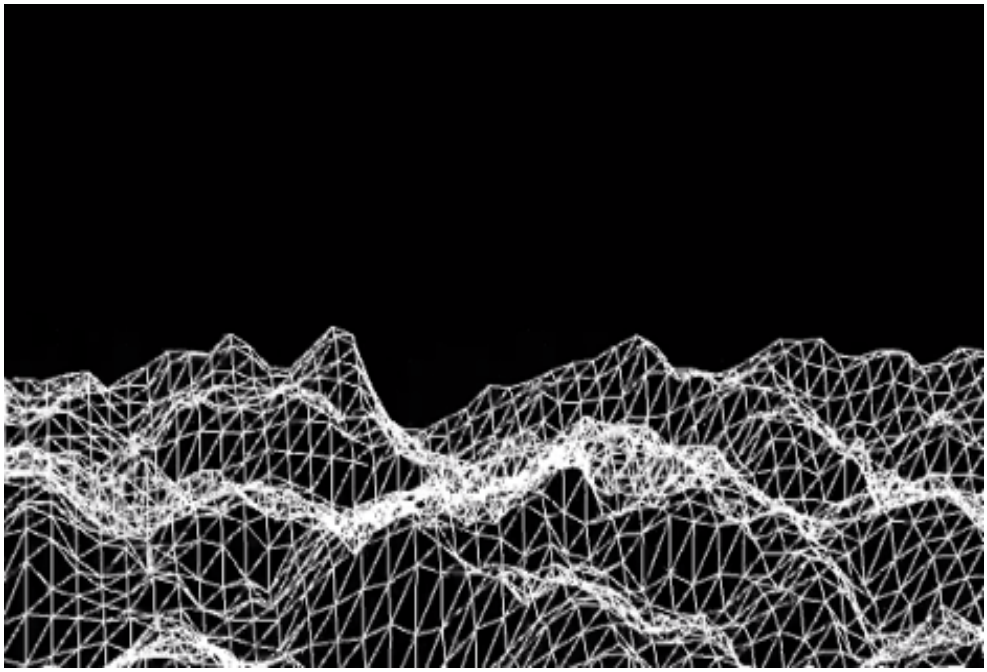
An Uneasy Terrain

An Immersive and Speculative Research-Creation



BY

AMREEN ASHRAF

A THESIS EXHIBITION PRESENTED TO OCAD UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF DESIGN IN DIGITAL FUTURES

TORONTO, ONTARIO, CANADA, 2020

Abstract

Amreen Ashraf
OCAD University
An Uneasy Terrain: An Immersive and Speculative installation
April 2020

This thesis contemplates the "politicization of vision" by exploring contemporary visualizing technologies that use body and facial recognition to map data in physical and virtual spaces. Through a technological review, this thesis analyzes the emergence of the "social media filter" and examines how this technology not only allows users to morph, alter and extend their digital bodies, but also creates data. Through the literature review I argue that this data contributes to "knowledge creation" for artificial intelligence systems, hence politicizing technologies of vision. Informed by my role as an "active subject" living in a surveilled urban environment, I pay attention to emotions as a guide throughout my creative process. Methodologically, this research-creation renders an immersive and speculative installation engaging bodies in physical space, whereby the audience-participant is materially and virtually present in the projected and captured data. This research-creation contains two pieces that work in tandem; the written document and the installation together make up "*An Uneasy Terrain*".

Installation, Surveillance, Computer Vision, Machine Vision, Social Media Filters, Facial recognition, Feminist Theory, Speculation, Prototyping, Data, Knowledge Creation, Emotion, Thinking With.

Acknowledgements

It is with the deepest gratitude that I thank my advisory committee, Simone Jones and Maria Belén Ordóñez. This truly wouldn't have been possible without your support.

Simone Jones, you are a trove of knowledge for those pursuing the arts. Your vision helped me look at my project through many lenses, viewpoints, angles. You have inspired me to engage my own body in the process. Your support and encouragement throughout the process has been invaluable.

