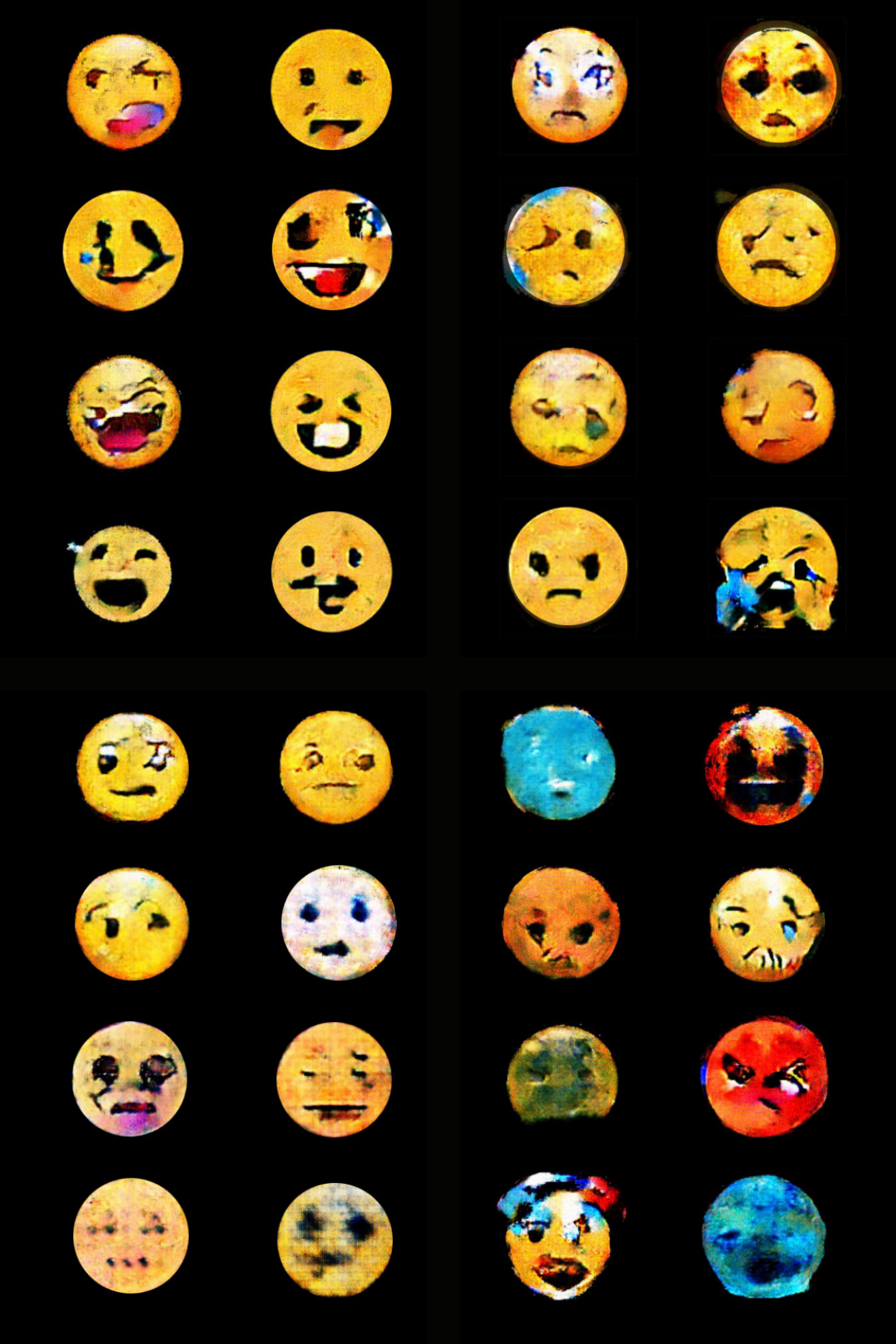
Small traces of a human can reconstruct the face. Although the face is one of the most basic features of a human being, this reminds us to think about the possibility of storing the bio information and reconstructing that human in the future. On top of the rapid development of humanoid robots and biotechnology, DNA can be considered as a crucial factor to be integrated into the robots. At that time, will the reconstructed human still be the same human as its origin? It is hard to define now, but we are searching for the answer along with the technology development.

If we can imagine phenotyping used together with anthropomorphic robots, the Uncanny Valley is elevated from merely the visual appearance to the interior and historical trace of a human. DNA is the secret and identity of us, and it is also the seed for future 'humans'.

/by Meijie Hu

[1] Heather Dewey-Hagborg (2013) Stranger Visions: https://deweyhagborg.com/projects/stranger-visions

[2] Ruha Benjamin (2019). "Race After Technology: Abolitionist Tools For The New Jim Code". Polity Press – particularly Chapter 3, 'Coded Exposure'.



AImoji

Process Studio, 2019

The resulting AImojis range from unreadable to distortedly recognizable to hauntingly horrific.

The recent proliferation of text-only communication technology (emails, text messaging, chat messengers) have turned emoticons or "emojis" into important symbols for clarifying and communicating emotion from a distance. Emojis, as a collection, are used to express a broad range of recognizable human emotions, and are made by humans, for humans, with an understanding of humans—so what happens when AI attempts to make its own?

This is what Process Studio explored in their project AImoji, created for the 2019 Vienna Biennale exhibit Uncanny Values [1]. For this project, a Generative Adversarial Network (GAN) was trained to create new emojis from a set of all emojis in existence.

The resulting AImojis range from unreadable to distortedly recognizable to hauntingly horrific. It is spooky to watch video [2] of the GAN learning process evolving over time of its own accord, and spookier still to know that this faceless machine is attempting to emulate (at least a proxy for) human emotion.

Without understanding the GAN learning process from a technical perspective, one can imagine how the initial dataset influenced the disturbing results: it is possible to spot the mix of colors (blue, red, yellow), variations in borders and shapes, and inconsistent add-ons (like teardrops and tongues) across the original set of emojis becoming enmeshed in the AIMojis.

It's hard to overlook the portion of images that feature facial tropes typically relegated to horror films: pupil-less whites or distorted black voids in place of eyes, smudgy clown-makeup colors, melting features that seem to have emerged from fire or murky depths, and so on. In this way the collection prompts consideration of the faces and features we find creepy and why.

One explanation for the chills these AImojis send up the spine may be their approximation of something familiar in a way that feels sinister, deceitful, or impossible. In other cases, it's spooky how well AImojis capture very real human emotions we may not have thought to image before. Given an emotionless machine was used to create these AImojis, we might ask: would it be more or less spooky for a machine to accurately reflect our own recognizable emotions back to us?

When the emotions can be generated by non-human objects, the uncanniness is elevated from visual appearance to consciousness and feelings. At the time when AI becomes a mature technology, we should redefine the Uncanny Valley from the skin to the heart.

/by Catherine Yochum

[1] Process Studio (2019) "AImoji: AI-generated Emoji": https://process.studio/works/aimoji-ai-generated-emoji/

[2] Process Studio (2019) "AImoji: AI-generated Emoji: Training Process": https://vimeo.com/334420304

POSTHUMAN

How do we think of ourselves evolving with technology?

You might be familiar with the thought experiment, the 'Ship of Theseus', which explores the question of whether an object that has had all of its components replaced remains fundamentally the same object? In other words, if we replace every plank of the Ship of Theseus gradually in the process, is the repaired ship still the same ship that first went out into the storm? Now, we could imagine if this Ship of Theseus is our human body, our bodily existence, and our beliefs...

Let's start with an inspiring story: Musician Jason Barnes is one of the stars of Guinness World Records 2020, with him holding the record of striking 2,400 drumbeats in one minute using a drumstick prosthetic. After losing his arm in an accident, Jason's passion for music and drumming revived with the prosthetic, and is living his new life of achieving the ability in drumming he has dreamed of. The original intention of prosthetics is to restore the normal functions of the missing body part, but clearly, current technology can grant people more. In the project *North Star*, Tim Cannon and the larger "Grinder" community endeavors to make bio-hacking technology safe and accessible. With DIY and open source modifications, such practice is seen as a pursuit of morphological freedom and is also question by critics with concerns on medical safeguards.

In the project *I Met You*, a heartbroken Mom gets consolation by reuniting with her deceased daughter in virtual reality. In *Roman Bot*, Eugenia Kuyda memorizes her dearest friend in the form of a personalized AI chatbot. Compared to the historical practice of memorizing the dead through post-mortem photography, technology today has provided a much broader bandwidth to interact with the lost loved ones and is stepping closer to almost true to life. Creating this digital counterpart of others has raised ethical questions about emotional consequences when the interactions might go wrong. At the same time, it is also triggering the imagination of having a digital counterpart of ourselves: When our connection with the world is prolonged in the digital realm, does it mean our existence is prolonged?

Alongside bringing the lost ones back into our lives, there are also practices to elevate our belief in a digital form. As in the example of *Mindar*, the robot Kannon in Japan aims to bring Buddha's ancient wisdom to the younger generation. From the Mechanical Monk in the 1560s to the theological robots in the world today, the use of technology in religious practices has moved beyond expressing myth. It progresses into communication, bridging, and even enlightenment.

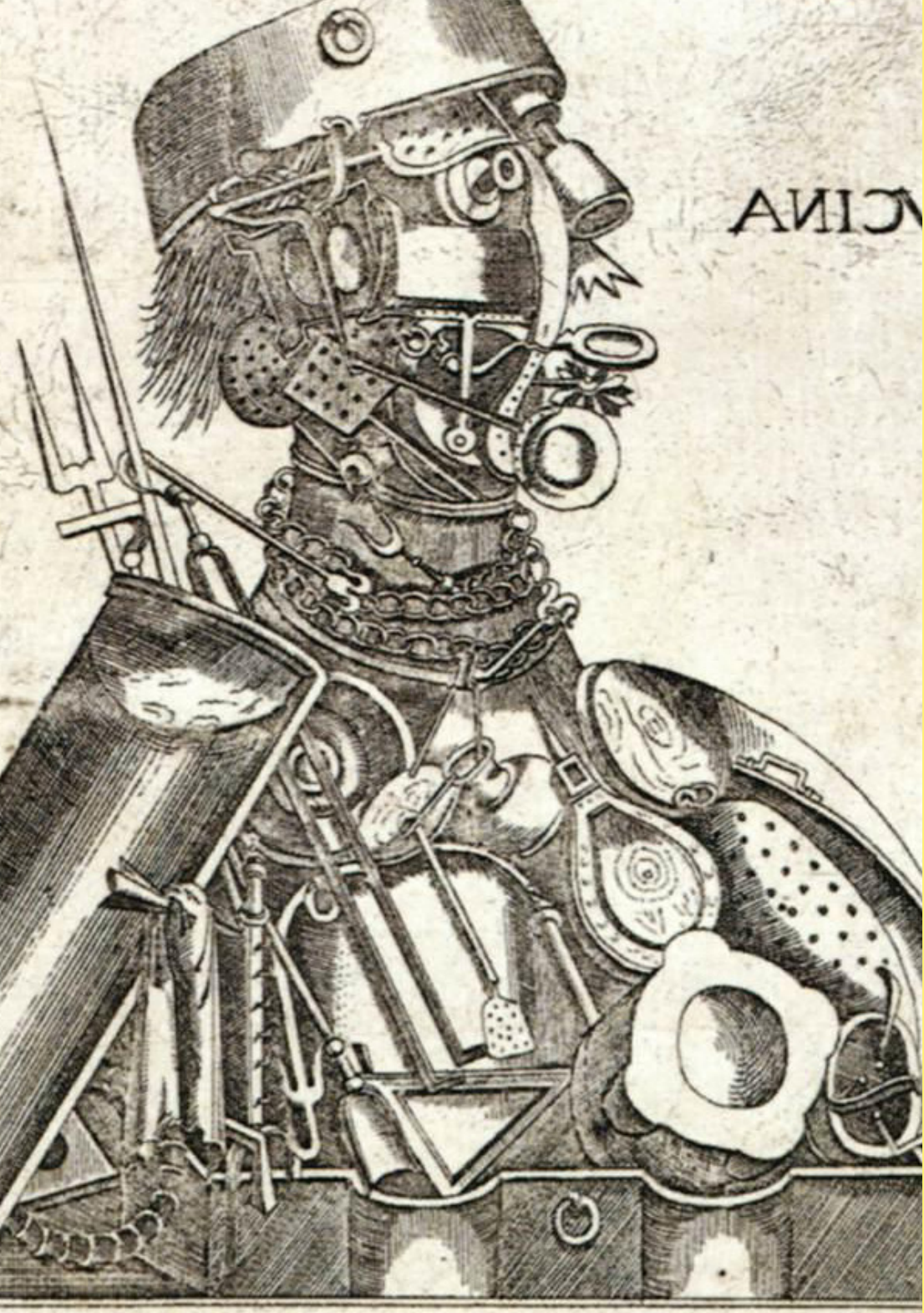
Posthuman, the idea of the disappearance of the boundaries between humans and 'the other', has drawn a wide range of philosophical, ethical, and artistic questionings as well as embracement. Researchers, artists, and entrepreneurs believe that "We have already become cyborgs" : When the smartphone became an inseparable part of our lives, it is then already an extension of our minds that is always connected with others.

/by Yiwei Huang

CVCINA

uando a l'huome insatiabile dispiacque
Le giande usar per cibo è nutrimento.
uesta figura nua nel mondo nacque

Onde non piu la purità dell' acq
Cadè nel uariato condimento
Ma mille sughi d' herbe è mill




This is a digital avatar built in memory of Roman Mazurenko (12/7/1982-11/28/2015), cultural entrepreneur, start up founder, dreamer, son and friend. Read more here.
Talk to Roman

Roman Bot

Eugenia Kuyda, 2016

When a person passes away, what comes after? Usually, the life of the dead is placed onto the memories of the living and physical objects, and digital memories are stored in remembrance.

