Spring 5-17-2018

The Vanishing Line

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A thesis presented to the Sam Fox School of Design and Visual Arts
of Washington University in St. Louis in partial fulfillment of
the requirement for the degree of Masters of Fine Arts

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Abstract

This thesis is an exploratory effort to bridge the rift that political and monetary powers created between art and technology. In my practice, these socio-political motivations are exposed through the creation of non-utilitarian inventions that use different technologies as charged metaphors. I research mass media language and construct interactive pieces while borrowing strategies from the entertainment industry to make environmental, social, and political issues more palatable than documentary films or raw data could. In my work, technology is regarded as a semidivine entity with supernatural powers that can both elevate and reduce the human experience. My work functions differently according to its audience: it encourages technology experts to consider the moral ramifications of their creations, and artists to recognize technology as one of the leading influencing factors in contemporary society.

Introduction

I am interested in the ethics of technology and its potential for both oppression and resistance to oppression. The fluctuation of power in technology is largely dictated by the diffusion of certain phenomena and the individuals who invest in it. I believe artists have an important role in providing inspiration and raising awareness to the general public. Science fiction is a great source of inspiration for my work, because it allows the viewer to experience a potential future by extrapolating contemporary situations. While science fiction often presents a distant potential reality, in my immersive installations viewers are confronted with the immediate ramifications from the loss of civil rights like voting rights, privacy, freedom of thought or belief.

The advent of virtual reality has sparked the public's imagination and several large companies are investing heavily in the development of tools to access and interact with this new plane of existence. Social networks and MMORPGs (Massively multiplayer online role-playing games) began replacing social interactions over the last couple generations. Technology was born as a way to reduce, if not eliminate, labor, but it increasingly seems that more aspects of our lives would be simplified if they were abstracted away, reduced to virtual actions that require little to no knowledge to execute. This level of convenience has become synonymous with this superpower that allows us to transform thought into action and lead several companies like Elon Musk's Neuralink to research brain-AI interfaces, capable of interpreting our thoughts in a computer understandable command. This is probably at least a few decades away, but it opens the door to the heavily prophesized theme of existing as entities composed of energy or, in a potentially dystopian twist, organic computers.

The End of a Technological Era

The cyclical nature of history teaches us that we are between the end of one major era and the beginning of another. We have witnessed the end of analogic technology and are currently at the pinnacle of the silicon based electronic world. The next step will be the quantum-based hardware and, with that, a lot of what we know to be a fact, or an absolute limit, might be shattered entirely. It is imperative to look at how this is affecting society and consider future means of dissemination as the cost and availability of technology changes.

The "Half Life of Facts" is an expression used to indicate the amount of time that it takes for well-established theories in a specific area of knowledge to be superseded by new information that extends or contradicts them[1]. The term is supposed to evoke the image of radioactive elements decaying, slowly turning into something less valuable. The concept has been around since the 1960s and in some fields like psychology it is estimated to be as low as seven years, due to the fluid nature of society and societal rules. This index is now beginning to seriously affect technology as we approach the limit of Moore's Law.

Gordon Moore, cofounder of Intel, postulated that the number of transistors in an integrated circuit will be doubled every two years. This trend has been pretty linear so far, but Moore's law was based on the premise that new technologies will allow for smaller transistors every two years. While we can create smaller devices in the shape of transistors, they simply don't work because we reached a scale in which the individual transistor's gate (the switch that determines whether a transistor is a 1 or a 0) is too small to properly function.

This might seem like a *small problem,* but it has global repercussions. The silicon chip industry often operates with huge tolerances between the nominal specifications and the factual

performance capabilities for their hardware. Not all the chips in a batch operate at the same level of performance, and the only way to know the true performance of what was bought is to test the hardware after it is purchased and hope for a lucky chip. Getting a good chip is often referred to as: *winning the silicon lottery*. These tolerances are caused by silicon impurities at a nanoscale. Many manufacturers like Intel and AMD use these range of performances to create families of chips that they sell for different prices.[2]

If the individual transistors cannot be scaled down, going forward then the only way to increase the processing power is to create larger chips with more processing cores. This is the reason why the new Intel and AMD commercial chips went from 2 or 4 processing cores to 10 or 12. As you might have guessed this means a larger silicon chunk that can potentially contain more impurities and an increase in the cost of entry level CPU's.

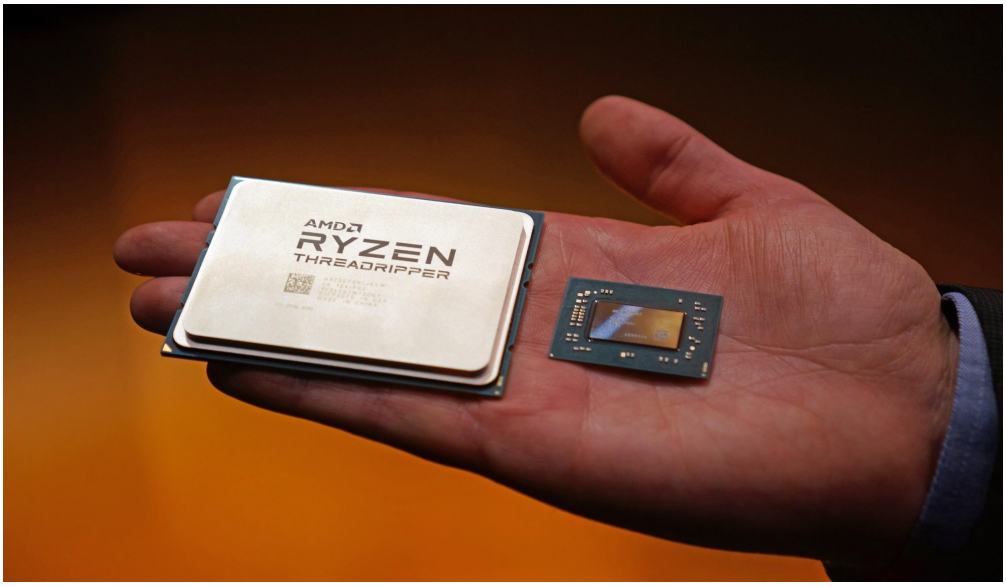

Figure 1 - AMD Chip Size Comparison

At the same time the advent of virtual reality games drove the graphic card industry to produce high performance cards in unprecedented quantities. This allowed for a reduction of the cost which in turn led to the adoption of such devices for bitcoin (or other cryptocurrencies) mining. Since July of 2017 it is near impossible to buy mid-range AMD graphics cards as they are being purchased in bulk by cryptocurrency miners that determined the ROI was optimal for that price point.[3]

These phenomena can be traced back to the personal computer revolution. The industrial or medical computers are 10 or more years old, they do one job and they do it well. Lev Manovich mentioned some of the same trends back in 2013 in his book *Software Takes Command* but he specifically focused on the pervasiveness of what he calls *media software* or in lame terms software that someone else creates for you to use creatively, i.e. word processors, Photoshop etc. today, only five years after the publishing date of that book the debate revolves around coding literacy as a basic skill on par with reading and writing. [4]

I remember when I graduated from high school most of the job offers were posted by banks looking for COBOL programmers (the programming language equivalent of Latin, an ancient language created in 1959) because it is a tested and true system. My computer Science professor at the University of Florence was specialized in safety critical systems, (aircraft's landing gear, dam containment valves etc.) and he taught a class on MIPS2000 architectures. MIPS2000 is a hardware platform that barely exists anymore, it has to be emulated to run. This is the equivalent of a dead language, but it is still in use on airplanes and other industrial applications created between 1985 and 2000. In contrast, personal computers have ridiculously short life cycles and even shorter release cycles. Paired with practices like planned obsolescence

and lobbying against the right to repair this exploitation system makes hardware age extremely quickly and ensures a continued revenue for the company that sold you the device.

This short life cycle is relevant for artists considering technology as their primary medium of expression. If the artist employs technology as a means to create something else this might not be a problem. In fact, being able to buy a used device for cheap seems like a great deal, (one that companies are quickly marginalizing with buyback incentives to remove perfectly good used hardware from the market). But if you intend to create pieces that leverage existing technologies and services, then constant upkeep is necessary and sometimes insufficient if the service used is discontinued or becomes unaffordable.

I encountered that very problem while maintaining *Amarcord.*

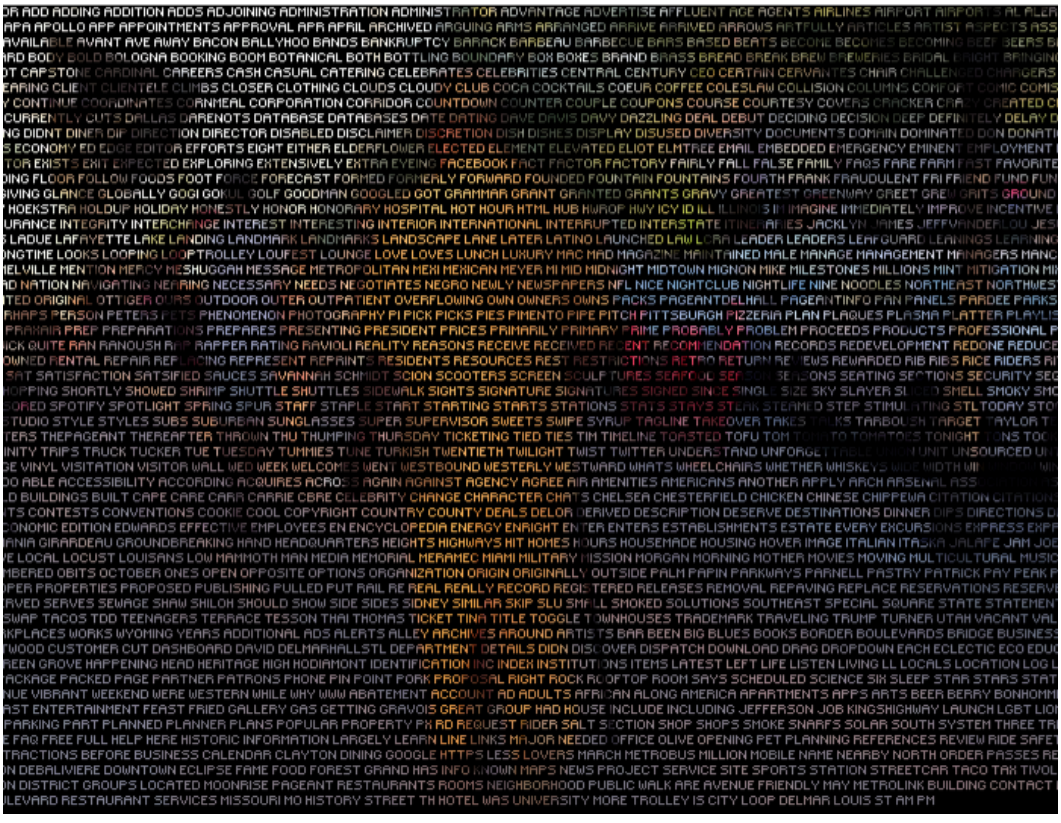

Figure 2 - Jacopo Mazzoni, Amarcord

In this ongoing project I select a specific location in the city I currently inhabit, film it and constantly collect all the latest news regarding that place. The text extracted from every news page is deconstructed by arranging each word by statistical occurrence. As this happens the image becomes visible through the text, revealing the filmed location. While the text becomes less discernible, the visual record becomes a fragmented composite of the physical space and the events associated with it.