Maria Belén Ordóñez, thinking with you is thinking with many. Yours is a multispecies vision, one that alters all visions and asks for a deep engagement with life and all her generations.

Suzanne Stein, you inspired me the most during my time at Digital Futures. You are a prophetess whose visions of the future have planted many seeds.

DF faculty, Kate Hartman, Emma Westecott, Adam Tindale, David McIntosh, Cindy Proemba and Judith Doyle.

My cohort, the loveliest of people. Smart, bright, deeply engaged with understanding all possible futures.

My sisters, Norbert, Maria, Lauren, Olivia, Maz, for the constant support, love and conversations.

My sister Carisa, for the constant laughter that kept me sane.

My poochie, Clara Juliano. To be resisting with you, always.

My siblings for their love and support.

Dedication

Dedicated to my parents, Ashraf and Gulshan. Gratitude will never be enough.

Table of Contents

List of Tables:

List of Figures:

Introduction

An Uneasy Terrain is the culmination of a yearlong investigation, presented in this document and through the final installation. *An Uneasy Terrain* refers to the uneasiness I feel around visualizing technologies, especially around those that are being trained on the human body and face. This uneasiness also comes from seeing the proliferation of these technologies like facial recognition in the everyday. It stems from my experience as a designer inhabiting physical and virtual spaces. In *An Uneasy Terrain,* I explore the physical and virtual through the construction of an installation that engages bodies through immersion and speculation. Furthermore, I unpack my feelings of uneasiness by thinking with what Donna Haraway calls "troubled times" (Haraway, 2016).

Haraway, a feminist-biologist and storyteller, invites a call for action in her book, "*Staying with the Trouble: Making Kin in the Chthulucene*" (Haraway, 2016). Her call to action insists that we must think, and in her words, to consider what "thoughts think thoughts" (ibid). For me it is a call to think deeply about the present, proposing a path forward for thinking in troubled times.

The trouble for Haraway is planetary degradation. Her preoccupation has always been about *the trouble*, whether it be thinking with organic ones or inorganic machine ones. This thinking with trouble that Haraway speaks of is *thinking with care*. This care does not construct a solution to a problem in troubled times, but rather provides a feminist speculation about the trouble itself. Thus, in this research creation I explore this trouble, this uneasiness I feel about visualizing technologies at this present time. To this end, and with a feminist lens, I rely on Maria Puig de la Bellacasa's essay *Nothing Comes Without Its World: Thinking With Care* (2013) to structure this thesis. While she does not call it a method outright, she approaches structures of relating to others with care.

Haraway uses the sensory world of vision to articulate and build a layered critique of visualizing technologies. In this way, Haraway lays out a politically rich feminist critique on gender, race, science and technology. She describes visualizing technologies as those that

"include computers, video, cameras, satellites, sonography machines, optical fibre technology, micro-cinematography and much more" (*Virtual Speculum,* 23). I want to extend this definition to add contemporary technologies that we use in our daily lives–such as computer vision–which form the basis of facial recognition.

The metaphor of vision for Haraway is to think about "truth" and "objectivity" in the sciences and scientific methodologies in fields such as biology. In "*Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*"(183) she takes a feminist stance regarding the "truth question in science" and she critically illuminates the workings of tools and technologies of vision by questioning "knowledge", particularly the knowledge that comes from being trained to view the world in a certain way.

> "The eyes have been used to signify a perverse capacity-honed to perfection in the history of science tied to militarism, capitalism, colonialism, and male supremacy- to distance the knowing subject from everybody and everything in the interests of unfettered power." (*Situated Knowledges,* 188).

Furthermore, I am interested in "*situated knowledges*" in contrast to the *knowledge* that is created through visualizing technologies. Haraway lays out a treatise on what feminist knowledge creation could look like and mean in a world where knowledge itself has a long patriarchal history. Haraway contests knowledge by thinking of it in terms of *knowledges*; it is not all-encompassing rather it is situated, partial and multiple. Feminist knowledges are locatable and can be positioned. As a researcher I am drawn to this idea because of my own feminist politics.