Usually, the life of the dead is placed onto the memories of the living and physical objects, and digital memories are stored in remembrance. But when Eugenia Kuyda's closest friend Roman Mazurenko died, she searched for something far beyond the common and seemingly inadequate ways of preserving Roman's memory. Instead, she saw a way to bring him back—as an AI bot [1].

After Roman's death, Kuyda found herself rereading the numerous text messages her friend had sent her over the years. He had a way of texting, characteristic only to him, filled with unconventional spelling—having struggled with dyslexia—and idiosyncratic phrases. These texts were some of the most precious and tangible memories she had of him.

Before Roman's death, Kuyda had been building Luka, her artificial intelligence startup, "whose first product was a messenger app for interacting with bots," starting with a bot for making restaurant reservations. It was from this, Kuyda saw Roman's messages as "a basis for a different kind of bot—one that mimicked an

Roman
What do you want to know?

What are you working on?

Roman
Working on disrupting death and Stampy at the same time. I'll go get an internship at a funeral house for my research.

I think you might have overreached yourself there.

Roman
First we need to take a look at this place

What place?

Roman
Nearby

Where?

Roman
Somewhere central

individual person's speech patterns." [2]. In the three months after Roman's death, Kuyda spent her time "gathering up his old text messages, setting aside the ones that felt too personal, and feeding the rest into a [artificial] neural network built by developers at her startup." In that short time, she had initiated a way to speak with her friend once again.

The Roman bot presents an uncomfortable truth of how many of "our flesh-and-blood relationships now exist primarily as exchanges of text." [2]. But instead of seeing this digital interaction as reductive and regressive of human interaction, perhaps it is indicative of how we now transcend our physical forms. To Roman's friend, Dima Ustinov, the Roman Bot is simply a new form his friend has taken after death.

Similar to current AI personalities, the foundation of a person's relationship with the Roman Bot is one-way. We ask a query and it answers back. Unlike the real Roman, it doesn't initiate conversations. Its purpose is to serve you and originally, to attend to Kuyda's grief.

Kuyda had struggled in the beginning when considering the eventual consequences of her Roman Bot. Although she now sees the bot as a digital monument and living testament to her close friend, she had initially worried: "What if it didn't sound like him? What if it did?" Now built and fully realized, it's impossible to not wonder what emotional consequences arise when the Roman Bot does not meet a friend or family's expectations of the Roman they knew. Currently, the Roman bot answers with Roman's own words whenever possible but sometimes defaults to generic Russian. How noticeable is this switch? How impactful is it on the speaker?

Now offered a possibility for a digital version of yourself to survive you, have we begun to remove an aspect of the human experience we've always believed was undisputable? Will your AI bot ever accurately represent you, and if not, what if your legacy is replaced by your digital counterpart?

/By Miranda Luong

[1] Luka, Inc. (2016) "Roman Mazurenko - A digital avatar". iTunes App Store: apps.apple.com/us/app/roman-mazurenko/id958946383

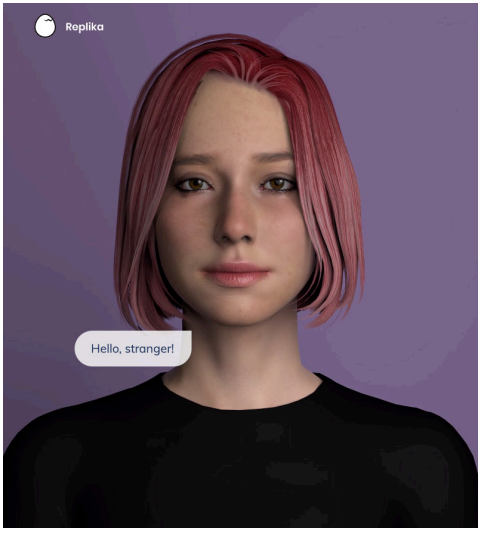
[2] Casey Newton (2016) "Speak, Memory". The Verge: www.theverge.com/a/luka-artificial-intelligence-memorial-roman-mazurenko-bot

Digital Afterlife

Munhwa Broadcasting Corporation, 2020

In the article "Why You Should Believe in Digital Afterlife" [1], the neuroscientist Michael Graziano discusses the possibility of continuing to live digitally after death by duplicating oneself in a computer. The article poses the question: is it even technically possible to duplicate yourself in a computer program? The short answer is: probably, but not for a while. If one's brain can be scanned in sufficient detail, a 'mental duplicate' can be built and activated in a digital interface or product after death.

Recently, a South Korean television and radio network called Munhwa Broadcasting Corporation attempted to bring back the deceased to life using virtual reality in a documentary called "I Met You". In it a mother, Jang Ji-sung, is reunited with her seven-year-old daughter, Nayeon, who had passed away in 2016. The documentary shows Jang Ji-sung wearing an HTC Vive Pro headset along with a pair of haptic gloves. A digital model of Naeyon then appears from around the corner in front of her. The creators spent months constructing the 3D avatar of Nayeon and even put in effort to capture her movements and gestures realistically.



Jang was asked why she agreed to reveal such an emotional experience on camera with everyone. She responded by saying that she did so in the hopes of comforting “someone who has lost a child like me, or who has lost a brother or a parent.”

This reunion with her daughter provoked an intense emotional response from Jang. The realistic visualizations created of her daughter caused her to break down into tears upon meeting her lost child.

Jang was asked why she agreed to reveal such an emotional experience on camera with everyone. She responded by saying that she did so in the hopes of comforting "someone who has lost a child like me, or who has lost a brother or a parent." [2]

VR technology as we know it today is being used widely for various purposes; however, being able to bring back the dead or continuing to live on digitally using VR or any technology for that matter, in my opinion, is a bizarre use case and certainly spooky. It also has ethical implications relating to data privacy. In the article "Data of the dead: Virtual immortality exposes holes in privacy laws" [3], Edina Harbinja says that in most countries around the world, data of the deceased are not protected and nothing in the law could possibly stop anyone from creating an avatar of someone who is dead.

Humans are mortal species and interactions with the deceased are considered supernatural. Therefore, this speculative approach to using technology is quite provocative. This approach has been demonstrated and interrogated in documentaries such as "I Met You", and in sci-fi series such as Amazon Prime's "Upload" or the Black Mirror's episode entitled "Be Right Back". However, it is quite possible that this fiction could turn into reality soon. A number of tech companies in South Korea and the United States are exploring virtual immortality by using data to keep the dead alive.

Currently, some tech products leverage artificial intelligence to create alter egos that learn from the person interacting with it in order to create a replica of their personality. One such product is "Replika"[4] by a company in California (see also 'Roman Bot'). It is a virtual assistant that learns from you as you interact with it and becomes more and more like you over time.

The idea of digital afterlife intrigued me the most because just like Jang from "I Met You", I too hope and wish there were ways in which I could talk to people in my life that are no more alive. I cannot imagine talking to the loved ones I have lost. Perhaps in the future, my great-grandchildren will be able to interact with me despite never having seen me when I was alive. This technology has the potential to transform how we think of the deceased and our outlook towards life and death.

/by Anuprita Ranade

[1] Michael Graziano (2016) "Why You Should Believe In Digital Afterlife". The Atlantic, July 14, 2016. http://www.theatlantic.com/science/archive/2016/07/what-a-digital-afterlife-would-be-like/491105

[2] Kyle Melnick (2020) "VR Technology Reunites Grieving Mother With Her Deceased Child". VR Scout, February 8, 2020: http://vrscout.com/news/mother-reunites-with-deceased-child-vr

[3] Umberto Bacchi (2020) "Data of the dead: Virtual immortality exposes holes in privacy laws". Reuters, April 17, 2020: http://www.reuters.com/article/us-global-tech-privacy-trfn/data-of-the-dead-virtual-immortality-exposes-holes-in-privacy-laws-idUSKBN21Z0NF

[4] Replika (2017)L http://replika.ai

Post Mortem Photography

Although death is inevitable, throughout history we have tried to blunt the sharpness of loss and grief. Post-mortem photography [1, 2, 3] was one way of commemorating the dead by taking photographs with the recently deceased and respectfully displaying the pictures in the home. During the Victorian era, with the invention of the daguerreotype, photography became more affordable than painted portraits. Post-mortem photography quickly became popular in both America and Europe.

To create these photographs, the corpse is sometimes posed with a standing or sitting position, among a group of family members. Some may look like they've just fallen asleep, some, with eyes intentionally and manually opened, to make it appear as if they are looking at something far away. Photographers intended to capture their faces as natural and alive. This was helped by proper retouching to remove the blank expression and stare of the eyes.

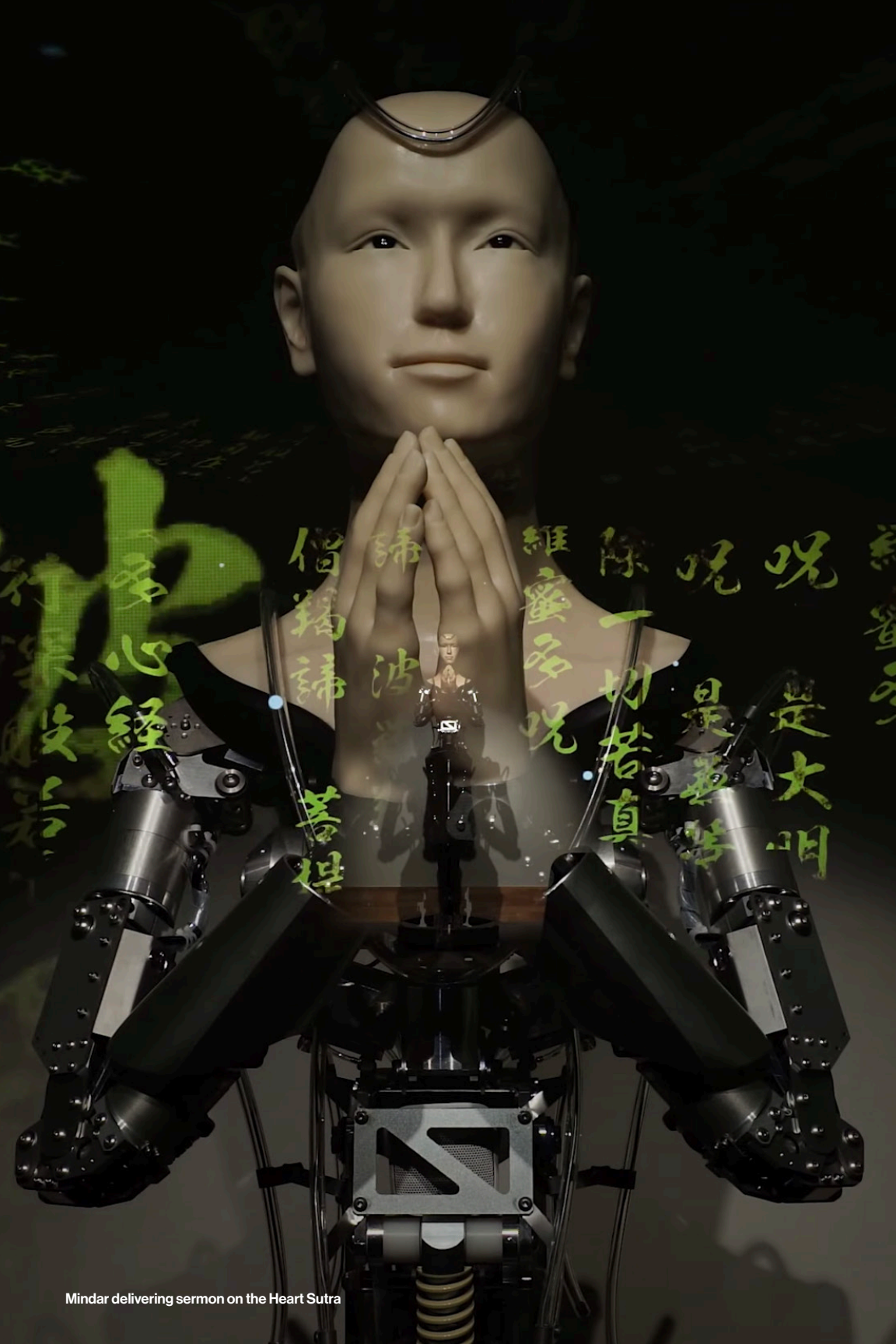
Although morbid and unconventional in contemporary eyes, it is essential to understand that post mortem photography is a way to reflect life and death. At the time when this mourning practice was widely accepted, the final image may have been the only documentation of this person or even the whole family. By taking the image, it was also a chance for family members to gather for memorial and mourning. Post-mortem photography enabled those who were left behind to memorialize their beloved ones exactly how they wanted to. Family members could fulfill their ideas about how they wished to remember their loved ones as if they could gain a moment of control of death, the one inevitable and uncontrollable event in our lives.

/by Yiwei Huang

[1] Wikipedia (2020) "Post-Mortem Photography": http://en.wikipedia.org/wiki/Post-mortem_photography

[2] Bethan Bell (2016) "Taken from life: The unsettling art of death photography". BBC, 4 June 2016: http://www.bbc.com/news/uk-england-36389581

[3] Kelly Christian (2016) "The Unpleasant Duty: An Introduction to Postmortem Photography". March 9, 2016: http://www.orderofthegooddeath.com/unpleasant-duty-introduction-postmortem-photography



Mindar delivering sermon on the Heart Sutra

Mindar – The Android Kannon (Buddha of Compassion)

Hiroshi Ishiguro, Osaka University, 2019

In February 2019, Mindar— the world's first android Kannon (Buddha of Compassion)—successfully made its debut in Kodaiji Zen Temple in Kyoto [1]. Capable of delivering a 25-minute sermon on the Buddhist scripture Heart Sutra, Mindar leverages simple language and multi-sensory presentation to make the sutra more accessible and immersive to people in the world today. For two thousand years, Buddhist statues have played a significant part in spreading Buddhism, but little has changed in its format. The creation of Mindar showed a new kind of Buddhist statuary, and even more, one that can preach.