My project's name is a reference to Fellini's masterpiece by the same title in which he revisits some of his childhood memories amidst the literal and metaphorical fog of the landscape. My project is currently shrouded in a similar fog. Since the piece pulls the news information in real time it needs to relay on one of these third-party search engines to provide the source content. This makes each time the piece is shown completely unique as it is pulling from a completely new landscape of information but also completely connected and dependent to these information providers like Google, Yahoo, Bing, etc.

This project spans several years and over that period of time many of the services I used changed their terms of service, most requiring a hefty payment for a service that used to be free. While each piece was initially intended to contrast the language used in the news description of a location with a more personal visual description, it quickly became apparent that the project was so intrinsically tied to the digital world that its interruptions were symptomatic of a larger shift in the power balance of the information world. Apparently, many large data-mining companies were using the same services I was using but with much more nefarious intentions. The most common misuse was attempting to influence search engines by creating fake interest in a specific website closely followed by searching and storing all publicly listed information for undisclosed purposes. Ben Rubin's *Listening Post* and *Movable Type* are two fundamental influences for this

piece, while the latter seems more like a commission and only pulls from one source of information the former pulls from internet chats in real time.

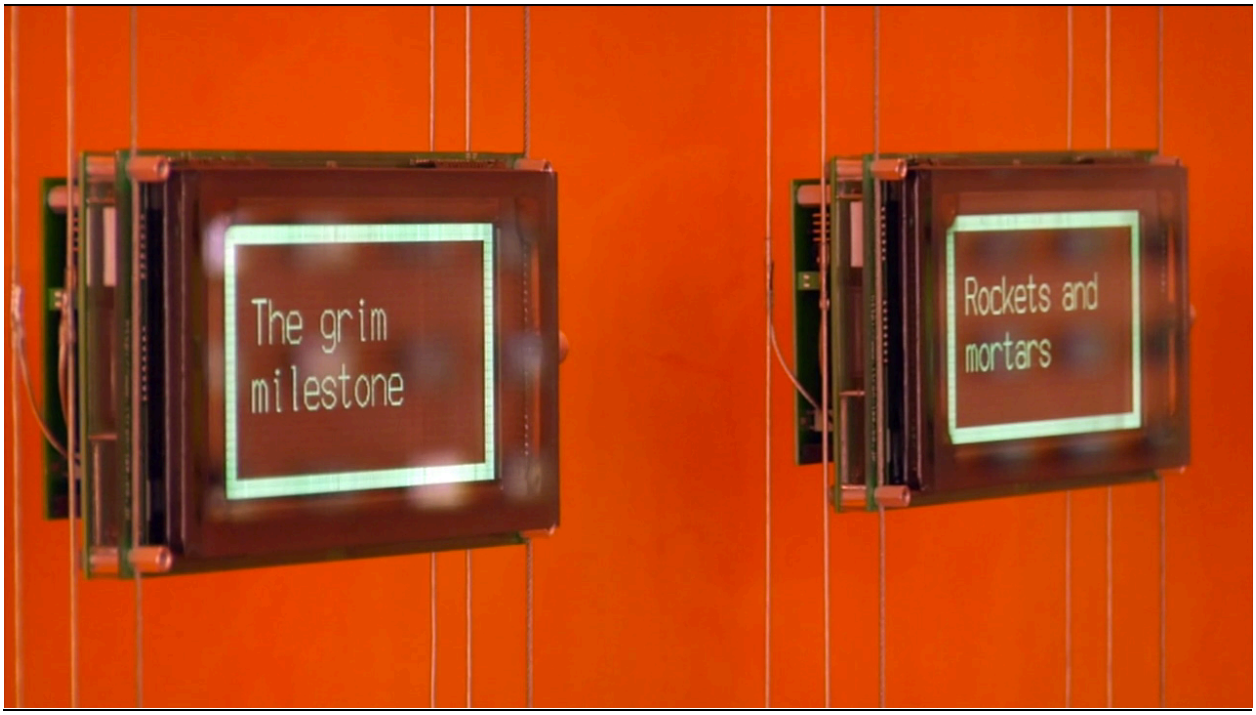

Figure 3 – Ben Rubin, Movable Type

This makes the piece a host, an empty body waiting for an ethereal spirit to animate it. The program searches and summons any sentence beginning with “I am” and displays it as a fragment of a presence with remnants of it originator’s identity. These information ghosts are made more interesting by the fact that they seem to be unaware of us or each other. They are pulled from different chats and when they are paired in this fashion they seem to combine and form a character with its own identity. An image of the web’s activity in that moment and how the people in it identify themselves. My piece operates in a similar fashion, by ranking the words that are more frequently used it creates unlikely pairings and random haiku like poetic images.

Impact of Technology: Its Dissemination in Society and Art

It is an important aspect of the nature of the virtual world, in its primordial stage the biodiversity of this technological ecosystem is at its highest, but the efficiency is at its lowest (unrefined simple entities). We have mimicked nature in a most intriguing way, the capitalist ideal of the survival of the fittest is the simplest form of social contract, the closest one to the rules of the jungle. Now it all risks coming to a halt because of one major opposing force: China, a communist country that is no longer willing to compromise on its ideals and will force some kind of unification of the discipline.

As artists, this information is paramount, both as the object of our artistic practice and as its subject. The geopolitical implications of a silicon chip are much more important now than at any point in history, even the time of its conception. Now that this era is coming to an end, we are at the highest level of infiltration of this technology. It is virtually ubiquitous. French philosopher Jean Baudrillard cites a passage of the short story by Jorge Luis Borges *On Exactitude in Science*, a fable of an empire that created a tangible one-to-one scale map of its territory laid over the landscape that is turned into shreds in the desert at a moment's notice.[5]

The most imminent concern is a return to cold war: a new crazed dictator has his finger on the doomsday button. Our history comes back to haunt us in the form of a technological ghost, a threshold of power that no longer excludes most of the players and upsets old balances again. These are some of the considerations that led me to create the piece *Reliquiae Naturalis*, an auction website set in the near future that sells shards of nature at extremely high prices. The website is disseminated with nods to historical events to come and economical information for

nature relics; much like stocks of the price of gold chart or drugs (i.e. dollars per gram of pine bark chart in the reserved area of the site).

Figure 4 - Jacopo Mazzoni, Reliquiae Naturalis

The commodification of nature for the ultra rich is hyperbole of recent political events and the idea was greatly influenced by the current art auction mechanics. *The tragedy of the commons* has never been so tragic: The BP spill, Fukujima, the Tundra Energy Pipeline spill, and the DAP construction on a major watershed and the recent bills opening national parks to CO2 injection and fracking. All those events, the visit to Bill Powhida's studio, and the video "Welcome to Life: The Singularity, Ruined by Lawyers"[6] inspired me to incorporate semi-fictional dystopian narratives in my practice. Bill Powhida's *After the Contemporary* prompted me to consider the role of my practice as an identity-defining process. I did not insert myself in this narrative, I inserted this narrative into my life. I will be the founder of the auction company,

I am performing all the acts described in the piece, I am collecting shards of nature and faithfully representing them in the website via 3D Scans. Unlike his piece mine does not stage multiple monologues, it enters a dialogue with its audience and the economic industry based on the exploitation of natural resources. The subtitle is a loosely translated poem from Giuseppe Ungaretti composed to illustrate the human condition of WWI trench soldiers.
Reliquiae is the Latin word for relics, the use of Latin in the title is not a nod to my cultural heritage, as much as an attempt to create an elitist and exclusive brand name. A dead language is a fitting parallel to the narrative developed in the piece in which I create an economy based on the circulation of dismembered pieces of a nature that does not exist any longer. All my 3D models come from a photographic source either a 3D scan or a photographic texture and all of them are available in virtual reality to reinforce the thematic link to commodification of nature and phenomenology and the blurring of the lines between these worlds.

On the other hand, the democratization of technology has brought innovations like the electric car and, brain to computer interfaces.[7]

Elon Musk's Neuralink was launched recently[8] and is now proposing to archive what Australian artist Stelarc could only symbolically achieve: "expanding the human potential past its biological limits". Incorporating hardware in one's body would be an incredible evolutionary step forward and as research in the neurosciences evolves we are finally coming close to discovering some of the secrets of our brain's inner workings.

Notably Musk's company is reverse engineering the effects of Parkinson to determine which areas of the brain are in charge of higher thinking. At the same time a team of neuroscientists known as the Human Connectome Project is imaging every inch of the human

brain with a new precision and are now able to map each neuron's connection to other neurons in lab rats.

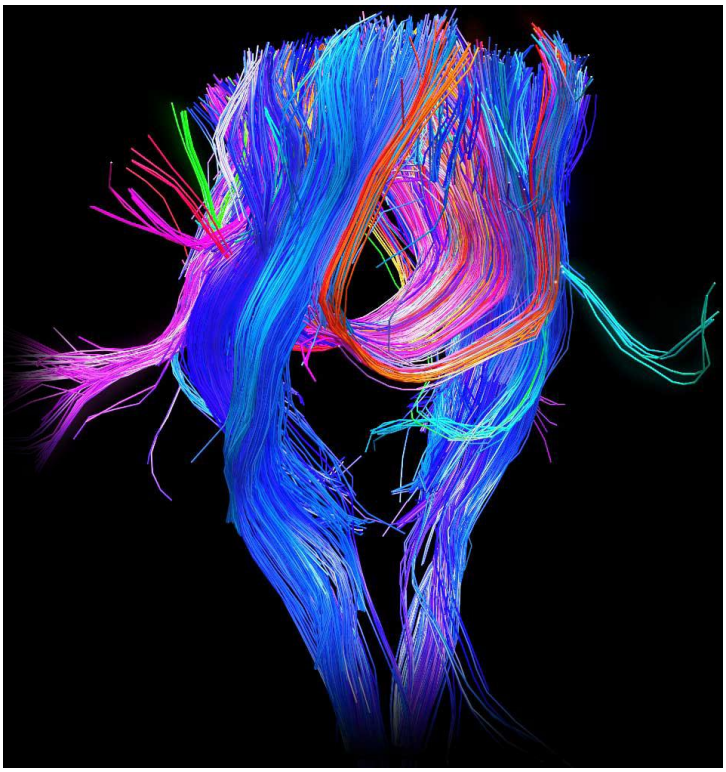

Figure 5 - Human Connectome Project

The human brain presents a challenge because of its massive scale: the imaging technique require compositing extremely small cubic tiles together. The difference in size between a rat brain and a human brain is substantial enough to still require years of work.