This research is an opportunity to bring in my own particular knowledge creation to better understand visualizing technologies. My position is that these visualizing technologies are not neutral; their design and dissemination through capitalist and neoliberal models are a cause for concern for me. I think with Haraway because it allows me to solidify my own feminist positioning. Feminist knowledge production for Haraway is "understanding how these visual

systems work, technically, socially and psychically, ought to be a way of embodying feminist objectivity." (*Situated Knowledges, 190*).

As the human and the human face have become sources of knowledge in training these technologies to see, to view, to process and to make judgments, this trajectory of knowledge creation has given way to an *emotional response* that necessitates deeper thinking. It is thinking about bodies situated in physical spaces interacting with these technologies. There will be some bodies who are at risk of being categorized and profiled by these technologies. I am also thinking about questions pertaining to the risk of surveillance. There are multiple layers of thinking and knowing: these layers create a complexity. For me, the feminist notion of care is about bringing in feminist thinking to understanding, researching and creating within this said complexity: Haraway's "trouble" (Staying with the Trouble, 31).

In *An Uneasy Terrain*, I think about layers of space that collide; the physical and the virtual spaces that bodies move through constantly. What kind of affects and emotions does this create? How can I research emotions to further understand the trouble that I see, as does Haraway, with visualizing technologies? To understand emotions, I have been thinking with Sara Ahmed who offers an intersectional feminist understanding in the field of affect theory. Therefore, I ask:

How can the design of installation render emotions in an imaginative form?
How does my role as a feminist inform my research and design process?

I address these research questions in *An Uneasy Terrain* through the creation of an immersive installation. In choosing to unfold my research through the creation of an immersive installation, I ask audiences to experience the relationships between their bodies, technologies, and data.

Project Roadmap

In chapter one, I conduct a broad survey of visualizing technologies in keeping with Donna Haraway's definition. In my analysis I include three visualizing technologies: computer

vision, facial recognition and the social media filter. I define computer vision using Golan Levin's definition to highlight the usage of these technologies by artists like David Rokeby. In doing so, I make the distinction between how computer vision is used by artists versus how corporations use these same visualizing technologies. In this chapter, I also highlight that social media companies own sophisticated facial recognition systems due to the vast amounts of bodily data they currently possess. In laying this foundation for chapter one, I conclude in showcasing how data is extremely valuable as a source of knowledge for corporate agendas, governments, and the military.

In chapter two, I discuss the politicization of vision theoretically, showing that visualizing technologies that use artificial intelligence shape how we see the world. I think about how vision is socially mediated with Donna Haraway's essays, "*Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*" (1988) and the "*Virtual Speculum in the New World Order"* (1997). I also focus on the idea of emotions, which I discuss in reference to Sara Ahmed, who distinguishes the differences between emotion and affect. These theoretical frameworks ground me in thinking about visualizing technologies and the emotions that are evoked by them.

Chapter three introduces the methodologies and methods I have applied throughout the thesis development. I state my case for the evolution of each install through the use of an iterative process. I follow this by reviewing how this project is situated as a research-creation by examining Research-Creation as a methodology, as discussed in Natalie Loveless' 2018 manifesto on Research-Creation. *An Uneasy Terrain,* the installation, creates a space for feminist speculation. I employ Speculative Design methodologies in tandem with *thinking with* feminist scholars such as Donna Haraway, Sara Ahmed and Maria Puig de la Bellacasa.

Chapter four delves into the prototyping process for *An Uneasy Terrain.* This thesis document is accompanied by the installation design, which renders emotions through immersion and speculation. I further explore how immersion and speculation evolved iteratively in bringing the physical and virtual space together to form the *mixed space* of the installation. I reflect on how space, visualizing technologies and sound were employed to evoke emotions. I end the chapter by outlining elements of the install and how they came to prominence in the final installation.