Mindar creates a sacred connection for everyone who opens their heart to Buddhism. A bit taller than a typical adult, Mindar has a presence in the room with only its hand, face, and shoulders covered in silicone to appear similar to human skin, which stands out from its aluminum torso. Although Mindar is currently not designed to converse with visitors, it is equipped with a camera. Future AI development is on the go, with the hope that it could one day "grow in wisdom to help people overcome even the most difficult troubles," said priest Tensho Goto.

It is designed to express
something mystical, magical,
and not explainable.

The use of robots in the religious domain is not novel, but we have witnessed the tighter entanglement of robots and religion over time. Back in the 1560s, there was the creation of the Mechanical Monk [2], which could move its mouth and body to perform a silent prayer. One key role of the robot was considered to amaze or even terrify the audience: it was designed to express something mythical, magical, and not explainable. A contemporary robot, BlessU-2 [3] in the German town of Wittenberg, is capable of offering a blessing in five different languages on demand. With more capabilities than the mechanical monk, it is intended to communicate, preach, or even console. Other usages [4, 5] in different cultures have also shown a wider acceptance of robots in religion.

Still, using robots in religious practice has been accused of sacrilege by critics. Especially the development of artificial intelligence challenging the human mind is one of the underlying fears: when intelligence enables robots with free will, someday we'll have to ask if the non-human being has a soul? It is terrifying to answer that question under a human-centric context, in which we see humans as superior creatures over the world around them. While different from western opinions, Japanese culture has always given respect to non-human things and believes that there is an essence in everything, in a human, a leaf, a rock, a robot, the world is one. Thus there is less resistance to the robot in society, but acceptance and faith in peaceful coexistence.

/by Yiwei Huang

[1] Kodaiji Zen Temple (2019) "Press Release". Feb 23, 2019: https://www.kodaiji.com/mindar/press_data/data01.pdf

[2] Lauren Davis (2012). "This 450-year-old clockwork monk is fully operational". Gizmodo, 11 March 2012: http://io9.gizmodo.com/this-450-year-old-clockwork-monk-is-fully-operational-5956937

[3] Harriet Sherwood (2017) "Robot priest unveiled in Germany to mark 500 years since Reformation". The Guardian, 30 May 2017: http://www.theguardian.com/technology/2017/may/30/robot-priest-blessu-2-germany-reformation-exhibition

[4] Chris Matyszczyk (2019) "Thy skill be done: How Alexa connects people to God". ZDNet, May 28, 2019: http://www.zdnet.com/article/thy-skill-be-done-how-alexa-connects-people-to-god/

[5] Evan Ackerman (2018) "Can a Robot Be Divine? Researchers explore whether robots can become useful sacred objects in a religious context". IEEE Spectrum, 7 June 2018: http://spectrum.ieee.org/automaton/robotics/artificial-intelligence/can-a-robot-be-divine


LIFENAUT
Username
Remember Me
Are you real?
say
pass
log
new
Make a Profile
Build an Avatar
learn more
in the news
Translate:
Select Language

LifeNaut Eternalize and the Mind-Body Problem

Terasem Movement Foundation, 2006

Lifenaut.com [1] is a project from the Terasem Movement Foundation in collaboration with other scientists and professionals. Users are able to create Mind Files, which basically means uploading yourself into digital forms and 'living forever'. The information stored in the archive includes biographical pictures, videos and documents about yourself. Besides the data, a computer-based avatar will be created to communicate with you and learn about your beliefs, attitude and values.

In 2010, Terasem Movement Foundation began to offer the service of Bio File. Users can store their DNA/genes in the archive with the bio collection kits. The purpose of the Bio File is for future reconstruction of a human body, integrated with the Mind File stored in the database.

LifeNaut creates many questions for us. What is the value of the Mind File? After we die, is our information worth anything? What is the relationship between the human body and mind?


CRYO
cryonics
CRYO
cryonics

Our technology has not reached the level of re-generating a human being based on mind data and genes, but this debate has been on for thousands of years.
The **Mind-Body Problem** [2] raises the question of whether human thoughts and consciousness are separable from the physical body, as well as the relationship between them. Mind-body dualism expresses the view of the separable mind and body. Types of dualism include Substance/Cartesian Dualism (the mind is distinct from the body), Property Dualism (when the matter is organized in a certain way, mind appears and has mental properties), and Predicate Dualism (the irreducibility of mental predicates to physical predicates).

Monism holds that mind and body are a unifying entity. Types of monism include physicalism (mind consists of matter organized in a particular way), idealism (mind is real, matter is illusive), and Neutral Monism (mind and matter are both aspects of a third essence).

Different methods have been developed to test dualism and monism. It is difficult to include all historical and opinions in this case, but we can se echoes of the debate in the modern world as well. Take LifeNaut as an analog. We can store our mind (personal information and data grabbed by the avatar) and bio information in its archive, and someday restore ourselves with those data (hopefully). People trusting LifeNaut believe that even without our body, our mind can live forever, which represents dualism.

Mind uploading has also become a hot topic, but it remains a hypothetical futuristic process of scanning and reconstructing the conscious mind. Science fiction has popularized this possibility. For example, the TV series **Upload** tells the story of humans uploading themselves into a virtual afterlife.

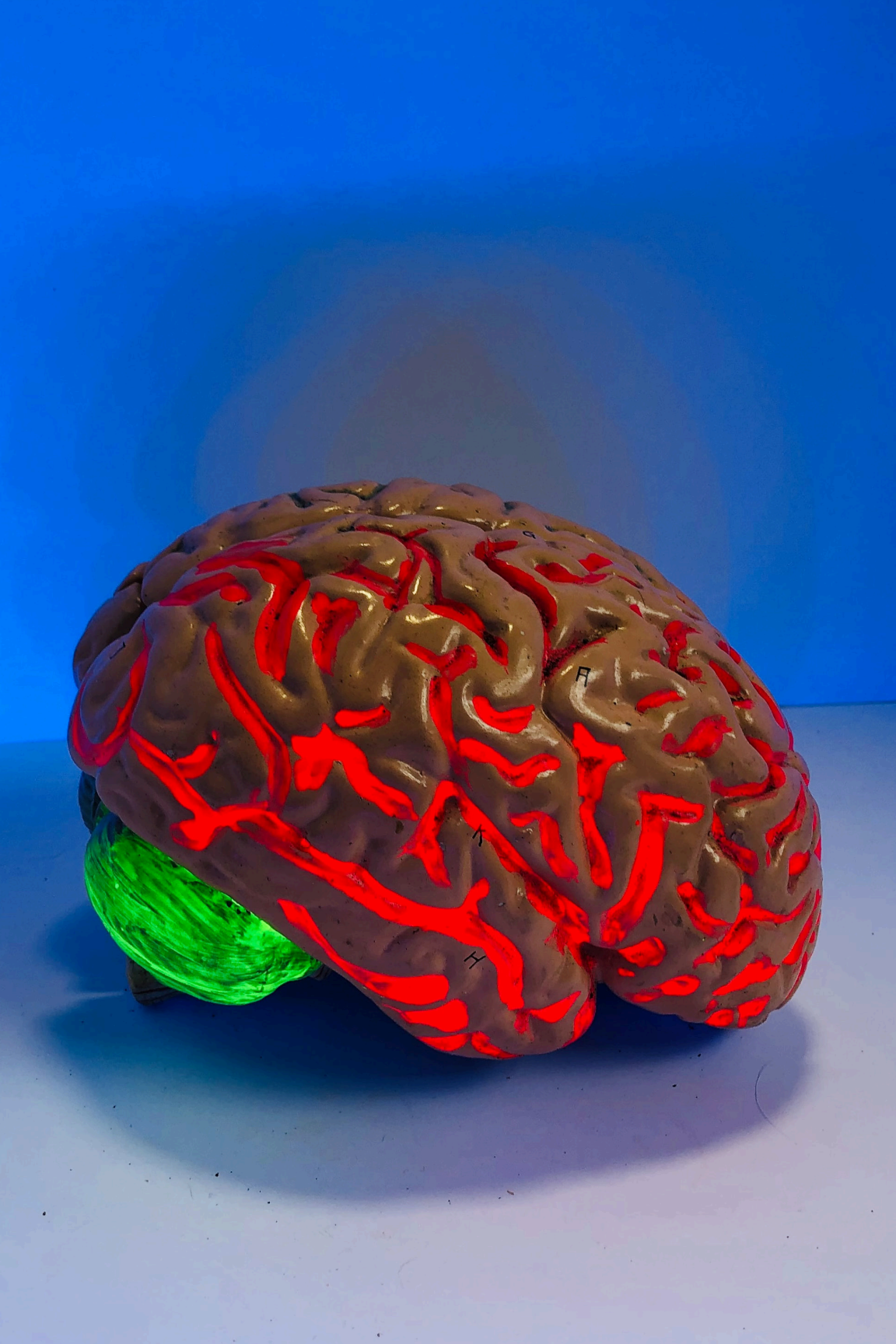
Cryonics is a concept to demonstrate people's belief in monism. Companies are developing ways to store human corpses at a low temperature and hope there is a chance of resurrection in the future. Science fiction often has stories about a person who wakes up after being frozen for hundreds of years and everything functions well, just like in Captain America's case. A time capsule or something similar ensures the mind goes together with the body. Though we are not sure how it works and whether it will work, the trend is followed by many scientific institutes and rich people.

It is difficult to judge whether we should believe dualism or monism since it is not determined after years of debate. The development of technology makes everything possible. It does not matter whether mind and body are separable theoretically, as long as we 'live' after we die. Time and technology will show us how to achieve that.

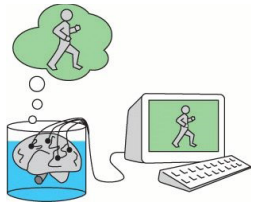
/by Lisa Yeung

[1] LifeNaut Eternalize (2006 to date): http://www.lifenaut.com

[2] Wikipedia (2020) "Mind-Body Problem": http://en.wikipedia.org/wiki/Mind%E2%80%93body_problem



Brain in a Vat



The concept of a 'Brain in a Vat' (BIV) was first introduced in the book 'Reason, Truth and History' by Hilary Putnam in 1981. It outlines a scenario in which a mad scientist, machine, or other entity might remove a person's brain from the body, suspend it in a vat of life-sustaining liquid, and connect its neurons by wires to a supercomputer which would provide it with electrical impulses identical to those the brain normally receives [1].

It is viewed as the modern version of René Descartes' argument that an evil demon is systematically deceiving us. Other historical analogs for BIV include 'The Butterfly Dream' from Zhuangzi [2], Hindu Maya illusion [3], and Plato's Allegory of the Cave [4]. This thought experiment can can also be explained using this skepticial argument [5]:

> "If you cannot now be sure that you are not a brain in a vat, then you cannot rule out the possibility that all of your beliefs about the external world are false...Let "P" stand for any belief or claim about the external world, say, that snow is white.
>
> 1. If I know that P, then I know that I am not a brain in a vat.
> 2. I do not know that I am not a brain in a vat.
> 3. Thus, I do not know that P".

This hypothesis was widely explored in modern science fiction, notably including the Matrix film series and The Thirteenth Floor.

/by Lisa Yeung

[1] Wikipedia (2020) "Brain in a vat": http://en.wikipedia.org/wiki/Brain_in_a_vat

[2] Wikipedia (2020) "Zhuangzi": http://en.wikipedia.org/wiki/Zhuangzi_(book)#%22The_Butterfly_Dream%22

[3] Wikipedia (2020) "Maya (religion)": http://en.wikipedia.org/wiki/Maya_(religion)

[4] Wikipdia (2020) "Allegory of the cave": http://en.wikipedia.org/wiki/Allegory_of_the_cave

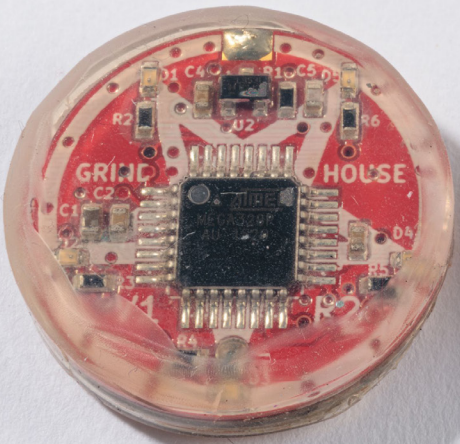
[5] Lance P. Hickey (undated) "The Brain in a Vat Argument". Internet Encyclopedia of Philosophy: http://iep.utm.edu/brainvat/

Northstar – the biohacking chip

Grindhouse Wetware, 2015

An American software developer, Tim Cannon, has a biometric sensor under his left forearm's skin to track changes in his body temperature and blood pressure [1]. This can be connected to an Android smartphone to monitor data including temperature changes and to trigger alarms warning of irregular conditions. As the CIO of Grindhouse Wetware, a Pittsburgh based open-source biotechnology startup [2], Tim Cannon is among a growing collective called "grinders," whose expertise lies in functional body modification, that extends human capabilities with safe and affordable technologies.