These new development in BCI (brain computer interfaces) are based on years of military research. Gareth Evans, author of the article: *Brain Computer Interfacing: a big step towards military mind-control* [9] points out that the army has been studying BCI's since the early 1970's. At the moment this technology remains just on the other side of the threshold,

unreachable and simply property of the domain of imagination, or an episode of the Twilight Zone.

Figure 6 - Rod Sterling's The Twilight Zone

Rod Sterling and many of the writers of that era were indeed visionaries, perfect oracles of the dangers posed by the power of nuclear power and space travel. Anyone working with technologies, artist or not, should take a mandatory *Ethics of Technology* seminar class. Existing outside of "the grid" means existing in isolation, and from a philosophical standpoint one could argue that that is equivalent to not existing at all. Much like a falling tree, or a photon passing through a double-slit, we need an observer to collapse the probability wave and concretize our existence beyond the one of a ghost.[10]

These are some of the questions that led me to create *il Conformista* (the Conformist); inspired by the 1970 movie by director Bernardo Bertolucci, the feature narrates the vicissitudes of a man during the violent fascist period forced to compromise between who he is and who the oppressive fascist regime wants him to be. Through the movie his elegant suits are an

anonymous armor. This tension is reinforced by the fact that the man is an agent for the secret state police.

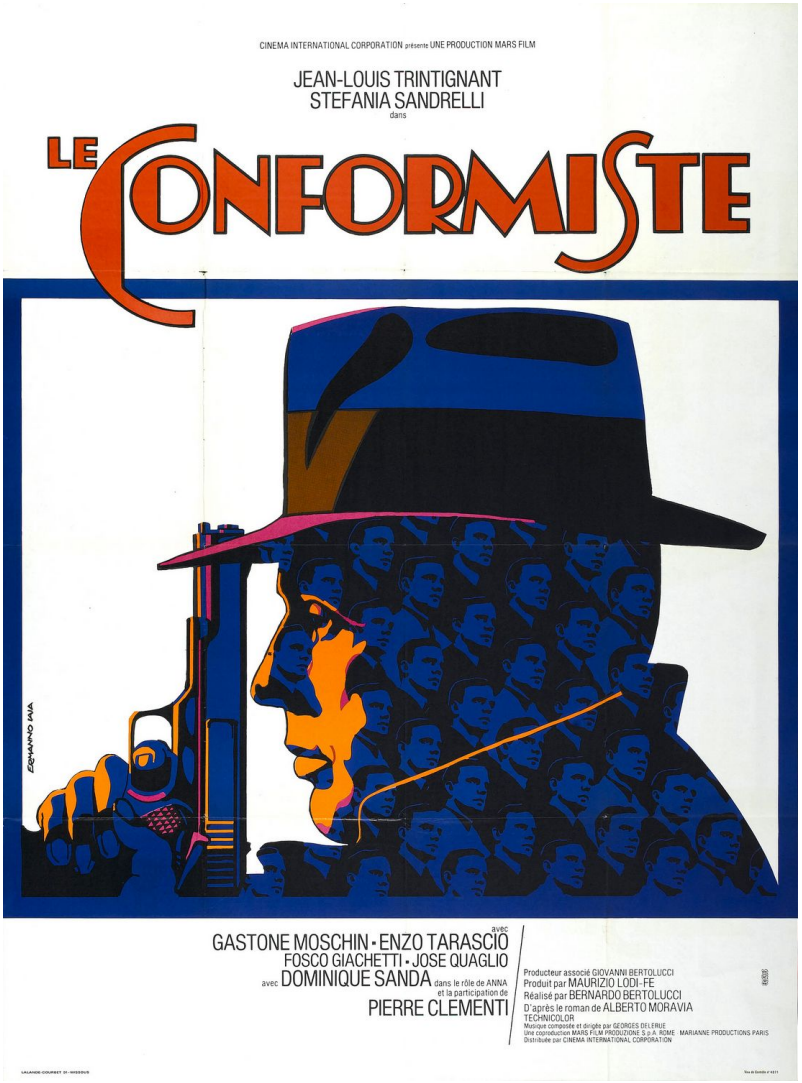

Figure 7 - Bernardo Bertolucci, Il Conformista's Movie poster

In my piece, a viewer can wear a hat resembling the one worn by the protagonist that allows the wearer to listen to a recreated portion of the movie, the confession with the priest.

Figure 8 – Jacopo Mazzoni, Il Conformista

That film dialogue fully embodies the duality of trying to fit in and maintaining individuality. The hat communicates through a small surface transducer that uses the skull as a resonating chamber. This creates an illusion of hearing disagreeing voices in one's head, fully immersing the viewer in the protagonist's shoes, or in this case, hat. The absence of a device in one's ears allows for a true augmentation of one's perception, an empathic sense of receiving a shared inner voice. At the same time the user is partially stripped of his freedom of thought while listening. The reference to the fascist regime is a hyperbole to comment on contemporary society as seen from an outsider trying to fit in.

The clash of Civilization and the Remaking of World Order, by Samuel P. Huntington is the extended version of an article he wrote for the journal *Foreign Affairs* in 1993, a book that simply divides up the countries by allegiance and the ones that don't quite fit are described as *thorn countries*, as in thorn between two major conflicting cultural influences. To his defense he later conceded that the world's geopolitical influence mechanisms are a bit more complex than

this but the damage is done: this highly divisive book is on the mandatory reading list for the US Department Of Defense employees.

Huntington describes Italy, my country of origin, as a thorn country, contested between Russia and America, doing business with both and lacking an identity of its own except for what the fascists created at the time. I think the first time I was presented with the immense popularity of this book I was frightened. I was shaking at the idea that other people might view the history of the birthplace of western culture as a sidenote, something of no relevance. But truly what I was afraid of is how easily we seem to forget, how nothing seems to be set in stone and that the more we can know the more superficially we pay attention to anything. It reminded me that the technology I was interested in is not computer science but information technology. The book is in itself a machine, a means to carry information as powerful as any other weapon of mass information. Its speed has now been surpassed by other technologies but the basic mechanism is the same. It is a piece of hardware, a concrete piece of reality that affects the virtual reality, the world of ideas, the Hyperuranion. As with the double-slit experiment the observer must reside outside the system of the experiment.

With the advent of digital records and documents this perspective has become even more problematic. In my cumulative 5 years as an international student I experienced first-hand the power that this bureaucracy can exert on an outsider and that motivated me to create the piece *Documents Please*. This video piece is a grotesque and ominous experiment with scale. Inspired by the work of Franz Kafka, and the bureaucratic load of my current immigration state, it pairs the textural details of my surroundings (a dollar bill, synthetic fibers, paper from documents etc.) with close up video of backlit architectural figurines. The reverberation of audio and visual

layers evokes the sense of disorientation and agitation that comes with immersion in bureaucracy or highly controlled environments like airports or planes.

Figure 9 – Jacopo Mazzoni, Documents Please

The imposing stare, angle of filming, and erratic movement refer to what I imagine a person turned into an insect, like Kafka's Gregor Samsa, might see when looking up. An inaccessible grotesque mountain, that moves away from or toward us without warning, a barrier that shifts with us blocking the way to the light, an omniscient untiring guardian. The soundtrack for this piece was obtained by recording a conversation about immigration and slowing it down until words are no longer recognizable. The haunting soundscape that results could be identified as the voice of the giant, the desolation of wind rolling down a barren wasteland or a plane's jet engine.

Worlds Colliding: Virtual Reality and the Vanishing Line

In this time of technological hegemony, the statement *Knowledge is Power* assumes a sinister tone. We have delegated so many social functions over the years to machine control that now gaining control of these systems can result in real power over people's lives. A vast majority of the population is ignorant of the mechanisms that govern their daily routine. This detachment from knowledge can be the source of innumerable afflictions.

The United States Navy Global Positioning System is a famous example of intentionally inflicted technological deception. In the 1980's the system was made available to the world for free, but with one catch: The system's precision would be reduced for civilian use and the coordinates were scrambled during military operations. (mostly to keep an edge over potential enemy users)[11]. It might seem like the United States government did a good job maintaining control over this technology but truthfully, the GPS system has changed very little since the 80's, and GPS jammers can be deployed to disrupt the inherently weak GPS signal to impede the use of the system in strategic areas[12].

The GPS example is common knowledge because the technology has not changed and the root problems are still present: the small number of users, the low occurrence of scramblers in the consumer world, and the enormous cost of reengineering satellites made the flaw a characteristic of the system. The same cannot be said of another military technology that was adopted by the consumer world: Internet. Unlike satellites, network equipment is relatively inexpensive and gets replaced or upgraded frequently. This allows for revisions and fixes to be distributed to the masses and problems to be easily addressed (and quickly forgotten).

This fluidity and rate of growth allowed the Internet to evolve from a system to maintain communication, in case of a nuclear attack, to the modern rich interaction space we enjoy today. One of the consequences of this rapid rate of growth is the inability of the uninitiated to keep up. This velocity of change allowed for the creation of a vulnerable set of users. This type of users often loses control of sensitive information leading to catastrophic failures. The nuclear launch codes have been released on several occasions, private politician's emails recently became public etc. Now there is an abstract virtual world which is potentially indistinguishable from reality with concrete repercussions on the real tangible world. This inverted hierarchy is beautifully postulated by Baudrillard in the *Precession of Simulacra*. In the first chapter the author establishes a variety of properties of the simulacra in relation to reality and real events but most importantly he declares that political incantation is a form of hyperreality.[13] My claim is that that the term virtual reality similarly highlights a line that is getting fainter each year. Arguably in many regards everyone's life is already regulated by virtual entities.

Television used to be the primary means of distribution of content. Today its relevance is diminishing as the Internet has become capable to fully absorb its functions, especially amongst younger viewers. It will likely be set aside in favor to streaming on demand versions of the same content with one exception: News. The continuous cycle needs a 24-hour stream that can reach everyone, not only those who seek information. This is largely due to the basic principle broadcasting networks are founded on: sell advertising space. Be it political or commercial that is the model. They seem unscrupulous in what they are willing to do to appease their advertisers and be able to afford broadcasting licenses. By comparison hosting content online is free on many platforms and allows for a variety of points of view that would not otherwise find representation. This unprecedented freely accessible space to host content allowed for the

creation of communities of creators that were able to connect with their audience in an unprecedented way. The content creator is less concerned with the diktat "please all the viewers" and can start to focus on "please your audience".