Chapter five is the conclusion chapter of this thesis. I summarize my own reflections on the process and the final output of this thesis. I explore my thoughts on the future iterations *An Uneasy Terrain* and my reflections from working on this project for over one year.

Chapter One: Technological Review

In this chapter I think with Donna Haraway's definition of visualizing technologies (*Virtual Speculum,* 23). I use this chapter to lay the groundwork for explaining computer vision as a foundational element in the technologies that are used by facial recognition systems. I illustrate how thinking with these technologies played a part in forming the speculative aspect of *An Uneasy Terrain*. Furthermore, I show how facial recognition systems are incorporated into social media platforms that users interact with on a daily basis.

Computer Vision

The computer aided process of translating visual information into symbolic information, known as image processing or computer vision, is complex and interdisciplinary in nature.

Computer vision forms part of an artificial system (including hardware and software) that extracts information from images and the physical world in order to automate and model tasks that human visual systems perform[1].

I am drawn to Golan Levin's definition that demystifies computer vision for novice programmers like myself. Levin defines computer vision as:

> "Computer vision" refers to a broad class of algorithms that allow computers to make intelligent assertions about digital images and video. (flong.com)

[1] Computer Vision is a broad scientific field that includes a wide range of computer algorithmic techniques. The field is interdisciplinary in nature and is concerned with how computers gain a high-level understanding from visual imagery and video. Computers rely on cameras to access pure data and make assertions based on extractions of that data. This conversion of data from pure data to synthesised data assists computers to make decisions. According to Dana Ballard "computer vision is the enterprise of automating and integrating a wide range of process and representations used for visual perception. It includes as parts many techniques that are useful by themselves, such as image processing (transforming, encoding, and transmitting images) and statistical pattern classification (statistical decision theory applied to general patterns, visual or otherwise). More importantly it includes techniques for geometric modeling and cognitive processing." (*Computer Vision*, 2).

Broadly, computer vision is the visual sensory part of a machine which operates by scanning the world through a camera or 3D camera sensor. Levin describes how artists and designers such as David Rokeby have used this technology in various new media installations (ibid).

Figure 1: David Rokeby "Sorting Daemon" 2003 (Image copyright David Rokeby) (Rokeby. D, 2003)

In his project *Sorting Daemon* (2003), Rokeby programmed an artificially intelligent vision system that analyzed data from a camera pointed towards a busy street opposite the installation space (Figure 1). The collected data is used to sort captured images of bodies based on color to create a composite image displayed on a screen inside the installation space. Rokeby creates visual systems to understand the "difference" between human and computer vision[2].

In Rokeby's artistic practice, examining vision is by extension thinking about surveillance. I, too, am concerned with computer vision and the role it is rapidly playing in surveillance technologies. In *Sorting Daemon*, Rokeby trains his camera on human bodies to extract color information, and in *An Uneasy Terrain*, I use a camera to capture bodies in space to place them

[2] Rokeby, describing his work *Sorting Daemon,* writes, "I am astonished at how willingly and easily we underestimate the complexity and subtlety of our own human faculties. If we underestimate ourselves, then we will be in danger of putting machines to work in situations where these undervalued human faculties are actually essential elements" (davidrokeby.com 2003).

within a digital terrain. Viewers recognize themselves within a digital space, and it is through this recognition that I strive to evoke a sense of uneasiness.

Computer vision acts as a mediator between the human body and our devices. As a growing field in Human Computer Interaction (HCI), computer vision technologies are changing the ways in which humans interact with screens. Utilizing this broad class of technologies, developments have been made on how devices are unlocked, secured, encrypted and operated. From a computer science perspective to an HCI perspective, computer vision is a powerful tool which helps with the processing of vast amounts of data that cannot be processed by the human brain and eye. Currently, an unprecedented amount of data is uploaded to the internet, and most of it is done through social media. Roughly half of the world's population currently holds a social media account (Salim, 2019). Computer vision therefore plays a powerful part in sorting out data for social media companies. Most of the data is sorting out human faces, for example Facebook uses a powerful system called DeepFace which is able to match faces with 97% accuracy. (Lange. qtd. Simonite). This has allowed for important biometric data to be available to corporations whose platforms allow people to share images and videos easily (Singer and Isaac).