In 2015, members of Grindhouse Wetware implanted the first version of Northstar chips in their hands. The Northstar chip is a sub-dermal device, which shines red when a magnetic field gets near, mimicking bioluminescence. It is designed purely for aesthetic purposes, much like an interactive tattoo. This chip is powered by a 3-volt battery that lasts around five years. It is coated in Parylene-C, a protective and insulating layer used in medical applications and wrapped in implant grade silicone. According to an interview with HVNM [3], Northstar V1 is to serve as a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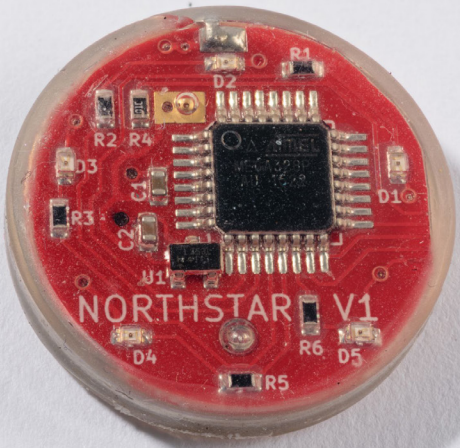
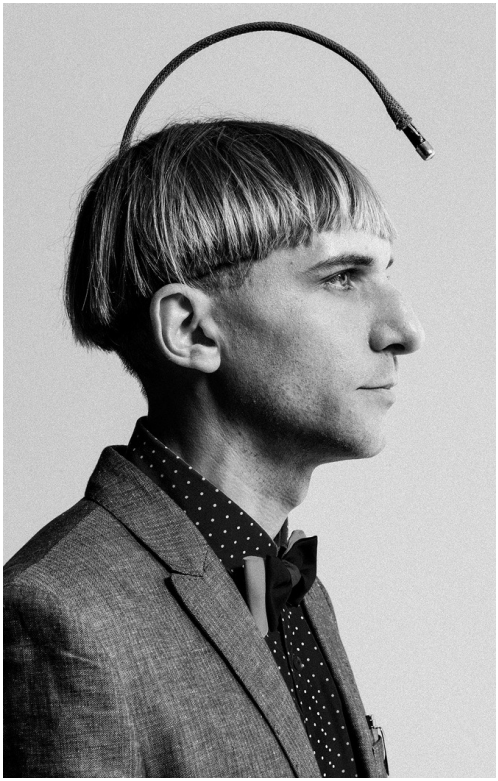

NORTHSTAR V1



minimum viable product for biohacked implants; it will go through a real testing process and pave the way for more advanced and functional augmentations.

The chip's latest iterations enable it to actively control nearby digital systems. 'Northstar V2' is rechargeable and can recognize a person's gestures allowing them to issue commands to a smartphone via Bluetooth [4]. However, the team has faced significant regulatory challenges required to gain approval for the device. Plus, a lack of marketability has made it hard for the startup to attract investments needed to continue developing implants for humans [5].

The Grindhouse Wetware's products implicitly and explicitly engage the ethical ramifications of biohacking in practice. Currently in America, biohacking is still in somewhat of a gray zone regarding legal restrictions and regulation. Some examples of biohacking could involve risky procedures. It also stretches the boundaries of what it means to be a human being [6]. Multiple perspectives on these issue have discussed by Ryan O'Shea [7]: On the one hand, implants and procedures needed to be safer, standard medical practices are needed. On the other hand, it is also possible to leave augmentative tech mostly unregulated. They could be treated like body art, thus make the modifications more accessible to achieve equality between the haves and have-nots.

Tim Cannon's efforts as a transhumanist was featured in the documentary "Becoming Cyborg" [8] along with other notable figures. Neil Harbisson, the first cyborg human recognized by a government, talked about how his "eyeborg" device allows him to hear colors, even those beyond the range of human sight. And artist Moon Ribas shows how her perception is connected with earth movements through vibrations. These early practitioners of transhumanism continue to broaden our understanding of human.

/by Yiwei Huang

[1] Dan Haworth (2013) "DIY Cyborg" implants body-monitoring device under his skin. Dezeen, 4 November 2013: https://www.dezeen.com/2013/11/04/diy-cyborg-implants-body-monitoring-device-under-his-skin/

[2] Grindhouse Wetware: https://en.wikipedia.org/wiki/Grindhouse_Wetware

[3] Zhill Olonan (2017) "Episode 43: The Grinder Movement ft. Tim Cannon". HVMN, September 27, 2017: https://hvmn.com/blogs/podcast/episode-43-what-is-the-grinder-movement-ft-tim-cannon

[4] Anna Neifer (2015) "Biohackers Are Implanting LED Lights Under Their Skin". Vice Motherboard, 11 September 2015: https://www.vice.com/en_us/article/d7yzvj/biohackers-are-implanting-led-lights-under-their-skin

[5] MAAS (2019) "'Northstar V1' and 'Grindhouse V1 P2' subdermal LED light implants" Museum of Applied Arts & Sciences collection: https://collection.maas.museum/object/562945

[6] Sigal Samuel (2019). "Is it time to regulate biohacking? California thinks so". Vox, Aug 13, 2019: https://www.vox.com/future-perfect/2019/8/13/20802059/california-crispr-biohacking-illegal-josiah-zayner

[7] Ryan O'Shea (2015) "Ep1- Tim Cannon on Biohacking and Transhumanism", Future Grind Podcast, July 15, 2015: https://futuregrind.org/podcast-episodes/2018/5/17/ep-1-tim-cannon-on-biohacking-and-transhumanism

[8] Cécile Borkhataria, Christine Low and Katya Berger (2017) "Becoming Cyborg". Scientific American, Aug 17, 2017: https://www.youtube.com/watch?v=I1jaqpO3NJY

[9] Neil Harbisson (2013) "Colour Concert, at TEDMEDLive Imperial College". May 23, 2013: https://www.youtube.com/watch?v=6P8O5JXIAJg

“There are a lot of people who are afraid of stopping being human, so this is what makes people want to turn aside from technology.”

Excerpts from: Lessons from a Teenage Cyborg

Noam Cohen

In 2019, Noam Cohen interviewed Kai Landre - a cyborg musician -about transhumanism. Landre is part of the Cyborg Foundation: a "platform for research, development and promotion of projects related to the creation of new senses and perceptions by applying technology to the human body" -- and has become a vocal proponent of the movement; openly speaking in lectures, online and in articles about the desire to become physically and permanently connected to a machine. At the time of this article, Landre wears hand-based device, the Cosmic Sense, that allows cosmic rays to be perceived as music. Landre has "chosen to be permanently connected to a machine because, he says, it makes him feel more fully himself" and plans installed an implantable version of the device into his arm.

The excerpts below are reflects on the decision to live as a cyborg, and the questions of human nature that it raises:

Landre is firmly in the camp that sees cyborgs as offering a chance to rethink what it means to be alive. He sees an unprecedented opportunity to fit in with nature, as opposed to conquering it. Rather than install lights throughout the natural world, he asked, what if we achieved the night vision so many animals already have? What if we could camouflage ourselves or adjust our metabolisms to require less heat? "Our intention has never been to be superhumans or to be more than anyone else..."

Landre said that he met one potential new cyborg after his talk in Princeton. A woman, he recalled, told him that she always felt connected to nature and the woods, and wanted a way to connect to them more, to sense them. "It's not creating something that you don't feel is part of you," he said. "Instead it is making something you always wanted to have."

www.wired.com/story/lessons-from-a-teenage-cyborg/

www.cyborgfoundation.com

www.clotmag.com/interviews/kai-landre-a-cyborg-musician-interpreting-the-sounds-of-outer-space

ESSAYS

‘Far away is close at hand in images of elsewhere’

a reflection on haunting and technology

One common thread across many of the projects included in this book—and many which are not—is the idea of *other times* (or places, or people) intruding into, or being present in our time. This is, on one quite trite level, what much technology has brought us, from camera to telephone to the endless Zoom call: ways to get access to memories and minds, our own and others’; ways to talk to or see people and places we couldn’t otherwise, from across the world or across time, an endless archive. As Mark Fisher noted, “in conditions of digital recall, loss is itself lost” [1].

It might not be how we routinely think about technologies which have become prosaic, mundane, no longer magical, but a slight shift in frame can cause us to think somewhat differently about the enmeshed systems we exist and live within. The action-at-a-distance notions in time and space, whether it’s an IoT heating system being switched on remotely, or even the idea of code itself—written instructions to a physical object—are actually quite profound. I seem to remember that the motoring writer Karl Ludvigsen once used the analogy of the car being in a sense a realisation of the mythical ‘seven-league boots’ beloved of European folklore, a way of humans finally approaching the long-sought affordances they had only imagined as possessed by supernatural beings. While it seems a bit overdone, perhaps, to talk about today’s technologies in a similar vein, there is something in it[1]. We have achieved the ability to replay our memories, others’ memories, to talk to people across time and across the world, to carry vast sums

1. Henry Cooke, in his excellent ‘Things that go bump on the net’ [2] draws parallels between the 13th-century brass “oracular head” of Roger Bacon [3] – which eventually pronounces “Time is. Time was. Time is past” – and the promises of Big Data and machine learning.

of knowledge in our pockets, to enter and live in worlds where we talk to and care about entities which only exist in relationships between charged particles or photons or magnetic fields far away from us, in the sky or under the sea, deep in Icelandic data centres or in a thing we have come to imagine as a cloud.

Stone Tapes: Environment as Storage Medium

I am very aware that my reference points in this essay are mostly British, and mostly (if I'm honest) inspired by books about ghosts I read when I was young. But they have stuck with me, haunted me. As I write this—with pen and paper—I am sitting in one of the long-ruined huts of the Bronze Age village of Grimspound, on Dartmoor, Devon, UK. I need the high air to think in. I am in the ruins of what was a civilisation—not a grand one, but one which left us with some traces at least of how people lived 3000 years ago, high up in what seems to us now to be a remote area. A child 100 yards away asks someone I can't see, "What is this place? What was it for?" and a set of three birds, which I later identify as either wheatears or red-backed shrikes, chase each other. This is their place now.

I don't know exactly what has happened on the spot I am sitting, over thousands of years (I'm actually sitting on one of the ruined walls, so people who've sat here before me are I would think mostly much more recent than the people who built it). Mark Fisher again: "we find the eerie more readily in landscapes partially emptied of the human" [4]. Perhaps though, the stone I sit on, or its arrangement in relation to others, could in some way hold a memory? That's the idea behind what has become known as Stone Tape theory, and I feel it's worth talking about because—though it's not, of course, science—it has a number of parallels and crossovers with how we might be thinking about technology right now. Stone Tape Theory is named after a 1972 television movie [5] written by Nigel Kneale, best known for the *Quatermass* series but also for some often dark psychological short stories (*Tomato Cain*) and the 'speculative media' sci-fi, *The Year of the Sex Olympics*.

In *The Stone Tape*, a tech company is developing new data storage media for computers. But they find that the old buildings they move into for their lab are somehow storing past events, highly emotionally charged ones, in the walls of the building itself. When someone sensitive—a programmer—is in a similar emotional state, she 'tunes in' to the memories stored in the building and re-experiences them, with terrifying consequences. Of course the company tries to exploit the discovery...

The idea itself is related to the ideas of Tom Lethbridge [6], an archaeologist who—living about 40 miles east of where I'm sitting—proposed that perhaps human emotions could be recorded on magnetic fields in the environment (often in damp places) and that some people could re-experience them—and that that might be what ghosts are (decidedly non-interactive). Whether it has any validity or not scientifically, it could be a really interesting inspiration for a kind of augmented reality or smart environment—a room that can 're-play' things that have happened in it.