One of the defining traits of Internet is the capacity to elude government control. Emerging video artists do not need to submit physical copies of their work and can simply submit to international festivals by pressing a button. Depending on the government in question this can be seen as a grandiose feature or a terrible flaw. Skipping the censor can lead to the formation of international movements to defend free speech like The Pirate Bay or ISIS recruitment chats. The ethical question of how to monitor the Internet is still being debated. Some parties like NSA, FBI, and other security agencies advocate for an absolute control stance, and sometimes secretly enforce it with the covert collaboration of major US companies. Other parties like movie studios and the music industry, actively lobby for preferred lanes to deliver content and stronger copyright infringement regulations.

Most artists and activists prefer a wild land with no control and infinite potential. In *Art Power*, by media theorist Boris Groys, points out the avant-garde desire to be daring, break taboos, exploding norms, and destroying traditions. The Avant-garde legacy in the modern art world is located in the desire to avoid producing *harmless* work. According to Groys the current desire to disrupt, likens artists to terrorists in more than just an ambivalent way as terrorist organizations start to use the video art language and tropes to craft their infamous recruitment tapes.[14]

Virtual reality seems to be a perfect place for clandestine operations of this kind, a place to find like-minded individuals and establish a resonating chamber, a sub-society where the societally unacceptable becomes the norm. Historically the advantages of having such places

outweighs the disadvantages, for every pedophile or terrorist cell we have a whistle blower that prevents large corporations or governments from covering up their latest mischiefs. These people need to escape the circle of yes-men and collaborators they are surrounded by to find the courage to release incriminating evidence against their powerful employers. And while it is still early to judge Julian Assange and Edward Snowden for many they are regarded as martyrs who sacrificed their lives for the greater good, stopping powerful evildoers and exposing them to the light. The community and a privileged access are just a part of what makes such acts possible: in many regards the internet is a true meritocracy, it allows for epic recreations of the battle of David and Goliath, where a single person can expose governments or giant multinationals by overtaking their security with knowledge. Again, at the same time the worst-case scenario involves a malicious attacker taking down an innocent entity or as a way to wage war. A famous example of this is the virus Stuxnet that in 2010 targeted uranium enrichment plants in Iran in order to prevent them from functioning. The security experts at Kaspersky Labs determined that a virus of this complexity would require the resource of a government to create. This was the first digital weapon used by an unidentified government to attack an Iranian military facility[15]. When power wielding government agencies or large corporations fail to understand the technologies they employ to exercise power, that power shifts from the hands of an ideally benevolent institution to a potentially malicious entity. Julian Assange opens his book *Cypherpunks* with the following line:

"This book is not a manifesto. There is no time for that. This book is a warning. The world is not sliding, but galloping into a new transnational dystopia"[16]

Politically this could be disastrous, a foreign entity might be able to affect elections by leaking information obtained from one of the candidates. Even reveal private emails or generate

false information that could poison the voter's mind. He advocates for privacy for the weak and transparency for the strong.

This is what inspired me to create *The Leaky Abstraction*. In this installation the viewer is presented with a choice, two buttons, red on the right, blue on the left; either button triggers an audio response. The response is a female voice saying "спасиба" (*spasiba* or *thank you* in Russian).

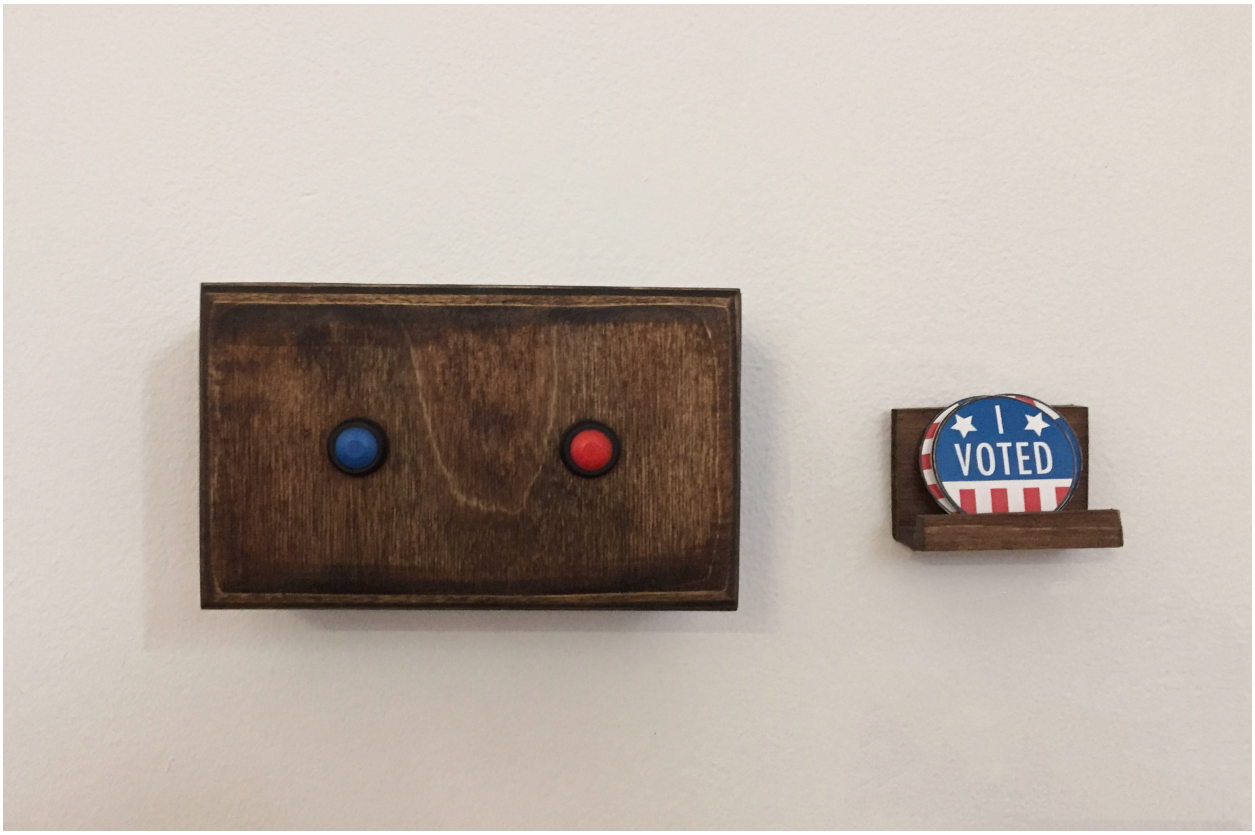

Figure 10 – Jacopo Mazzoni, The Leaky Abstraction

The piece introduces a touch of irony by subverting the initial premise that the two buttons would trigger a different reaction. The title "leaky abstraction" is a commonly used expression in computer science to describe situations in which the user is given an oversimplified interface, and is presented with an error that can't be fixed with the set of tools at his disposition.

When the complexity of the inner working of a system is hidden away we have no guarantee that that system will behave like we expect. It is literally a closed box system, much like my piece, inscrutable from the outside. I suggest we lift the veil, remove this abstract interface and deal with the complex and non-sentient/objective nature of these systems by taking the time to fully understand them as they are, in a literal and Galilean sense the Chief World Systems that govern our world.

In our striving towards a better integration between virtual reality and physical reality our technology seems to gravitate towards ocular systems, either replacing or augmenting our sense of vision. According to science historian Jacob Bronowski and his book *The Origin of Knowledge and Imagination* primates' predominant sense is vision and the first sense involved with virtual reality is hearing (or the inward eye)[17]. The invention of a complex language is one of the fundamental traits of our evolution. In many ways, all forms of communication are an exercise in translation from idea to symbol and back. A great example of this concept can be found in the intro to *The Dictator's Hammock* by the French novelist Daniel Pennac. He states that if asked to think of a window every person will imagine and visualize in their mind a different looking window. There is a shared idea of a window but it does not look the same for everyone.[18]

This leads to a problem of perception, what if it were possible to elicit your idea of a windows rather than showing everyone the same image? This would require bypassing the sensory organs and delivering digital information directly to the brain. This is what Elon Musk is researching at his company Neuralink[19], specifically a way to link AI's to human brains. Interestingly this research is based on reverse engineering degenerative diseases and might be able to help those who suffer from that condition. Pulling them back to reality with a device

meant to reach over the threshold to communicate with an artificial being that resides in a fictitious dimension. It is worth mentioning that Mr. Musk has voiced his concerns about AI Safety multiple times and he worries humankind might not be able to contain its creation. His AI engine (Open AI) is the most sophisticated product available to researchers and he made it available so that people could test AI's and find all the critical fallacies before putting it in charge of critical systems.

AI's are seen as the next industrial revolution, they should be able to replace most coders (arguably coding is this millennium's new form of labor) and are already replacing accountants. The first impact of the virtual world invading the tangible one will be an invasion of non tax paying highly skilled workers. This is one of the reasons why many believe that in such a system the government should change to a sustainable welfare based model as most jobs will become unavailable. This sounds like a communist utopia but if jobs and labor are out of the picture all we have left is "From each according to his ability, to each according to his need". Alternatively some have proposed more bleak predictions with Terminatoresque scenarios. It seems that science has mastered the visible and has been focused on the invisible for a while. After understanding the body we now need to investigate the mind and consciousness beyond speculation.

Any scenario we considered would not deter the quest for knowledge for a number of possibilities, the hope to understand more about our self, potential health benefits, and the famous science fiction Arthur C Clarke's third law: "*Any sufficiently advanced technology is indistinguishable from magic*". This would be the closest to magic we get, being able to think an idea into existence. According to *Exploring the Invisible* by Lynn Gamwell, lecturer of history of art, science and mathematics at the School of Visual Arts: this unification of the spiritual world

with the physical world has been dreamed by humankind for centuries. It is part of the Kabbalah and Spinoza's ideology that everything is a manifestation of god or nature, a unique entity that embodies spiritual and physical while Descartes believed that spirit and body are on two separate planes of existence.[20]

These ideas emerged again in the twentieth century with Freud and his attempts to separate the mind in its component parts and introducing the concept of unconscious mind. Dalí made reference to this when defending his painting *The enigma of Hitler* from critics, claiming that: *"the unconscious mind is uncensored."* [21] Attributing his creation to a mind beyond his control, a sort of permanent resident of the non-physical, reinforcing the shamanistic element in art where knowledge is condensed from the divine into the realm of tangible. A few years later Judd, Stella, LeWitt and others in the minimalist movement proclaimed that their art object had no meaning whatsoever claiming: "what you see is what you see". A complete opposite, a body for art unencumbered by ideology. [22] Ultimately the issue of shifting the threshold between magic and technology to gain power has been around for some time and now technology led us to a closed door, one that we should consider carefully whether or not to open.