The virtual is a space that the human body inhabits equally or as much as physical space. This has led to databases of human faces that are increasingly used in training artificially intelligent algorithms to recognize the human, and apparently all facets that come with being human, such as the emotions articulated through facial gestures and movements (Smith). In *An Uneasy Terrain,* I work with physical and virtual space as fields that viewers can occupy simultaneously. In this sense, I view the physical and the virtual as creating the *mixed space* of the installation.

I want to go back to David Rokeby's work *Sorting Daemon* and his creative process. Rokeby says, "I create systems rather than a picture" (Rokeby, 2003). In *An Uneasy Terrain*, I conceive of the installation and its component parts as creating a system that has its own processes. I use computer vision technologies such as an Xbox Kinect to capture and immerse bodies in a constructed space. I further immerse bodies through the use of sound and mirrors. In *Sorting Daemon,* Rokeby doesn't directly engage with an audience, but rather uses a camera and

algorithms to capture anonymous bystanders in a busy street. In *An Uneasy Terrain*, I choose to engage with bodies in a space where the audience is *aware* that they are virtually and materially present in the installation. The camera is hidden to provoke the uneasiness that occurs when one senses that they are being surveilled. I further remove the presence of the camera to discourage viewers from performing when they inhabit the installation space.

Facial Recognition

Under the broad range of computer vision technologies falls the category of technologies known as "Facial Recognition". Facial recognition identifies human faces in images and video, and is trained through methods such as deep learning in the field of computer vision. (Das et al., 3).

According to Das et al., "Facial recognition has been an active field of research since the early 1970s. For many decades progress in facial recognition was slow due to challenges arising from the fact that faces are not rigid objects, but are constantly changing due to aging, facial expression, makeup, or (facial) hair style." They further state that due to recent breakthroughs in computer vision technologies[3], the accuracy of facial recognition has advanced.

Many social media corporations such as Facebook, due to their ability to amass a vast amount of facial data, have developed very strong facial recognition systems (Lange). Additionally, there are companies like Clearview AI, based in Silicon Valley. Clearview AI is a controversial start-up that has access to over three billion faces scraped from publicly-available social media data, and uses computer vision systems to match the uploaded face to a large database. It was developed for use by law enforcement agencies worldwide (Hill, 2020).

To illustrate how facial recognition is used by social media companies, I am drawn to this description in a research paper published by Facebook on their DeepFace facial recognition system. In the paper, they state:

> Thus, we trained it on the largest facial dataset to-date, an identity labeled dataset of four million facial images belonging to more than 4,000 identities. The learned

[3] Eigenfaces and Fisherfaces are two methods that algorithmically advanced facial recognition systems in tracking faces in 3D (Das et. al, 2017).

> representations coupling the accurate model-based alignment with the large facial database generalize remarkably well to faces in unconstrained environments, even with a simple classifier. Our method reaches an accuracy of 97.35% on the Labeled Faces in the Wild (LFW) dataset, reducing the error of the current state of the art by more than 27%, closely approaching human-level performance. (Taigman,1)

I am concerned with what exactly human-level performance means in this context. Why would a company seek to create a technology that recognizes faces with such accuracy? What choices do users have to provide consent when this data is being collected? Recently Facebook settled a facial recognition case (Singer and Isaac) which meant they had made a change to their platform allowing for their users to "opt-in" or "out" from facial recognition. The below figure is an update I received on my personal Facebook account (Figure 2).