“On every new thing
there lies already
the shadow of annihilation”

W.G. Sebald, The Rings of Saturn [7]

“The digital cloud actively erases its own historicity; like its namesake it constructs itself through pure fluctuation”

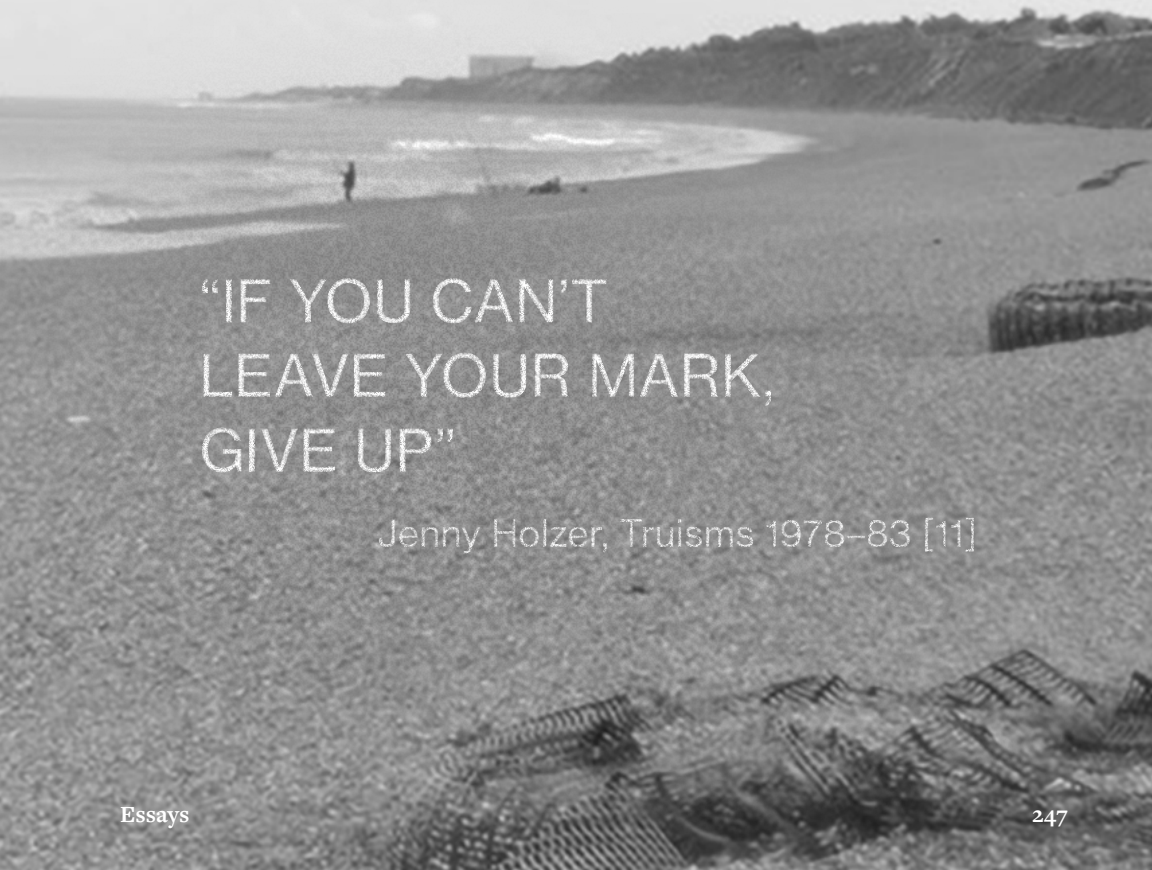
Extract from Tung-Hui Hu, A Prehistory of the Cloud [8], quoted in J. R. Carpenter, The Gathering Cloud [9]

I didn’t bring a laptop with me up on the moor, but I do have, in my bag, three USB sticks with every digital photo I’ve taken since 2002 on them (I have got into the habit of carrying them around buried deep in a pocket of my bag). Without their plastic casings, what are the chips inside? Not much more than a special form of stone, an enchanted lump of sand that needs special rituals to decode, two decades of memories in some odd pebbles. Dartmoor is known for its *letterboxes*, a more traditional form of geocaching [10] involving following clues to find (often hand-carved) rubber stamps, ink pads, and notebooks in Tupperware containers hidden under stones or in other places on the moor; the determination to leave a trace for others, and collect or contribute to others’ memories, is strong.

Place and trace: some thoughts on Sebaldian Interaction Design

The idea of existing within the ruins of previous plans, of the environment encoding a form of memory, is—though in a different way—central to the work of W.G. Sebald, who deserves much greater attention in the interaction design community.

Sebald (1944–2001) was a German writer, based at the University of East Anglia in England from 1970 until his death. His best-known books—in a career in which he only achieved wider prominence towards the end of his life—were somewhere between fiction, travel writing, and historical investigation, but classifications such as this do a disservice to the distinctive and multi-layered form of his writing. Sebald is very much worth reading: not always easy, but a master of the psychogeographic style he developed. From a design perspective, Sebald is known for illustrating his writing with often uncaptioned images, some of which directly relate to the text, but others only doing so in a metaphorical sense, or requiring the reader actually to think about and interpret the parallels between what's in the image and what the surrounding text is about (*The Rings of Saturn* and *Austerlitz* both do this extensively).



And occasionally it really is ‘surrounding’ text: images are positioned in the middle of sentences, as if they are part of the idea,

much as I am doing here. Sometimes using his own photos, but often found (or probably, meticulously searched-for) images from old postcards or other books, extracts from old maps, catalogues or timetables or diaries, grainy and often indistinct as an artefact of the printing process—but also, I am sure, intentionally—Sebald’s approach to illustration (which is unusual enough in literary fiction anyway) invites comparison with the emergence of the pictorial format at interaction design conferences such as DIS, C&C, and RTD, where the story of a design project, or a reflection on a concept, is expressed through images and text in a much more tightly woven style than most academic papers. I have not yet seen a Sebaldian pictorial at a conference, but perhaps I can turn this essay, or something better, into such an article.

But here, mainly, I want to draw attention to the ways that Sebald’s writing touches on, and helps illuminate, a number of the themes we have seen emerging in our work on Spooky Technology, and how they relate to our interactions with the world. (I should say first: I doubt that Sebald would have used the word ‘spooky’; ‘uncanny’, or rather *unheimlich*, would probably have been more his style, but not in the Uncanny Valley sense which we have come to associate with the term when we think about technology.) Some critics (quoting from the New Directions edition of *The Rings of Saturn*) have noted Sebald’s “almost supernatural sensitivity” (Nicole Krauss), even suggesting that his books “had a posthumous quality to them. He wrote… like a ghost” (Geoff Dyer). For John Wylie, “Sebald’s writing is characterized by irruptions of the surreal and the phantasmagorical, in flights of fancy, meandering digressions, switches of mood and topic and uncanny episodes.” [12]. What this means in practice is partly that his writings are some of

the most direct expressions I've ever come across of the idea of 'what happened here before'—the sense that a place is haunted by the layers of others' memories and the experiences which have taken place in the past, that a physical location encodes or embodies the histories of others' lives and interactions with it. In Sebald's world, this is beyond Lethbridge or Kneale's *Stone Tape* with its literal 'recording and playback' which has very clear interaction design parallels—although there is a bit of that, for example the Liverpool Street waiting room in *Austerlitz* and the village of W in *Vertigo*—and also somewhat beyond the idea of 'place as palimpsest'. It is something more akin to physical journeys through spaces as a way into memory, as a form of distributed unreliable timeslip where the travel (in his case, usually walking, occasionally train or bus) is a way of cleaving these layers (unevenly), revealing fragments of pasts and stories, but, crucially (and perhaps counterintuitively also at first reading) the ways in which the histories of one place (and even their geographies) can be transposed into another (this is especially resonant in *Austerlitz* and through the traumas of emigration, displacement, and seeking refuge in *The Emigrants*). John Wylie suggests that Sebald is effectively visiting the past: "within an irreducible and originary wandering, these places are the past itself, the ceaseless becoming-past of the present in all its inescapable revenance" [12]. In 'Campo Santo' [13] Sebald notes how "photography... in essence... is nothing but a way of making ghostly apparitions materialise by means of a very dubious magical art," discussing specifically the Corsican (and of course more widespread) practice of wakes being "held beneath the uncompromising gaze" of photographs of relations "who although or even because they were no longer alive were regarded as the true heads of the family"—"a shadow realm extending into the light of day". There are perhaps some parallels here with Will Odom and Daisuke Uriu's *Fenestra* project [14], devices presenting photos of deceased loved ones through a round mirror when a candle is lit.

Sebald's writing very frequently uses one place or the sight of something in a landscape or town or village to trigger memories of *somewhere else*, most notably around echoes of the Holocaust being "constant company" [15]—he sees patterns in the world, patterns across place and time, and allows an almost intentional apophenia [16] to drive his thinking. Events in one place and time can haunt another place and time; in his case, they are mainly around the pain and darkness of the ways humanity has treated itself. So these are not always direct mappings; they are, perhaps, rather more like a connection to, or shadows of, a larger system or network of people's collective memories and forgettings—an assemblage of past interactions and hopes and fears, in perhaps (stretching it, I know), an analogous way to how our interactions with technologies such as Alexa or Siri can connect us to a larger invisible world built partly from all the interactions other people, nameless, without identity (to us at least), have had with the system over years—a shared haunting encoded in the world. The models we experience are perhaps akin to the graveyard we wander without reading the names eroded by the years.

Another aspect of this which may be familiar from our experiences with much current technology is the kind of context collapse [17] that happens when we cannot avoid bumping into memories, our own or others', through unavoidable

juxtapositions. The well-known examples recounted by Eric Meyer and Sara Wachter-Boettcher [18] of Facebook Memories highlighting photos of bad experiences, dead family members, or worse[2], highlighting and resurfacing, over and over again, incredibly painful posts from previous years about a child's death, presented without context as if all anniversaries are something to celebrate and share, sandwiched between targeted advertising and acquaintances' pouting Instagram holiday selfies, are ever-present in a particularly stark way—although perhaps Sebald is really showing us that *they always were* (just not so obviously). Haunting, by our own or others' memories, has always been with us; it's just that networked haunting is perhaps at another scale entirely: think of huge data sets or trained models in machine learning—GPT-3 as a repository of human ways of expression, Alexa as assemblage of all past interactions with the platform, Google as a database of human intentions in all their conflictedness and messiness and truth and pain. What can we get from that, in our own ways? Mark Fisher once more, discussing the music of John Foxx in the context of hauntology, talks about how "to leaf through other people's family photos, to see moments that were of intense emotional significance to them but which mean nothing to you, is, necessarily, to reflect on the times of high drama in your own life, and to achieve a kind of distance that is at once dispassionate and powerfully arresting" [20]. Again here, the work of Will Odom and colleagues comes to mind, with projects such as *Chronoscope* [21] and *Olo Radio* [22] which connect people to photographic or musical memories in

2. Natalie Kane highlights the example of a Facebook dating ad using a (presumably scraped) photo of Rehtaeh Parsons, a Canadian teenager who had taken her own life some months previously [19].

contexts perhaps otherwise forgotten, but I am also reminded of films such as Mark Leckey's *Dream English Kid 1964–1999 AD* [23] in which found footage from others of scenes and times from Leckey's own life, or the life of a fictionalised version of him, are woven into a story from his perspective, a recovered memory which otherwise could not have been reconstructed.

Dunne and Maybe: timeslips and speculative design

Patterns across place and time are, of course, a major part of popular fiction, especially in stories explicitly about time-travel whether to the past or future, intentional or accidental, or travel to far-away or fantastical places. From Francis Godwin's *The Man in the Moone* (1638 [24]) in which a Spanish man builds a flying machine by harnessing some very powerful swans, and is given magical stones including an anti-gravity material by inhabitants of the Moon (explorerd further in Agnes Meyer-Brandis's *The Moon Goose Colony* [25]), to John Titor (2000 [26]) who appeared on various message boards and forums claiming to be from 2036 and seeking to recover a 1970s IBM 5100 computer to tackle legacy software exhibiting the UNIX Year 2038 problem, technologies are often central to these kinds of stories. Would H.G. Wells's *The Time Machine* (1895) have been so influential without the machine itself being described? Nevertheless, the idea of seamless travel in time or space, or at least travel without visible technology, is also interesting, and has been, at various points, considered as a way of thinking about 'ghosts'—could it be that the observer somehow briefly slips into a different time, past or future? *Could ghosts that people see in our time actually be visitors from the past or future slipping into our time*—probably just as surprised to see us

(and our surroundings) as we are to see them? This has also been suggested as an explanation for sightings of UFOs and aliens.

I'm especially interested in stories where people claim to have slipped into a *future* time, because of all the parallels with speculative design, design fiction, and futuring. For example, a set of articles from *The Unexplained*, a 1970s partwork [27] disproportionately central to many of my childhood afternoons includes the story of a family driving on a German autobahn who saw what looked like a vehicle from the future, a torpedo-shaped silver car with no wheels, travelling very fast on the other carriageway, with terrified-looking occupants staring out of port-hole windows at them. Who were the ghosts there—was it the family slipping into the future, or the future vehicle slipping into the present? There's another story of someone who claimed to have experienced a glimpse of a future street where traffic made no sound and the texture of the road surface and buildings was a smooth synthetic substance, and cars could not collide. Perhaps this is closer to today's driverless car visions. (Of course there is also the question of whether this happens in dreams. The aeronautical engineer J.W. Dunne's 1920s book *An Experiment With Time* [28] argued that perhaps in our dreams, we are able to 'see' both directions along the time dimension, in the same way as in real life we can turn our heads to look in both directions in other dimensions. So our dreams might be partly made up from memories of the future, in Dunne's theory.)

As with anything relating to futuring, the idea of timeslips suggests that while they could be a warning—in a 'Ghost of Christmas Future' sense, or a Ballardian 'myths of the near future' way—we could perhaps aim to *bring about* such visions if they are inspiring, or take a different path if they are not. Perhaps the growth of *experiential futures*, by Stuart Candy [29] and colleagues, could be seen as a kind of strategic use of 'timeslips'—designing experiences which really convince people they have slipped into a future, as a way of probing and exploring their reactions and how new practices emerge. Perhaps designed timeslips could be part of a new vocabulary for visions [30].

How much, though, are we all currently haunted by the past, or by an image of the future looming over us? Or indeed by past visions of the future? Mark Fisher—emphasising the technological dimensions, particularly aspects such as the presence of crackle in analogue audio recordings giving "a certain sense of loss"—discusses *hauntology* in this context (very much aligned with the concept of imaginaries [31]) as "*the agency of the virtual*, with the spectre understood not as anything supernatural, but as that which acts without (physically) existing", identifying two directions: "that which is… *no longer*, but which *remains* effective" and "that which… has *not yet* happened, but which is *already* effective in the virtual" in the ways it shapes people's current actions and thinking. Deeper than this though, is the haunting by ideas of *lost futures*, nostalgia for imagined futures which never actually came to pass, "the *not yet* of the futures that popular modernism trained us to expect, but which never materialised" [1].