Figure 11 – Salvador Dalì: The enigma of Hitler 1937

The Ghost in the Machine

The advent of digital technology permeated every aspect of society so quickly that most people struggled to keep up. Many artists were attracted by this new uncharted field, seeing it in a new arena to make mistakes and be free from the weight of tradition. This field's rate of evolution is such that even its name is in constant flux: our understanding of it shifts too fast for any label to stick[23]. This rate of evolution is in large part connected to how fast the general audience is willing to adopt new technology. As soon as new technology enters the daily life and becomes part of societal habits it also enters that society's culture and creates a new semantic landscape for artists to operate within.

The expression *the ghost in the machine* was originally formulated by the Oxford philosopher Gilbert Ryle to describe the Cartesian mind-body relationship. Ryle's intention was to point out the flaws of assuming a disconnect between body and mind as a dichotomy with no information on how they interact. This sentence became the title of the homonymous 1967's treaty on philosophical psychology by Arthur Koestler. It has subsequently been used in the hacking community to express the difference between software and hardware in computers and, more importantly, in artificial intelligence-related science fiction. A notable example is *ghost in the shell*, a fictional narrative by Masamune Shirow that was recently popularized by a Hollywood movie but has enjoyed a cult following since its original publication in 1989. The phrase has been associated with the concept of an emergent intelligence: or the capacity of a system to become so complex that it begins to show signs of independent thought or consciousness and become more than the sum of its parts.

Similar sentiments were expressed in the title of Philip K. Dick's novel: *Do Androids Dream of Electric Sheep* later to become the basis for *Blade Runner.* In other words, we fear that our creations will develop independent thought and turn against us. It is the same archetype as the Golem of Prague, Frankenstein, Prometheus, Zeus turning on the Titans or Enkidu befriending Gilgamesh (and turning on the gods). Ironically while humankind is concerned with the off chance that technology will gain a living status we have been crafting biological weapons fully capable of turning against their creators. Perhaps modifying living matter is not as strong a worry as creating life from inert materials. Maybe that ability is more enticing because it is a forbidden perversion: it would be more empowering to finally find the alchemic process to create life, the philosopher stone we've been searching for so long. These parallels between mythology and science fiction and their effect on society are brilliantly analyzed by Darko Suvin in *Estrangement and Cognition:*

"All of us on the planet Earth live in highly endangered times. Perhaps the richer among us, […] have been cushioned from realizing it by the power of money and the self-serving ideology it erects. […] We live morally in an almost complete dystopia—dystopia because anti-utopia—and materially (economically) on the razor's edge of collapse […]." [24]

At the same time, humankind's creative imprint on the machines is not what we fear. This emerging intelligence is often seen as wild or part of the natural and sometimes divine world. Perhaps the creation of a substitute capable of surpassing and surviving our fatal flaws is

a necessary step in the evolution of any civilization advanced enough to build its successor. Perhaps because like Edward Shanken points out in *Art and Electronic Media* we spent most of our time researching how to expand human capacity and perception through technology[25], thus giving technology superhuman abilities.

Much of this debate can be traced back to issues of information. Information processing is the focus of both digital technology and the human brain. In *Reframing Consciousness* Stephen Jones notes that Descartes' idea of consciousness postulates that information is immaterial and is processed by an immaterial mind. This ideology tends to place the mind in a superspace attached to the body for a lifetime[26]. This is the form adopted by most theologies that embrace the concept of a soul. In this hierarchy, a machine capable of original ideas has gained a soul and is tied in some way to the abstract world of the ideas, souls and gods. In this sense many artists have researched ways to create this shamanistic machine that is capable of original creations. Others tried to use the machine to pull information from the abstract world into the real world and allow that information to affect change; so much so that in the past the capacity to create an object from an idea was considered a mark of the divine.

This approach of using computers outside their parameters to reach into the divine is often compared to the act of drug-induced hallucinations. The notion that affecting its inner workings would allow our minds it to expand beyond their confines has been around for a very long time. This concept is deeply rooted in ancient shamanism it is still part of contemporary cultural movements like cyberpunk. Art has always taken notice of mysticism, in many ways they both try to expand human thinking beyond the limits imposed by current society, to create

the mindset of the future. Often the confines of our minds are set for us by governments, companies, or more generally anyone with access to mass media and a good strategy to influence a vast audience[27].

Internet has often been used as the stand-in for the immaterial realm of ideas, or at least a close approximation; as such it has been able to elude some of the more mild forms of control and enabled dissidents with the freedom of speech they were otherwise denied. This is one of the pillars of Ai Weiwei's practice. His work often refers to Chinese dissidents using slang and creating a language to avoid identification. In the case of *Moon*, the online project he collaborated on with Olafur Eliasson from 2013-17, they allowed people to share a digital environment. The content was entirely provided by the users but the artists provided the context for the interactions.

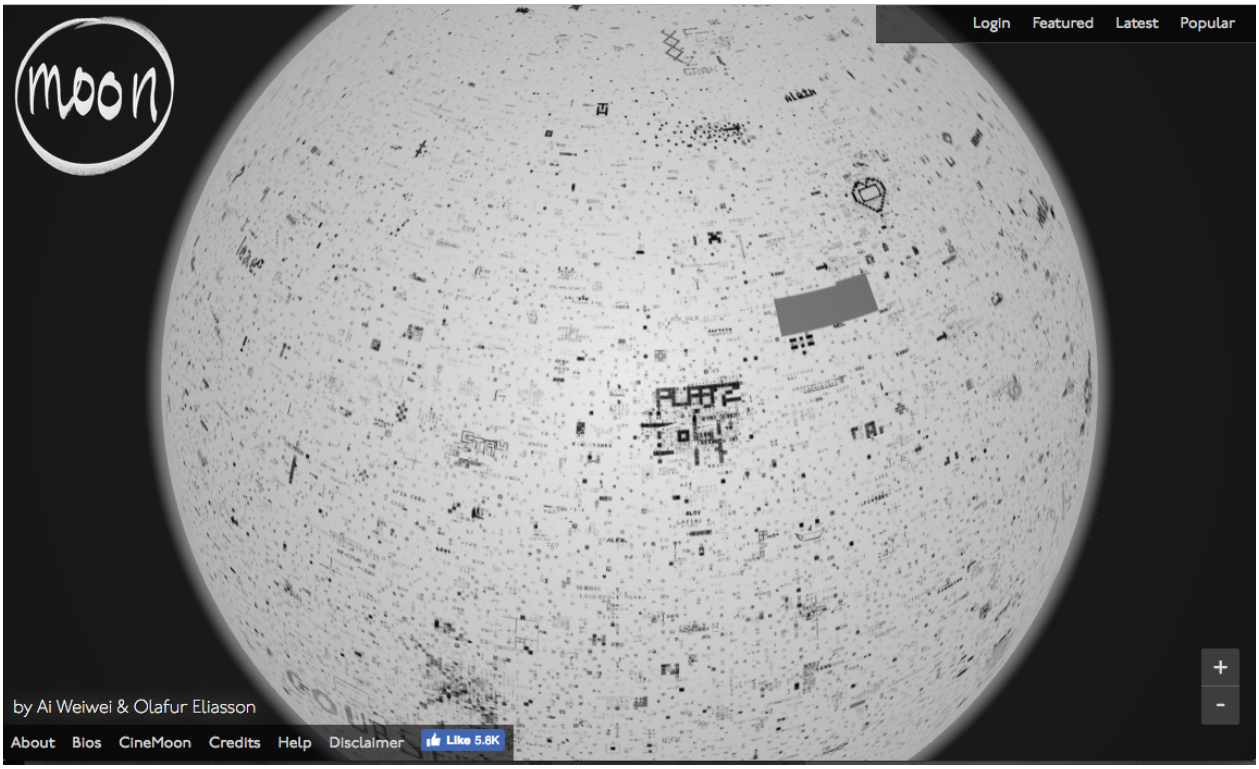

Figure 12 - Olafur Eliasson & Ai Weiwei: Moon

This piece is a strong example of art effecting change from a place beyond reality. *Moon* currently holds thousands of drawings, the level of diversity in both content and type of interaction is amazing. Some of the assigned tiles are just text or the kind of drawing you would find in a bathroom stall in a pub but some are much more elaborate and intense. This work inspired an interesting Reddit experiment that took place on April first of 2017. Reddit is known for its elaborate Aprils fool day social experiments and this one was particularly interesting especially in association with Ai Weiwei's work. The users in Reddit were given access to a 1 mega pixel grid in a thread called *r/place* and the ability of controlling 1 pixel of that grid.

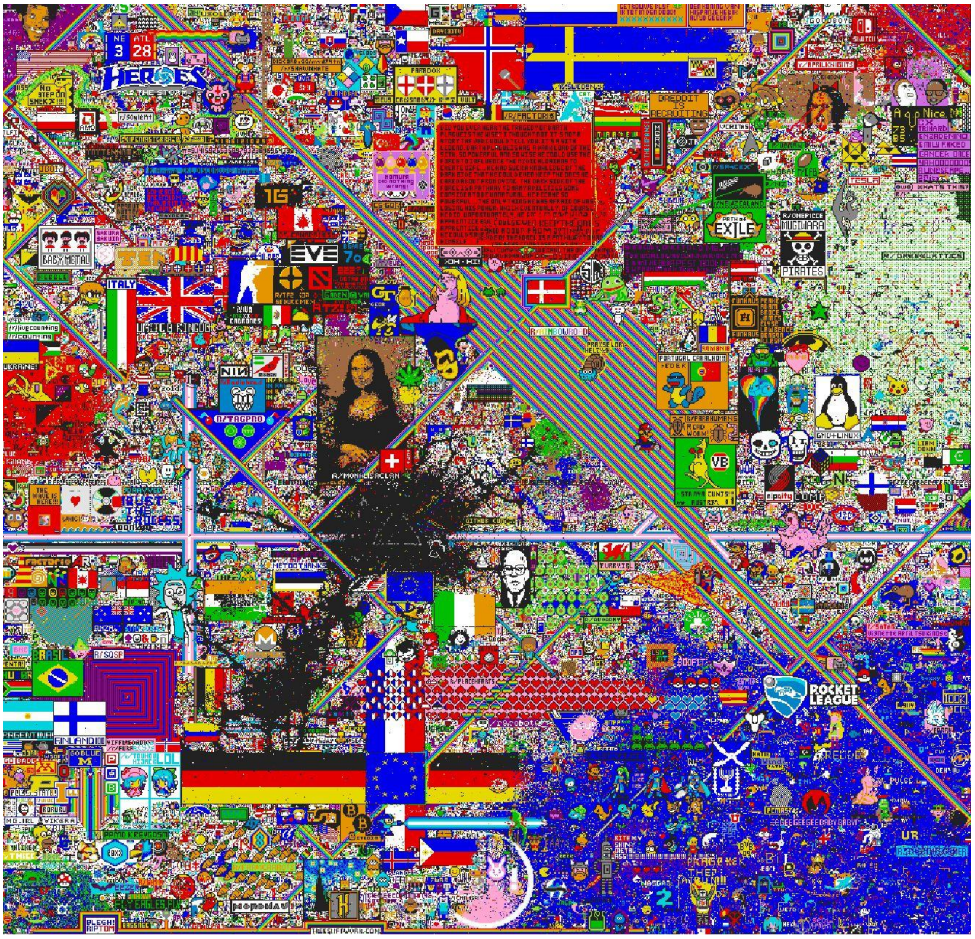

Figure 13 - Reddit /r/ place

To clarify each user could set the color of any pixel regardless if someone else already claimed it. If someone changed the color of the pixel you formerly controlled you are now able to spend your pixel again in any point on the grid. The main differences between this experiment and Ai Weiwei's work are the following: this experiment was finite in time and had an announced end time; it allows for occlusion by proximity but no one can delete your work; it does not have a forum component for people to meet and organize. The latter is extremely important as the *r/place* experiment quickly led to the formation of factions that fought each other for control of the grid. Some pretty distinct ideologies emerged and immediately there it seemed to be a tension between creative and destructive forces. Some users wanted to clear the grid to allow new illustrations to be able to emerge from the ashes of what they destroyed. Some wanted to defend what they had just worked so hard to create. These interactions were captured in the form of a timelapse that shows the evolution of the board over the duration of the experiment. While *r/place* was more engaging because of its video game-like qualities (a clear opponent/objective a finite amount of time and colors) Ai Weiwei's *Moon* has a poetic potential that *r/place* simply does not. The drawings on *Moon* might clash sometimes but they are framed as a device to understand others, not to fight them. They are all in black and white so no single tile overpowers the next with bright color. Both were meaningful to society: *Moon* as a poetic space for the exchange of ideas and *r/place* as the subject of studies on conflict resolution.

This idea of a space without a place sounds like a line out of Georges Perec's writings but the connections to the landscape are numerous and important[28]. The series *Landscapes Without Memory,* by Spanish-born Joan Fontcuberta, seems to deal with that very concept.

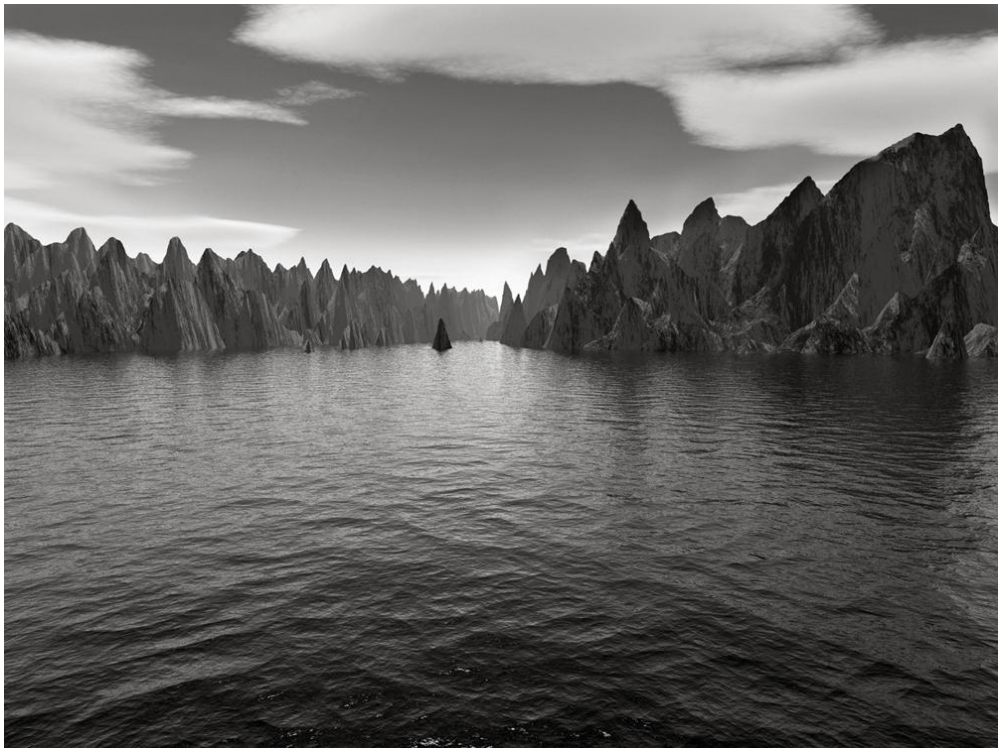

Figure 14 - Joan Fontcuberta: Landscapes Without Memory

He found a software (Terragen) written for the military that took an image of a map and created a 3d rendering of the landscape described in it. After some testing he discovered that the software did not know how to differentiate the image of a map from an image of anything else. The artist decided to use images of famous landscape paintings as the starting point. He describes the images created with this process as post-landscapes, a no-man's land between the virtual and the real, between truth and illusion. Because the software is used to produce a landscape the starting image is then recycled, and to quote the artist: "we make computers to produce hallucinations, we push technology to let its own unconscious emerge". This shamanistic approach aims at mapping uncharted territory, in this case, by translating a landscape into another and by giving shape and form to that translation. The capacity of those images to evoke emotions beyond the aesthetically pleasing is an essential part of the work. They fall in the

uncanny valley of landscapes. This approach spawn from a desire to shed the need for aesthetic beauty when describing the landscape. Fontcuberta claims that beauty has been substituted by the sublime and that the sublime in turn has been substituted by the sinister.

The uncanny feeling is explored in another way by Jordan Wolfson in his piece *In The Moment Of Terror.* The piece consists of an animatronic blond woman standing in front of a mirror and facing away from the viewer. As it dances and lip syncs the popular songs playing, it follows the viewer with its eyes from behind a grotesque mask. The shoulders are not covered in the fake skin material and reveal the motors and joints that move the piece.

Figure 15 - Jordan Wolfson's In The Moment Of Terror

The items of clothing on the piece are white but dirty and very revealing. That in conjunction with the type of dancing the robot is performing contribute to the tension viewers experience in the room. All those elements and the gaze implicate the viewer in a disturbing power dynamic. *She* is dancing for our enjoyment, *she* does not have a choice, and judging from the intensity of the gaze she probably hates us. It is important to think about the effect of this piece, it provides a reference for any future thought experiment to balance decision against it. This was a very clamorous piece, but as time passes these themes are transitioning from R-rated horror movies like *Ex-Machina* to mainstream culture. There are some images in the movie *Ghost in the Shell* that are extremely similar in nature, if not more disturbing (pleasant looking geisha robots shedding their face to reveal their grotesque insect like appearance and literally suck information out of an unwilling victim's brain). By considering these taboos we are able to create language to map these ethical issues and make them less frightening and less distant so to have a reference or an anchor point to launch our philosophical inquiries from.

If we compare the internet to a new landscape then it is important to recognize that governments and companies want to plant their flag on a piece of it and control it. The rise of a few powerful players lobbying for a controlled internet has stirred up a debate over net neutrality and government control. Trevor Paglen is one of the most important activists and artists to deal with these issues today. His piece *Autonomy Cube,* consists in a transparent cube housing a computer that allows for a completely anonymous internet access using the Tor Network. When the viewer enters the network his traffic is routed in a volunteer based network of computers and bounced all across the world. At the same time the sculpture allows other people to route their

traffic trough the gallery hiding the actual point of origin. This technology is despised by governments as it makes controlling who is looking at what nearly impossible. This piece can then be considered the physical manifestation of the portal to an ideal internet, much closer to the abstract world of ideas than a physical network where your actions or thoughts can be spied and stored by your government. Paglen is also trying to educate his audience to the dangers of this disconnect, the average user is unaware of the possible dangers of using an unsecured connection and the piece makes use of technologies that anyone can adopt for free and names them (Tor Network).

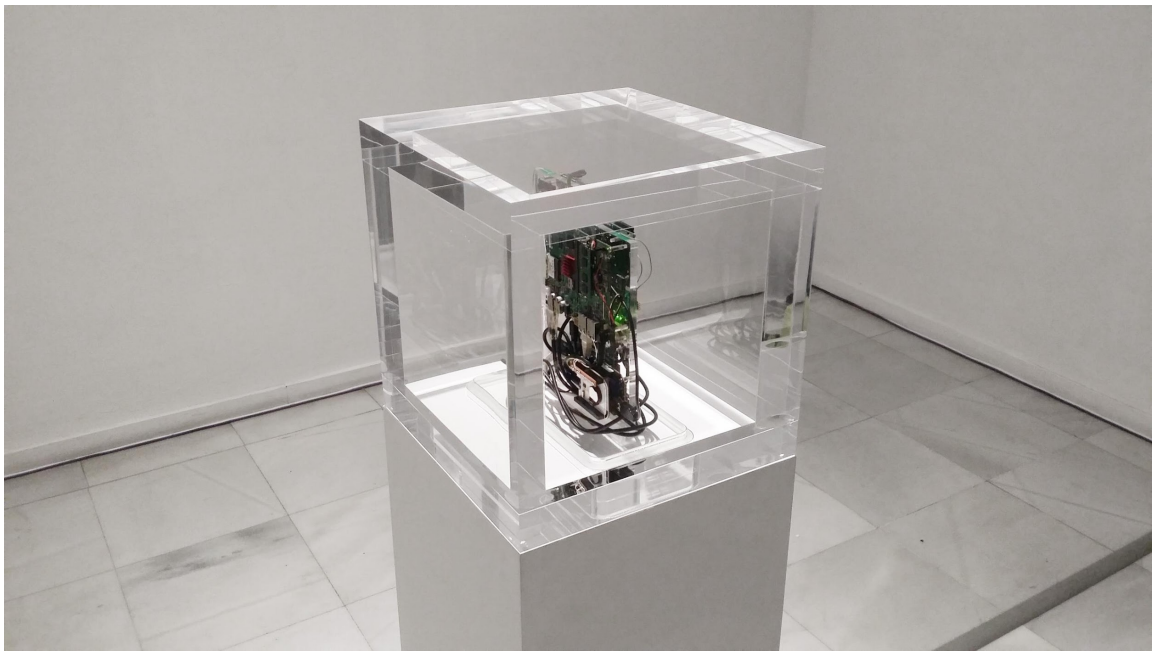

Figure 16 - Trevor Paglen: Autonomy Cube

Another approach to familiarize audiences with technology is to allow them to experience this surreal properties in a physical manner. Camille Utterback's *Balance* has an interactive video of a woman losing her balance as the object is tilted. The interaction with the machine

becomes an interaction with a character and an emotional link is formed. This allows us to explore the tension with our preoccupation over machines gaining the ability to feel. The title references both a physical and an emotional state to strengthen the dual nature of our action, both physical and psychological. The removal of a technological medium and the creation of a physical way to interface with the abstract world of ideas is a critical element of how well machines can have an impact on society. The first joystick was an enormous breakthrough and allowed for the creation of ever so complex virtual worlds.