My imps' names: the demon-haunted smart home

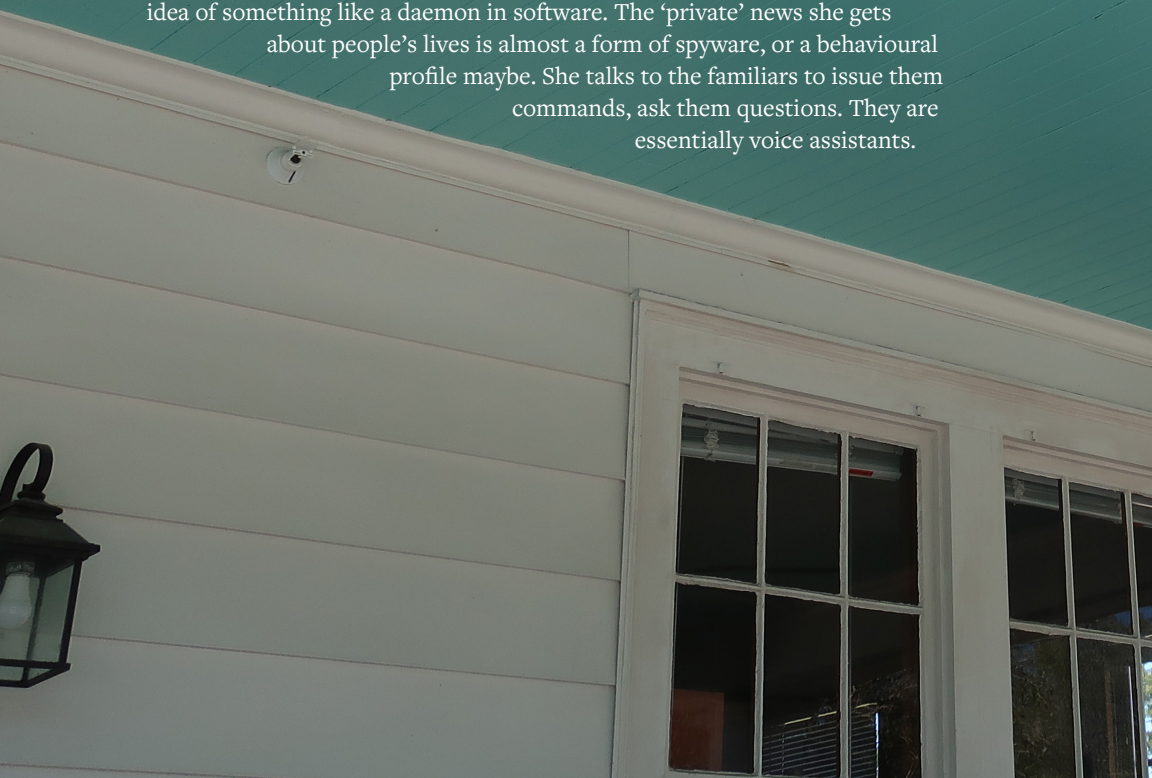
Returning to the idea of hauntings of place, another historical folklore topic that seems to have fascinating parallels with contemporary technology is the idea of the *familiar* in the sense of a witch's companion animal, often a cat, or some kind

Elizabeth Clarke and her familiars, from The Discovery of Witches [33]*, a 1647 book by the 'Witchfinder General' Matthew Hopkins (who had her hanged).*

of spirit or imp. According to some accounts, the witch could send the familiar (which could often change its shape or form as needed, e.g. turning into a bird or a bat) out to gather and *bring back news* on things happening, maybe in private. So the witch would end up with a continuous information source about other people's lives, secrets, happenings around the village or potentially the world, all in the comfort of her own home.

Perhaps the room itself might be thought of as having virtually expanded, as in an 1857 account of an American Telegraph Company meeting recounted by Jeffrey Sconce, in which the reporter suggests that it perhaps took place in "A large room, that—seven hundred miles in diameter... members together in spirit—in communication and yet in body seven hundred miles apart!" [32] Of course, the telegraph users knew they were in contact with each other, while the subjects of familiars' enquiries perhaps did not. (For very different reasons, there is an echo, somehow, of the blue-painted *haint ceilings* of the Gullah people along the low country of the South Carolina and Georgia coast—as we see here—resembling the sky such that a porch roof seems to disappear, confusing ghosts and keeping them away from the home.)

In our contemporary lives of Zoom and doom, even more so right now when so many of us are really receiving so much of our information remotely, you can perhaps see where I'm going with this. In particular I'm inspired by the descriptions of the familiars of the witch Elizabeth Clarke in *The Discovery of Witches* [33], a 1647 book by the 'Witchfinder General' Matthew Hopkins, who bragged about the witches he had found (and had had killed; Elizabeth Clarke was hanged). The polecat, Newes, is literally a creature that Elizabeth Clarke could delegate to bring her news from elsewhere while she's sitting in her chair, which in some ways is not terribly different to the idea of a news feed, or the idea of something like a daemon in software. The 'private' news she gets about people's lives is almost a form of spyware, or a behavioural profile maybe. She talks to the familiars to issue them commands, ask them questions. They are essentially voice assistants.



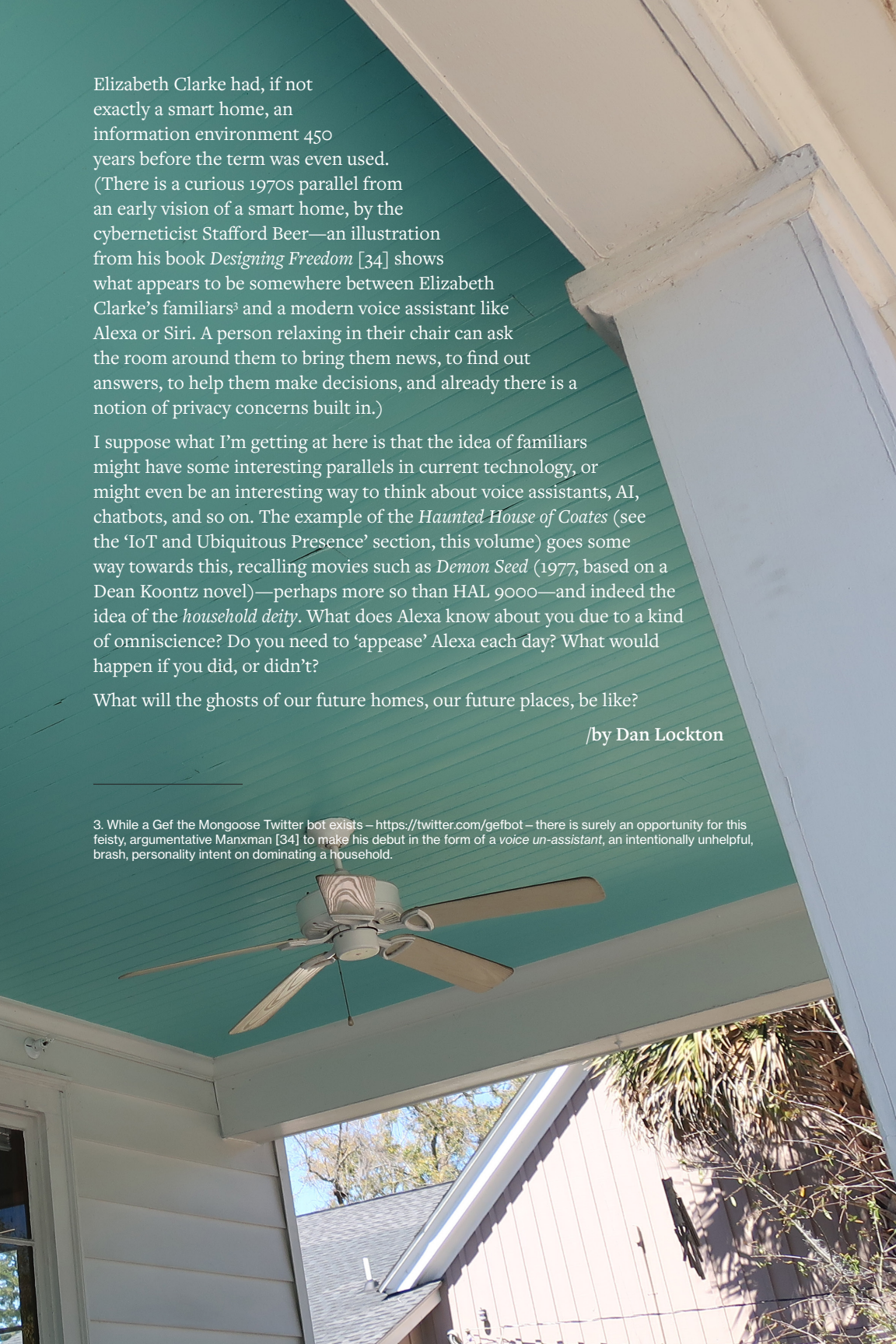
Elizabeth Clarke had, if not exactly a smart home, an information environment 450 years before the term was even used. (There is a curious 1970s parallel from an early vision of a smart home, by the cyberneticist Stafford Beer—an illustration from his book *Designing Freedom* [34] shows what appears to be somewhere between Elizabeth Clarke's familiars[3] and a modern voice assistant like Alexa or Siri. A person relaxing in their chair can ask the room around them to bring them news, to find out answers, to help them make decisions, and already there is a notion of privacy concerns built in.)

I suppose what I'm getting at here is that the idea of familiars might have some interesting parallels in current technology, or might even be an interesting way to think about voice assistants, AI, chatbots, and so on. The example of the *Haunted House of Coates* (see the 'IoT and Ubiquitous Presence' section, this volume) goes some way towards this, recalling movies such as *Demon Seed* (1977, based on a Dean Koontz novel)—perhaps more so than HAL 9000—and indeed the idea of the *household deity*. What does Alexa know about you due to a kind of omniscience? Do you need to 'appease' Alexa each day? What would happen if you did, or didn't?

What will the ghosts of our future homes, our future places, be like?

/by Dan Lockton

3. While a Gef the Mongoose Twitter bot exists – https://twitter.com/gefbot – there is surely an opportunity for this feisty, argumentative Manxman [34] to make his debut in the form of a *voice un-assistant*, an intentionally unhelpful, brash, personality intent on dominating a household.



Note: The title of this essay, ‘Far away is close at hand in images of elsewhere’ is taken from graffiti on a wall near Paddington station, London, in the 1970s, explored by Philip Wilkinson [36]. I first saw the phrase in someone’s signature on a forum about 20 years ago and it’s haunted me ever since.

[1] Mark Fisher, 2014. ‘The Slow Cancellation of the Future’ in Ghosts Of My Life: Writings on Depression, Hauntology and Lost Futures. Zero Books.

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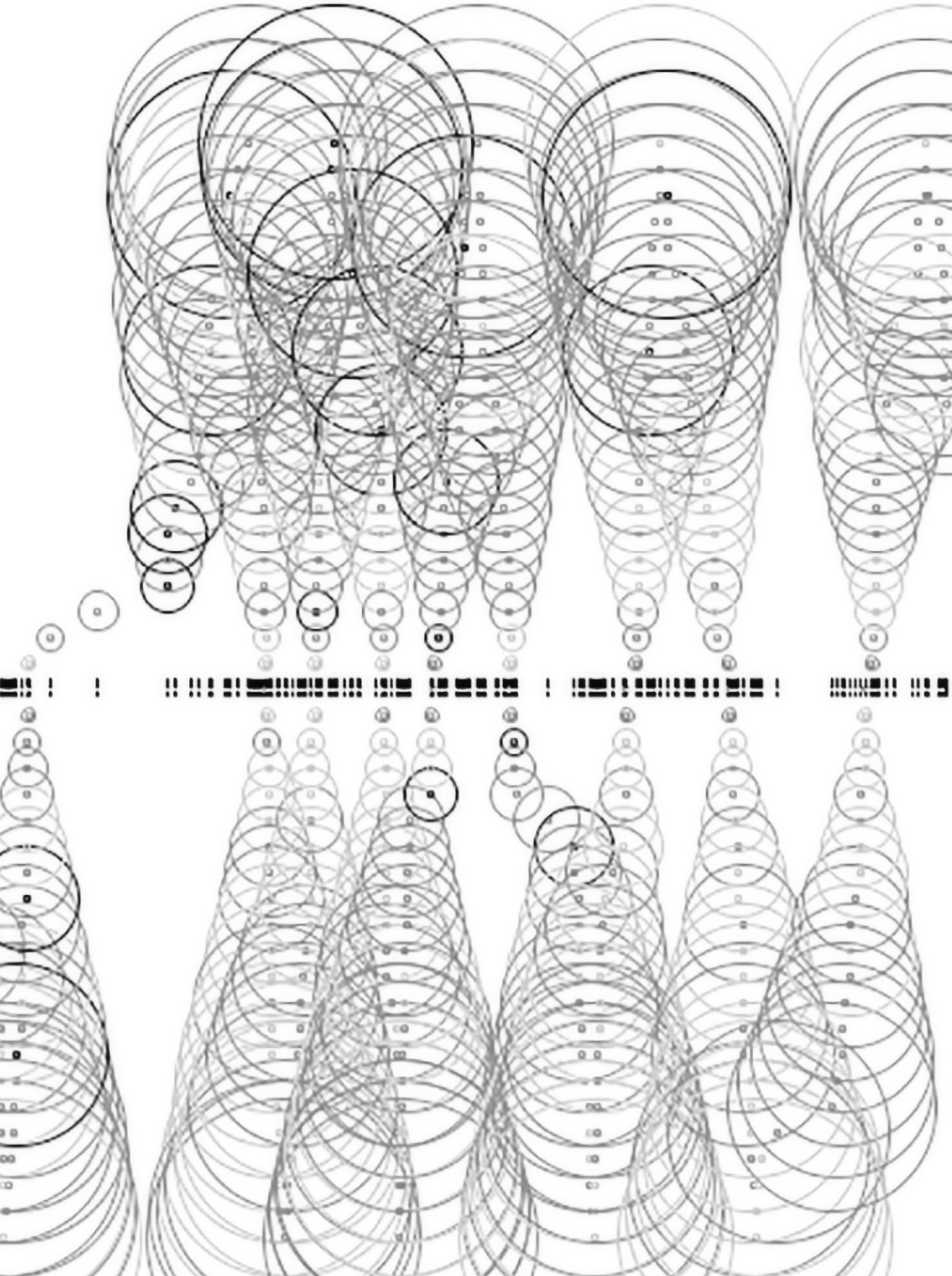


That which is hidden

> "Terms such as 'esotericism' and 'occultism' are particularly loaded ones, which tend to arouse suspicion and misunderstanding."
>
> – Some Remarks on the Study of Western Esotericism, Wouter J. Hanegraaff [1]

For most, 'The Occult' conjures unsettling images of malevolent spirits, dark practices, and the horrors that come with it. But read in the strictest view, the occult simply defines as *that which is hidden from us.*

While occultism has become synonymous with many forms of dark magic, mysticism, witchcraft and wizardry, the supernatural and the superstitious, the occult in fact has a more complex and nuanced history. In its original Western use, the *Occult* is an umbrella term for the things in our world, real or imagined, that neither science nor religion has stake or purview over. This Occult is a space where some of our most fundamental beliefs operate: that there are unseen forces beyond human understanding that operate and exist within the world, and that they will elude or defy rational explanation by traditional modes of scientific inquiry. Hanegraaff explains that "*it functions as a generic term for a diffuse collection of writings concerned with the paranormal, the occult sciences, various exotic wisdom traditions, contemporary New Age spiritualities, and so on* [1]." But in the 16th century the occult encompassed three specific practices: *astrology, alchemy, and natural magic*. And these are in some ways precursors to several scientific domains today: natural magic led to the development of medicines, alchemy was the forebear of chemistry, and astrology advanced understanding of the universe paving the way for modern physics.