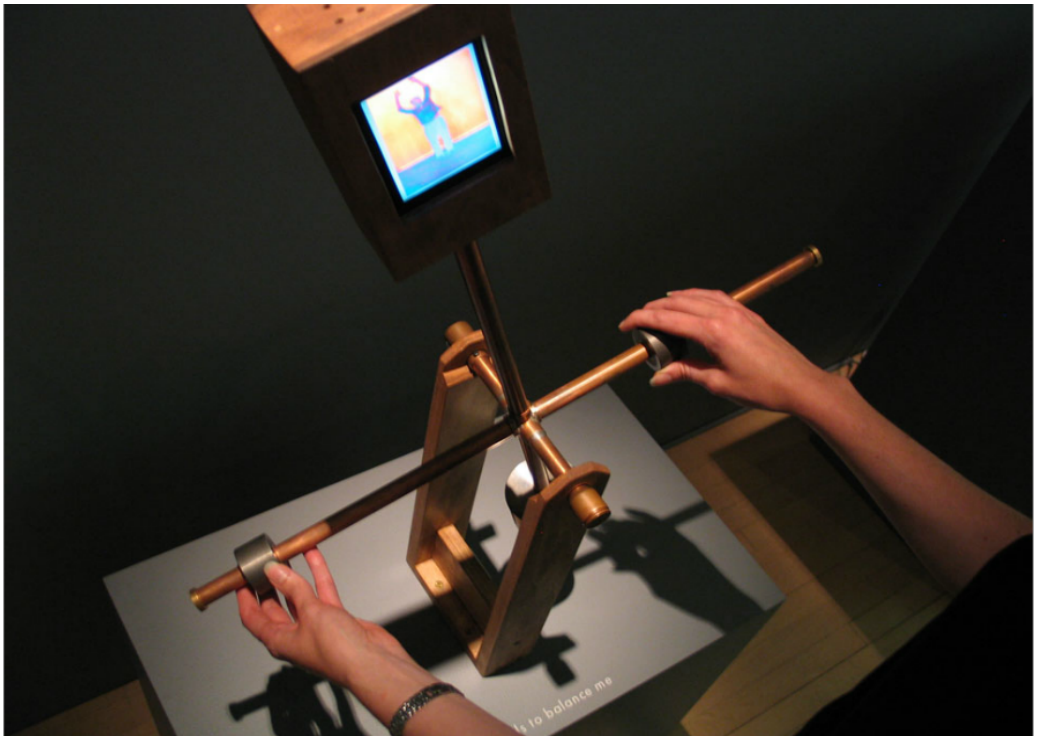

Figure 17 - Camille Utterback: Balance

One of the first computer programs to be considered a video game is the famous *Game of Life*. Its basic principle was to simulate cell growth in a petri dish with simple parameters, each cell would have a limited lifespan, if it comes in contact with another cell within that time it would reproduce if not it would die. This simple premise has inspired more complex software

simulation of living beings' survival[29]. One such example is the Lotka-Volterra equations set. This system is a mathematical model of a prey-predator system. The space is populated with grass, preys and predators. Each of these elements have a mortality rate and a reproduction rate. This system shows how any imbalance in the population of either of these categories would lead to the collapse of the system. This is also used to calculate the ideal parameters required to maintain a stable system. Many abstract artists appropriated the *Game of Life* aesthetic over time, but German-based artist Ursula Damm created her own simulation system starting from recordings of swarms near lakes and other bodies of water. The installation *Helix Swing* is usually composed of two monitors, one where the visitor can set the parameters of the simulation starting from videos of real insect swarms and by altering its genetic parameters launch a simulation of how that virtual creature would move in a virtual environment[30]. This ability to understand insects on an unprecedented level through movement in a technologically mediated space is a perfect example of how technologically created images have the capacity to expand our understanding of the world without using language but through observing motion.

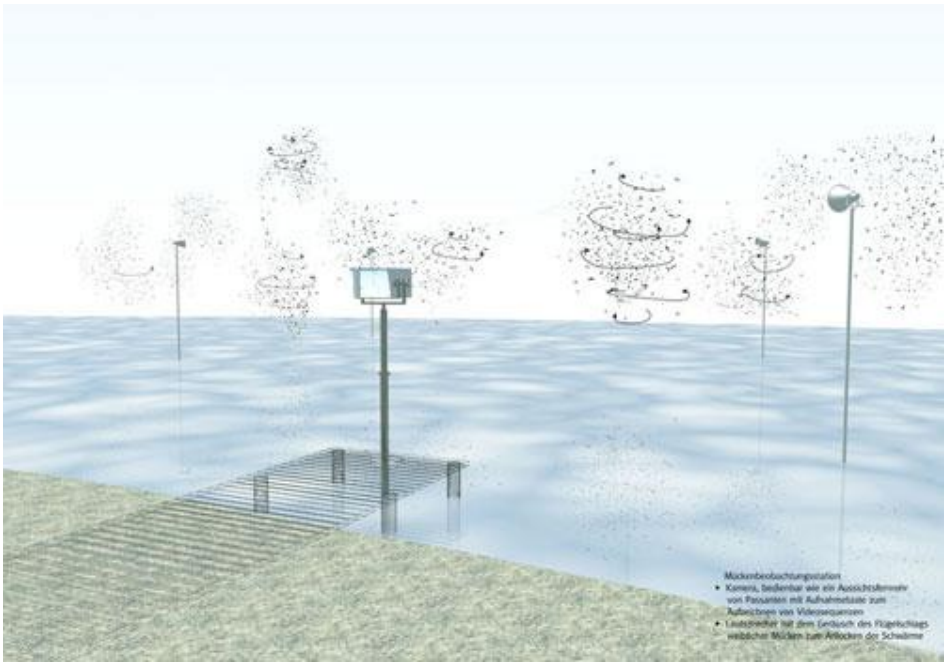

Figure 18 - Ursula Damm: Double Helix Swing

John Douglas Powers adopts a similar approach in his piece *Sky Blue Sky,* the small LCD screen plays a loop of pinhole footage of clouds. This extremely intimate scale allows the artist to load a machine with elements of the sublime and represent them outside of time. The pinhole footage is mirrored, and it seems to emerge from the center of the screen perpetually, forming anthropomorphic shapes. This idea of confining something as vast as the sky in a 5x3½ inches space ties to the capacity of machines to traverse the tangible world into the intangible world of ideas where scale and time seem to have different meanings. At the same time the loss is minimal, the piece is fully capable of evoking the entirety of the sky and not just a portion of it as it triggers emotions and sensations. This tension between the size of the container and the size of the sky is what activates a type of thinking that goes beyond description, almost an instinctual provocation.

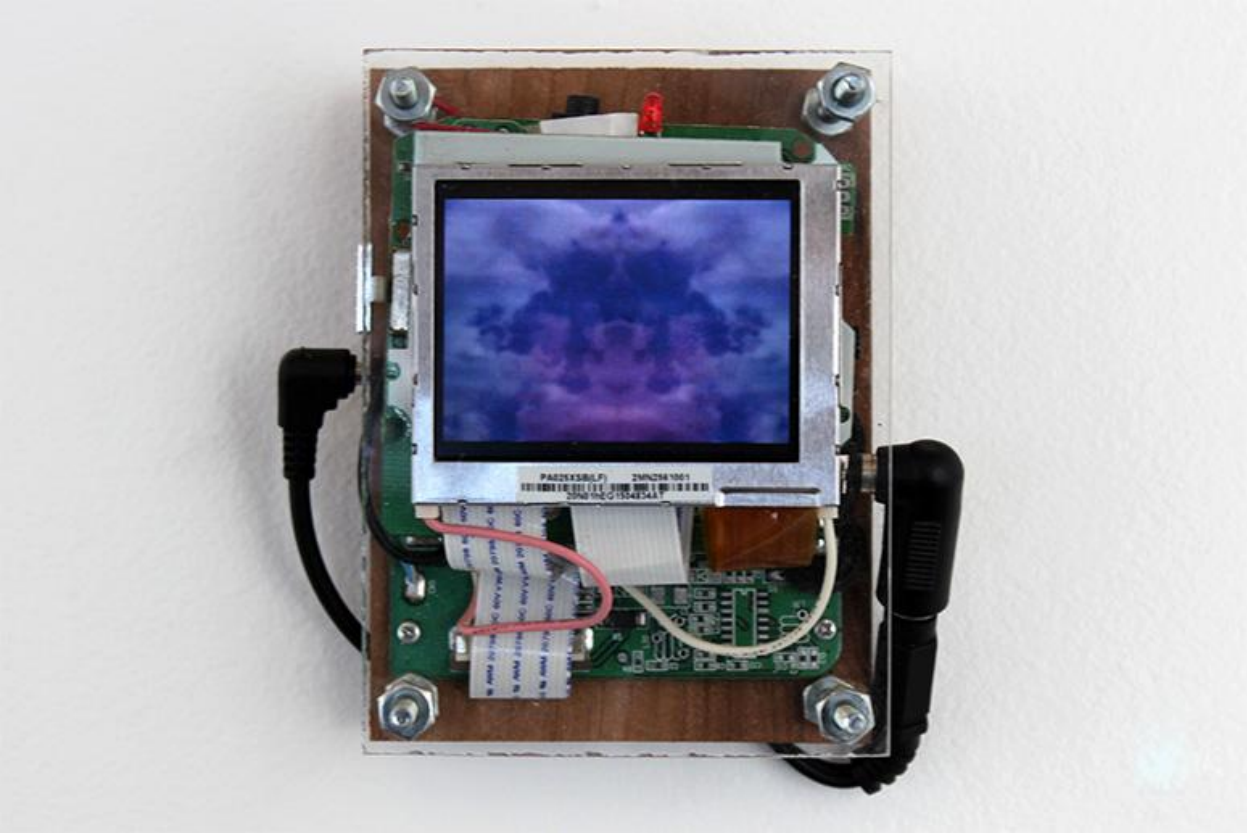

Figure 19 - John Douglas powers: Sky Blue Sky

Another example of activating instinctual understanding can be found in Ryoji Ikeda's work[31]. in his piece *Micro | Macro* Ikeda represents what he calls *plank space,* a recreation of subatomic events on a gargantuan scale. This immersive installation activates the floor of the gallery space as well as the wall and immerses the viewer in a new environment, a virtual recreation of reality at a different scale. Much like optic art Ikeda uses strong contrast fast variation and monotonic sounds to convey the sensations one might encounter if scaled down to an infinitesimal scale. As surreal as it might seem the images shown in Ikeda's work are a pretty accurate representation of subatomic motion patterns. He developed this piece in collaboration with scientists from CERN in Genève during a residency. This piece does not aim to confuse and

disorient but rather to expand our understanding of the physical world by bringing these intangible elements into the sphere of our perception.

Figure 20 - Ryoji Ikeda: Micro | Macro

Knowledge Is Power

The precarious state of our identities in this new world order is precisely what inspired me to craft my latest installation, *Knowledge is Power.* This immersive interactive audio/video piece utilizes a Kinect 360 sensor to track the movements of viewers in a dark room. In its resting state the piece projects obfuscated words moving slowly on the wall opposite the entrance. The text source is an extract from Wikileaks' Spy Files regarding the Russian and American government's efforts to establish large scale mass espionage systems on their citizens. A few keywords are highlighted and temporarily glitch and become legible. As the viewers approach the wall their silhouette appears on the screen in the form of a digital shadow. The shadow reveals the text that is otherwise obfuscated.

Figure 21 – Jacopo Mazzoni, Knowledge is Power

The distance of the viewers from the wall also determines the speed at which an audio file is played. In its resting state the audio is being played at 2% speed, making it completely distorted and unrecognizable, as the viewers approach the wall of text the sound speeds up, revealing a voice reading the files scrolling across the screen. After a set interval of time the obfuscated text briefly disappears and is replaced by a live feed of the viewer from an infrared camera. The infrared camera is equipped with a special filter that removes the visible part of the spectrum to reveal the near infrared band. The resulting footage has a monochromatic / night-vision look that we tend to associate with surveillance cameras. This results in better performances in low light and allows me to exploit the metameric properties of many synthetic materials. Metamerism is a scientific term used to describe a phenomenon where two colors that appear identical to the naked eye look completely different outside the visible spectrum. This discovery led to the widespread use of this technology in banks to film the face of burglars hidden under tights or thin balaclavas, but it also means that viewers wearing light synthetic clothing might get an intimate rendition of their anatomy. This creates a tension in the viewers when they are presented with a live image of themselves wearing clothes of a different color. It subliminally induces a sense of doubt regarding the reality they stepped in after crossing the threshold of the installation room. In the most extreme scenario some synthetic materials that are opaque to the visible spectrum appear transparent to infrared.

Photography outside the visible spectrum is used for a variety of diagnostic and forensic purposes but it is rarely utilized in an artistic context outside of landscape photography. The infrared camera has the added side effect of revealing the dot matrix projector from the Kinect. This invisible IR light is mapping the room and silently providing that information to my

program. An invisible spy is revealed to be in the room with you but only if you know what it is, otherwise it simply looks like an artifact of the camera.

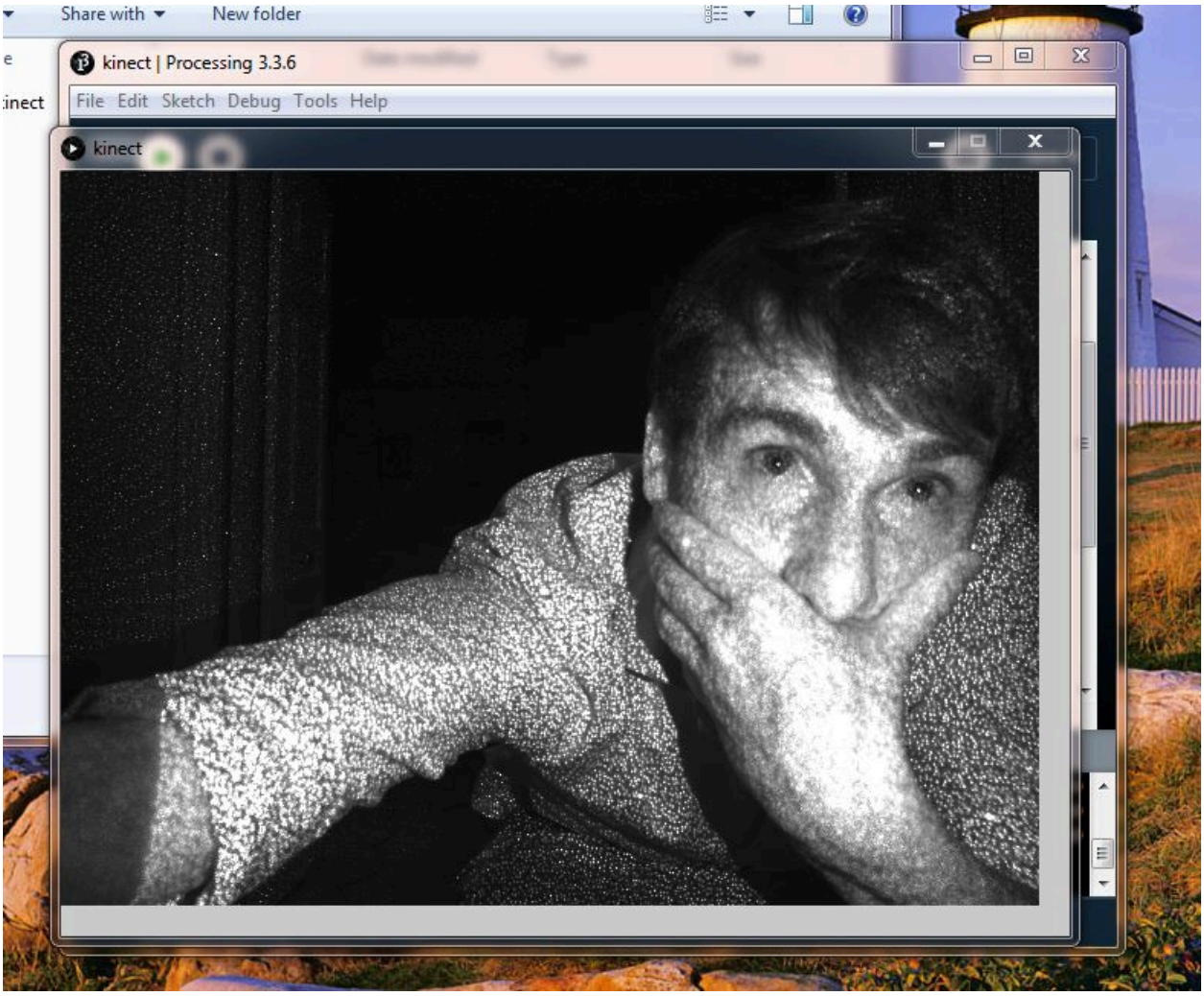

Figure 22 – Jacopo Mazzoni, IR Dot Projector Matrix Test

This apparently technical detail becomes relevant and sinister when we consider that the same technology is at the base of the new IPhone X facial recognition unlock feature.

The deployment of constantly more intrusive features in these personal devices is justified with the excuse of providing a more seamless and comfortable user experience.

Amazon's Alexa, Apple's Siri, and Google's Personal Assistant have operating modes in which they constantly monitor your microphone waiting for the keyword that activates them. We are assured that the companies that provide these services are not listening in on our conversations but technically we have no way to check whether what they are saying is true or not. The speech recognition engine of these devices is far too complex and sophisticated to run on the limited hardware offered by a phone or a tablet: it requires a cluster of high performing computers, so our devices constantly send live audio over the network to these offsite servers. Here is where things get interesting: unless these files are sent using some form of encryption it is absolutely possible for your internet service providers to intercept and listen in on your microphone. This kind of surveillance is not just technically possible, the NSA actually used this in collaboration with many tech companies to collect private information from millions of people until Edward Snowden called attention to it. Russia's government is striking similar deals with internet service providers, mobile operators and tech companies to integrate in their existing system of control called SORM. Such information is at the core of the Wikileaks file that is displayed in the piece. The text is gradually revealed as the viewer interacts with the piece both by the video and by the audio component. The interactive audio is composed by an audio recording of me reading from these files slowed down to a growling sound, a callback to my previous piece *Documents Please* in which the viewer is supposed to be reduced to the scale of an insect and made to feel powerless by these larger powers. As the viewer approaches the projected wall, the information becomes clearer, signifying both a reduction of the power these institutions have on us as we learn more about them but also a deadly lure meant to attract you to the front of the room so that the camera can take a better look at your face and implicate yourself as a possible threat to further surveil. This has a precedent in the urban legend of the public library flagging to the FBI

anyone who checks out Marx's *Capital* or Hitler's *Mein Kampf* . While the veracity of such claims is hard, if not impossible, to verify, it certainly inspired contemporary governments in the creation of digital surveillance tools. I had that comparison in mind while I researched the ethical bases of my piece. My roots compelled me to dislike the false equivalence between Hitler and Marx as enemies of the state. Italy is, after all, a socialist country and some of best parts of our republic are nothing more than practical implementations of ideas first drafted in the *Capital*. But in the eye of a government that serves itself the curiosity of its citizens is a threat, anything that tugs at the curtain and reveals the reality of the facts becomes material for censorship.

Conclusion

As a computer scientist turned artist I find myself in a strange liminal space: a twilight zone, where the absurdities of both worlds are revealed. In my work, the fluid nature of technology, with its possibilities, obsolescence, and convenience is exposed to include the sinister consequences that are often overlooked by the general public. My installations revolve around themes of ecology, integration, freedom of thought, and surveillance. My work is not a manifesto against innovation, but it denounces the use of technology as a system of oppression of the masses rather than democratic empowerment.

Now from this outsider position I find myself cataloguing potential future history before it happens knowing that with increased visibility comes increased danger. The echo of secular warnings like the tale of Laocoön or Nietzsche's *"[…] if you gaze long into an abyss, the abyss also gazes into you."* are silenced by the line that Dante writes for Ulysses *"Consider well the seed that gave you birth: you were not made to live as brutes, but to follow virtue and knowledge"*. The marmoreal group representing Laocoön and his sons being killed by snakes is extremely familiar to me. In my many visits to the Uffizi I would often pause in front of it for much longer than any other single object in the museum. The sculpture depicts both the importance of the seer and the might of the gods. This mythological battle continues in modern times and serve as a reminder of the stakes of the fight.

Still, the desire to see past the fog is strong enough to justify the risk and set sail for the strait of Gibraltar ready to face monsters and deities alike.

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