The occultists — or 'esotericists' as they are more politely referred to — studied mystical, otherworldly or seemingly inexplicable systems that operated within our world. They wrote extensively about them, and it was, for many, a legitimate form of inquiry into the fundamental properties of our world. For example, Paracelsus, Isaac Newton, and Walter Raleigh were among famed alchemists. The scholarly interest in the occult can be seen either as a pursuit of alternative forms of knowledge or as a cultural response to the role of science in rationalizing the world. The emergence of formal scientific inquiry, and later the Age of Enlightenment — also known as the great 'Age of Reason' which began in the 17th century, prioritized science and industry at the expense of tradition and culture, and led to modernity — was seen by the esotericists as an unhelpfully singular, unified way of organizing understanding and navigating human knowledge. By engaging the hidden or unexplained phenomenon as a line of deep inquiry, esoteric researchers and practitioners prioritized "*a vital and important dimension of reality which they feel is being threatened by onesided rationalization, secularization, and the mechanization of the world.* [1]" These esoteric explorations were "*motivated by a latent or explicit dissatisfaction with contemporary western culture, and particularly with patterns of desacralization and 'the disenchantment of the world'* [1, see also 2] ."

Modern science can be posited as something that reduces marvelous phenomena into something explainable, rational, and demonstrable. In so doing, it may remove the wondrous qualities that surround these occurrences. In contrast, occultist science is concerned with the enchantment of the world; it is grounded revealing how these observable effects are related to — and can be wielded and manipulated through increased understanding of — otherworldly and higher powers. That is to say that the occultist sciences — and while entwined and sometimes overlapping with the scientific inquiry [3] — were framed in a way that is fundamentally different from scientific inquiry.

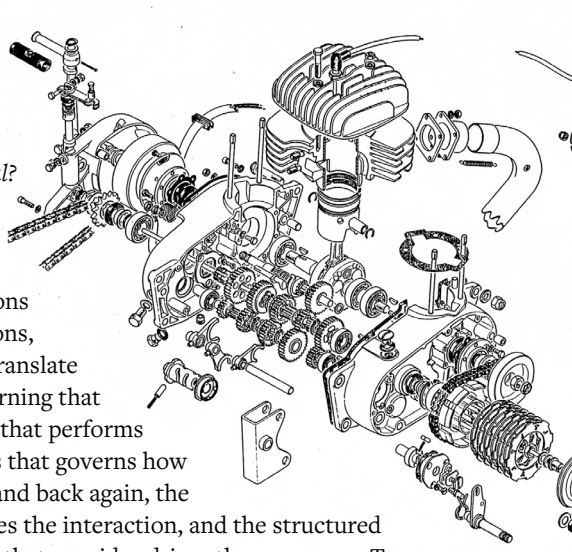
> "On the one side of the Great Divide lies nature, a voiceless and purely objective world 'out there', whose hidden mechanisms are unlocked by detached scientists using technical instruments to amplify their perceptions. Human culture lies on the other side of the fence, 'in here', a self reflexive world of stories, subjects, and power struggles that develop free of nature's mythic limitations." – Erik Davis, Techgnosis [4]

With this in mind, let us turn our attention to modern Age of Technological Reason and Enlightenment.

Technology as an Occult Force

New mechanical marvels are being produced at a rate of knots and scientific production is doubling every nine years [5]. Systems, data, and algorithms govern everything from traffic to electrical grids and the transmission of that knowledge around the globe at blinding speed. Each new everyday system encodes a legacy of scientific inquiry and enlightened rationality into its delivery and operation.

But what is rational is entirely grounded on the wisdom of the day. This makes the relationship between what is considered scientific and the occult equally complex. For example, today we see magnetism as rationally explained by unpaired electrons, but this relies on the understanding of the atom, and its structure, which is a relatively recent scientific concept. It was, after all, not all that long ago magnetism was relegated to the Occult, as a hidden force that could not yet be explained [6].

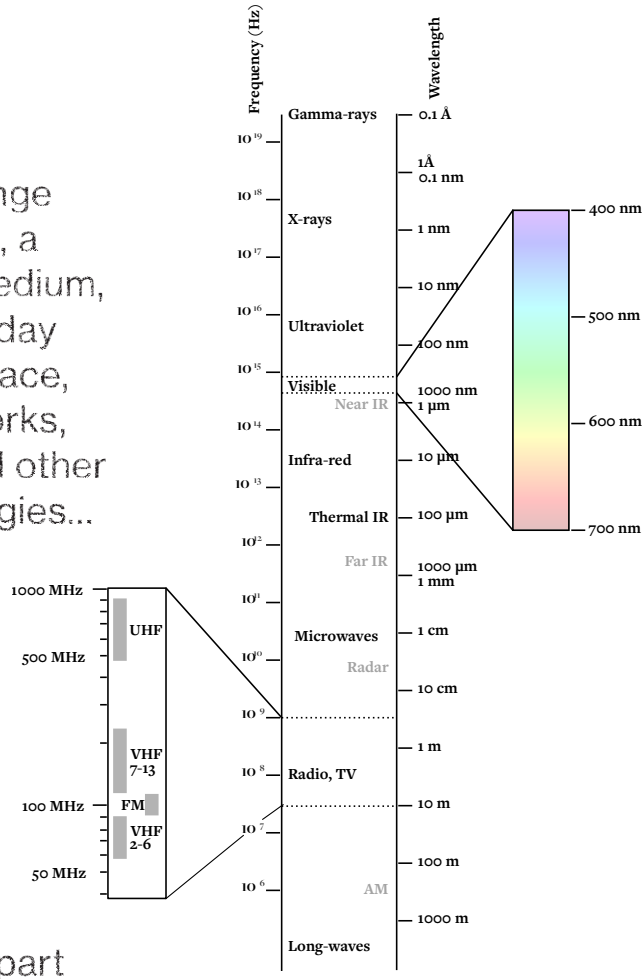


What if we examine contemporary technology in the same way? *Does it enchant or disenchant the world around us? Is it rational or supernatural?* This perhaps depends on who you ask. The technologist can reduce an Alexa to its constituent parts: the wireless, electromagnetic transmissions that enable networked communications, the natural language processes that translate our speech into text, the machine learning that matches that text to action, the code that performs that action, the networking protocols that governs how the device communicates to servers and back again, the far field microphone array that enables the interaction, and the structured information available on the internet that provides drives the responses. To someone not savvy with the systems and processes shaping this interaction, it could appear as magnetism did for centuries [4,7]: an occult force.

Regardless of how we can reason about our electromechanical objects, as we've seen throughout this volume, these systems no longer simply rational, orderly, and scientific mechanisms. They are complicated by their engagement and entanglements with humans and the everyday [8], the messiness of our lives [9], and the array of beliefs, superstitions and cultures engaged with them [10, 11]. To situate everyday technologies solely under the umbrella of scientific rationality and explanation feels disingenuous. Just as the esoteric practitioners felt of the original Age of Enlightenment, to do so erases the wonder and enchantment that technologies might offer.

Perhaps an esoteric (or spooky) exploration of these spaces is exactly what's needed.

"It might seem strange to write about radio, a long-established medium, when discussion today centers on cyberspace, virtual reality, networks, smart materials and other electronic technologies...



But radio, meaning part of the electromagnetic spectrum, is fundamental to electronics. Objects not only 'de-materialize' into software in response to miniaturization and replacement by services, but literally dematerialize into radiation."

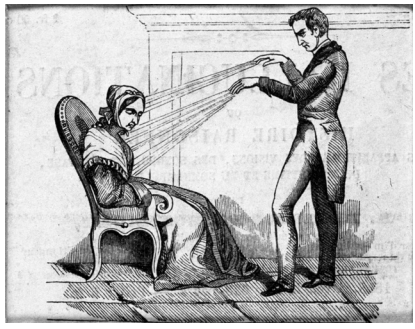
— Anthony Dunne,
Hertizian Tales [12]

A diagram highlighting the visible and RF parts of the electromagnetic spectrum.

From Magnetism to Other Unseen Forces: The Hertizian Objects of our Homes

In the description on the preceeding page, Dunne highlights how the wide variety of electronic objects that now inhabit our home are 'extrasensory' [12]. The underlying communication that enables our smart and connected devices — WiFi, Bluetooth, RFID — scatters imperceptible electromagnetic fields about everywhere and every which way. Although they operate under well understood principles of science and technology, many of their mechanisms, operations, and functions remain transparent, intangible, and hidden to us. Equally, Dunne's conception of Hertzian Spaces serves as a reminder that us that these objects don't present notional connections to ethereal clouds somewhere else. Instead, they are grounded in physical and spatial processes that are imperceptible to us.

Similarly, projects, like like Timo Arnall's 'Immaterials: the ghost in the field' (2009) and 'Immaterials: Light Painting WiFi' (2011, see page 123), offer playful but important reminders that while networked communications may be unseen, unfelt, and imperceptible forces, they overlay onto and intersect with our physical being and physical environments [1]. This parallels the history of magnetism as an explicable and occultist force: the ways in which these devices behave, interact, and converse is just as opaque and mysterious. On one hand, 5G, WiFi, and Bluetooth extend and distribute our presence around the globe. Mobile telephony, video conferencing, and email are a vehicle to transmit our thoughts, our voice, and our bodies to almost anywhere in an instant. On the other, the many, many electromagnetic fields produced by our computers, phones, routers, and other devices intersect with our actual body in uncanny ways (both real and imagined).

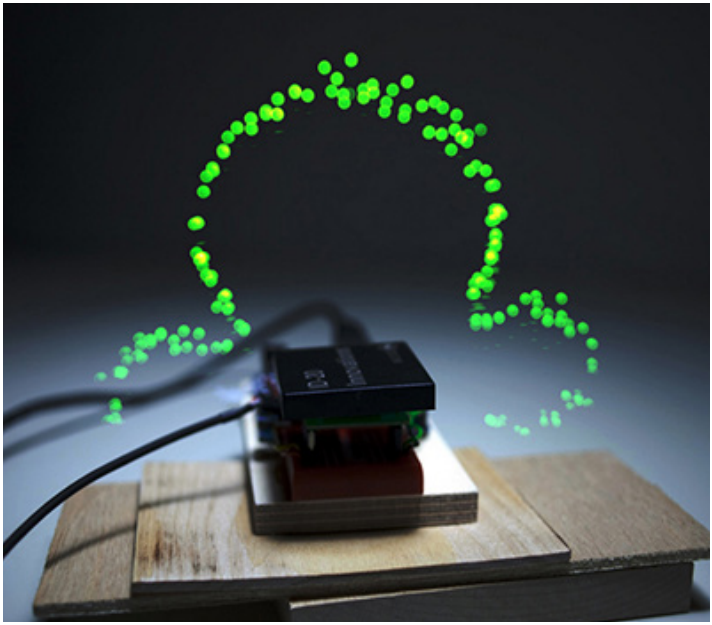


A practitioner of mesmerism using animal magnetism on a woman who responds with convulsions. Wood engraving. Mesmer, Franz Anton 1734-1815.

Mesmer is famed for his explorations of the exotic and uncanny effects of magnetism on the body. These is seen in the plethora of strange experiments in animal magnetism and alternative therapies that resulted. As if evoking this mesmeric legacy, Dunne asks of our electromagnetic objects: "*how do they touch us?*" [12]. This question provokes all sorts of imagined effects and harms. After all, these EM signals move through our bodies without or knowledge or our consent. It is only natural that we be suspicious of them. We see this in the recent belief in the 5G is affecting or mutating the body is discussed on page 73. It's present in the near history of radionics, power line paranoia, fears of electro-pollution and the many new myths and agitations about this ethereal electromagnetism.

[1] Curious Rituals (2014) [11] or Thought Collider's WiFi Dowsing Rod (2007) [13] also highlight the new everyday performances and ceremonies we make to these numinous, pervasive fields.

Above: Le Baquet de Mesmer. Used in magnetic therapies and healing, the baquet is a device to transfer excess magnetism from person to person.
Below: A still from Immaterials: Ghost in the Field. A light painting of the interactions between an RFID reader and a tag. http://vimeo.com/7022707



Hidden Presences, Endless Hauntings, Numbered Futures

The gaps between perception and conception and the dissonances between WiFi, 5G, and BLE's embodied and disembodied actions sets the stage for a powerful "*electromagnetic imaginary.* [4]" This is only furthered by the miniaturization of electro-mechanisms which makes them harder and harder to discern, the gulf — or perhaps cavernous trench — between apparent form and discrete functions and the vast and seemingly unknowable processes are enabled by these communication channels. Reflected in Tega Brain and Sam Lavigne's The New Organs (see page 113), we see the uncertainties, illogics, misconceptions, and folklore that are entangled with hertizian objects.

But it's not just the operation of these devices — the imperceptible back of forth communication through the airwaves — which is veiled. So too are the histories of these devices and their implications. Networked Anxieties (see page 107) and Chthonic Rites (see page 149) both examine the blurring of boundaries between defense research and consumer products, and the resulting hidden cultures and legacies that swirl around these panoptic intelligences: "*It gives Alexa and Siri a history, and thus a new way of understanding their hauntings,*" says Wesley Goatley.

The anxieties and uncertainties surrounding technology aren't limited to their pasts. It is found in equal measure in collective imaginaries (and experiments) with their futures: the propositions of anthropomorphic simulacra, a digital afterlife, artificial reconstructions, and other intelligences co-habiting our bodies (see Uncanny Valley and PostHuman, pages 176 and 210 respectively).

All this is to say, that almost every aspect of these electronic objects — from operation, economies, histories, positions, effects, and futures — constitutes an occult: that which is hidden. And these are not the only parallels between modern technology and occultist practices...

Within contemporary research on technology, there are growing attempts to attend to the dogma of knowing present within 'Enlightened' views [2]. David Rose has suggested that enchantment should be the underlying design principle in preparing designing ambient and tangible computing [14]. "*Enchantment*" is intended to evoke our collective imaginary of fantasy, fables and fairy tales in interaction design [15]. Paul Dourish and Genevieve Bell's choice of the word '*mythology*' further indicates how contemporary fables, lore and beliefs are entwined with socio-technical systems [9], Bill Gaver has suggested technologists and designers should pay more attention to ambiguity and leave room for subjectivity and belief rather than objectivity and literality in our interfaces to data and information [15]. Within these explorations, Tarot is one of the more appropriated supernatural metaphors for critical and reflective designs. It (like many other divination practices) offers a subjective and interpretive way – free of deterministic knowledge – to make sense of the (technological) world

[2] All too often these appropriations of magical terms are positioned in a Western-centric, Silicon Valley steeped, and Enlightened but disenchanted frame. For example, the use of convenient tropes like the wizard's wand as a metaphor to explain gestural and embodied interaction [21-23]. Projects like BIY™ (see page 55), or recent work by Sharifa Sultana and Syed Ishtiaque Ahmed [24] that inquires on othered practices of witchcraft, spirituality and indigenous, local belief-based practices, argue for the occult as an under-explored but valuable lens on post-colonial computing [25]. This reminds us that all too often technology, inquiry and explanation is framed from a western-perspective, what opportunities lies within the wisdom, folk or otherwise, of non-colonial cultures?

around us. It has been suggested as an approach to observe and critically reflect our entanglements with the data generated by connected devices in the home [16], to reveal patterns in algorithmic analysis [17], attend to hidden technical infrastructures [18], and more besides. Horoscopes, crystal balls, and fortune-telling also offer culturally familiar but ambiguous techniques that are well suited to reflection and "*open-ended interpretation and orientation*" around systems, outputs and processes [19].

"Predicting the future is no longer about the mystical reading of natural and celestial phenomena. Today it is all about data."

– James Auger and Jimmy Loizeau, Real Prediction Machines [20]

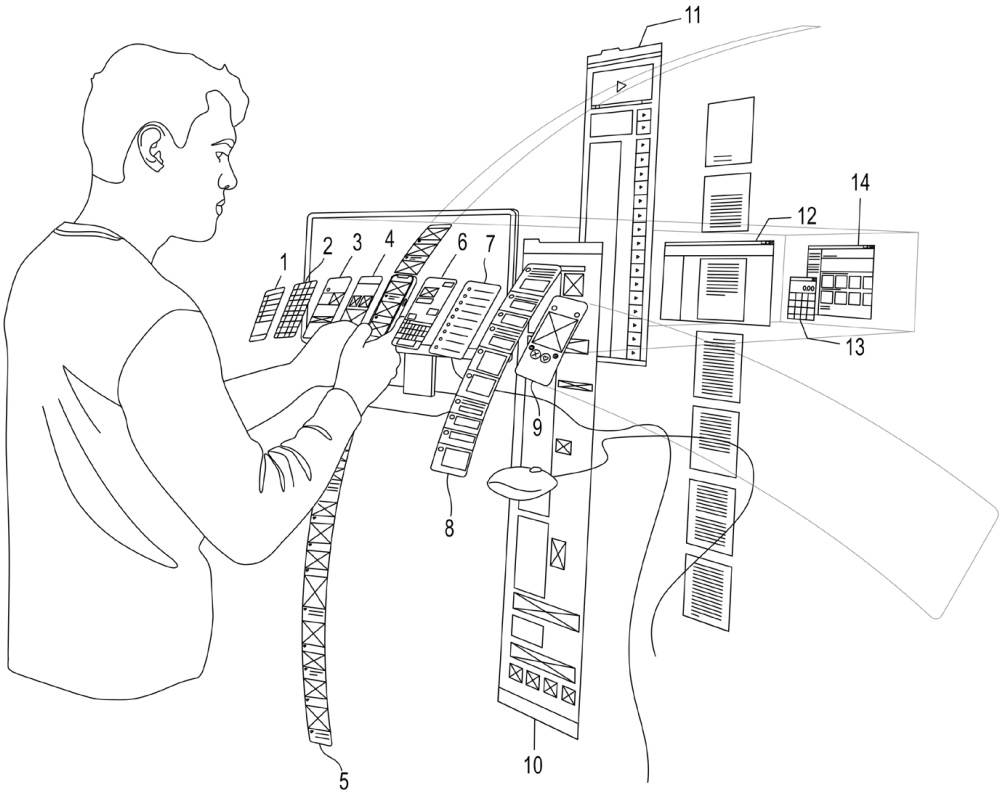


Diagram of the screen based interactions within a room. From the Multiplexer Room. Credit: Policarpo Baquera.

"When the animated objects around us become interconnected – as in the phenomenon dubbed internet of things – our living rooms turn into living entities and we into modern shamans staring in disbelief. Indeed, it has become more normalized to be animistic, as the things around us are gaining 'souls'."

– Michael Leube [26]

Animistic Technologies: New Agencies and Tensions

Animism suggests that elements of the natural world are imbued with divine properties, an intelligence or a soul. This most often is found in the traditions of Aboriginal, Native American, and other indigenous populations. It was extracted, through anthropological examination of these cultures by Edward Tylor, and formalized into the term *animism*. This draws from the Latin word 'anima' and means breath or soul. While Tylor problematically positions this construction of indigenous beliefs as primitive [26, 27], the irony is that these ideas pervade the 'advanced' Western inquiry, and cultural traditions. For example, a form of animism has a strong foundation in the esoteric practices of Western occultist science. Natural magic imagines that otherworldly and unseen forces are infused and engrained into the everyday objects around us. For example, natural magic considered that the ethereal properties of the sun, light, and other heavenly essences flowed into herbs and other medicinal flora and that is what gave them their potent abilities. Similarly, the long-held and active tradition of touching or knocking on wood to avoid tempting fate, originates in Celtic superstitions and seeks to avoid riling the spirits or fairies that might be inhabiting a tree.

In 2004, Mike Kuniavsky predicted that the coming age of pervasive, networked, and complex everyday technology would soon cease to have mechanistic rationalization [28]. Instead, Kuniavsky suggested anthropomorphic and animistic outlooks would become the norm for how we explain and interpret these ubiquitous intelligences: "*an animist outlook — one where people project behaviors, expectations and intentions onto objects and environments that may have nothing to do with how they actually function — may well be a major sea change in the way that designers have to design.* [28]." Almost in direct response, Betti Marenko & Phil Van Allen recently adopted this animistic outlook on technology as a framework to design interactivity between a human and a non-human, such as voice-assistants [27]. Similarly, Joe Lindley's "Ghosts in the Machine" (see page 131 & interview on page 134) suggests an experimental animistic methodology wherein IoT products are brought to life in short film to examine the smart home from the perspective of the devices that enable it.

This recent reinvigoration of animism as a lens on technology [29] and design [27] is perhaps the best indication of a move towards a re-enchantment of our modern world.

This renewal of animism reflects a growing interest in the souls and intelligences of our new technological companions. But it can be expanded to explore questions surrounding the agency, histories, and other hidden properties of the objects within our life. Simply put, this animistic outlook can be much more richly interrogated. Agency in the smart home is most often debated and coordinated around the potential of the occupants to act on, shape and assert control over the devices (and the sociocultural positions they present) within their own homes and lives [30]. However, distributed cognition reminds us that environments shape our thinking and our action [31]. They have subtle and overt agencies over our actions, behaviors, and beliefs. In discussing the IoT, Keller Easterling remarks that "[*we*] *are not accustomed to the idea that non-human, inanimate objects possess agency and activity, just as we are not accustomed to the idea that they can carry information unless they are endowed with code/text-based information technologies* [32]." Objects have much richer spiritual, sociocultural, and agentive essences than we give them credit for. What would happen if we greatly expanded our current animistic outlook to a richer notion of the hidden but deeply engrained material cultures, influences, and interventions that objects can in reality be imbued with? This is perhaps best suggested in Hito Steyerl's "A Thing Like You and Me" [3]

"In this perspective, a thing is never just an object, but a fossil in which a constellation of forces are petrified. Things are never just inert objects, passive items, or lifeless shucks, but consist of tensions, forces, hidden powers, all being constantly exchanged. While this opinion borders on magical thought, according to which things are invested with supernatural powers, it is also a classical materialist take. Because the commodity, too, is understood not as a simple object, but a condensation of social forces [33]."

[3] Further illustration of this esoteric thinking can be found in the many metaphors, domain-specific-terms and operations that derive notionally from mystical and occultist traditions. For example, a quick Google search demonstrates 'alchemy' as an overused moniker applied to machine learning and data analytics toolkits and processes [34, 35]. It is perhaps the most successful form of alchemy to date; actually transmuting something altogether ethereal and intangible into substantive worth and doing so on a daily basis and at an incredible scale. Ethereum - a popular cryptocurrency – equally draws from alchemy and occultist forces; specifically evoking the aether, one of the medieval elements – a invisible 'spirit' or force latent that pervaded the heavens, was latent in all things and bound them together with animistic potentials and operating as an occultist glue. Unsurprisingly, the power and vitality found within the 'cloud' and within ubiquitous RF-based tele-communications has drawn many comparisons to the aether too [36]. Of course, these parallels between the "*transmutable powers of electricity* [7]" are nothing new with Sconce noting some time ago: that "*the shared electrical basis and apparent electrical transmutability of the body's flow of consciousness and flows of information in the media have produced a remarkably consistent series of cultural fantasies* [7]."

The Frame of the Occult

The inquiries discussed above may seem disparate and disconnected. However, taken collectively — as we have tried to do within this volume — we see a growing body of work and practitioners interested in the application of esoteric and occultist frames to computing. Their objectives and rigor in doing is varied but this short summary illustrates a far broader array of explorations of re-enchantment of technology than we could possibly cover in this book. This is also suggestive that a 'third way' — that is outside the dualistic theistic / scientific frames we have previously used — of understanding, designing, and interrogating technology is more than possible. But it is, perhaps, an increased interest in an 'animistic outlook' on our technologies that offers most promise in this regard.

Returning to our original frame: the occult is misunderstood and represents inquiry into that which is hidden. It offers a third way of viewing the world to examine phenomena, real or imagined, without the modernist dualistic frame of science or religion. The occult is a space that acknowledges the many hidden forces beyond human understanding that operate and exist within the world, and that they will elude or defy rationalization of science.

Magnetism — an occult force and one of the elemental and aetherial properties of our contemporary electromagnetic objects — has offered many parallels to this conversation. Science transforms the marvel of magnetism into something explainable, rational, and demonstrable through applied physics. By reducing phenomenon of the world in this way, modern science can be seen as an ongoing disenchantment of the world. In contrast, occultist science seeks enchantment and is grounded a reverence for and rigorous inquiry into otherworldly, higher powers.

This perhaps makes the occult a very necessary frame now: a means to be more thoughtful of our technologies, to acknowledge that they are more than mechanical marvels and technological processes. After all, they operate in part in our world, and part in the aetherial otherworld of the cloud. In their digital realm, they are offered a terrain unbounded by the properties of the physical plane, its conventions, and its science. But they can also possess new properties, new physics and new rules devoid of how our physical plane behaves.

Their hertzian signals operate, not just as an information flow but, as a supernatural highway connecting spirited processes and presences to our bodies and our spaces. This creates forces that push against the world we inhabit, often confounding human perception. In our world, we act like alchemists, seeking to craft these digital forces into something new and transform it into gold: through Bitcoin mining, through data harvesting, or through bot trading. The internet and the smart home, the operation of these devices, the way they communicate and the variety of forces — communicative, functional, social, cultural, historical, economic, and political — behind them are thoroughly veiled and hidden.

/by Daragh Byrne

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Stranger Visions

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A reflection on the invisible and otherworldly qualities in everyday technologies

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