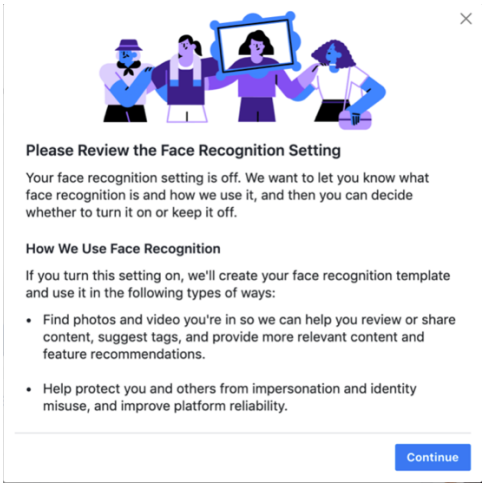


Figure 2: Facial Recognition opt-in by Facebook

Figure 2 is intriguing because it shows animated figures that are purple in color, almost implying an erasure of race. To me, it was a complete contrast to Facebook's SparkAR platform. This is the platform I have been using to make, research and think about social media filters. In the SparkAR platform, users can design augmented reality objects on a variety of pre-recorded

faces. Each of these faces is recorded to display a range of emotions, such as angry, happy, surprised. Users can use these faces and the respective facial emotional gestures to make interactable augmented-reality social media art. In the process of my art making, I felt uneasy when interacting with these faces. I couldn't escape confronting structural questions of the body such as race and gender, as the majority of the pre-recorded faces were of people of color (Figure 3). This led me to search for answers: who were these faces, and how did they come to be part of the SparkAR platform?

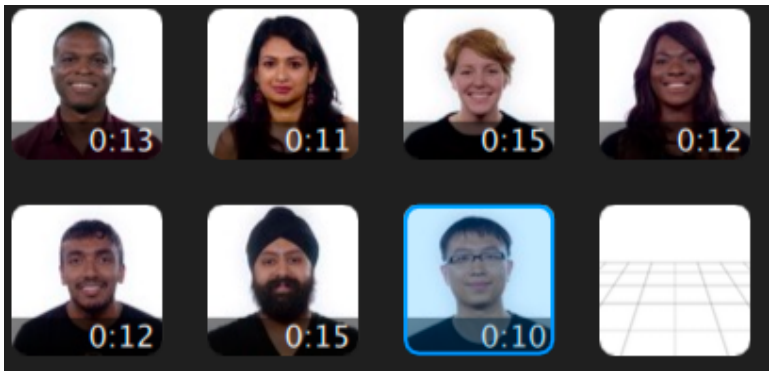


Figure 3: Screenshot of SparkAR prerecorded faces

I chose to incorporate these faces into the installation *An Uneasy Terrain*, as I believe these faces were chosen by Facebook on purpose. As the user-base of these technologies grows amongst people of color, there is a lot of value in creating datasets of racialized bodies for these companies. Facial recognition has always had troubling implications for people of color, especially in its militaristic use (Kessel et al, 2019). This research-creation isn't a deep look at the military usage of facial recognition, but rather a look at how facial recognition is creating a niche place in the world of art and design through the social media filter, which is equally if not more troubling in the way it isn't technically thought of as facial recognition.

Social Media Filter

Computer vision in the form of facial recognition is easily accessible through a variety of "social media filter" applications on mobile devices. It is frequently used on "playful" applications like Snapchat, Instagram, Snow, TikTok and many more. In this context, social media filters (Syed, 2020) map 2D and 3D augmented reality objects onto a user's face. In this thesis, I use the term "social media filter" but it is also known as an "augmented reality filter" (Sawyer) or a "selfie lens" (Rettberg, 1).

The social media filter entered my life as an innocent fun technology a couple of years ago (Figure 4). I started seeing my friends, colleagues and family changing their appearances on their social media selfies.

Figure 4: Social Media Filter Instagram

To understand the Social Media Filter, it is pertinent to understand the "Selfie". My understanding of the selfie is that it is a self-portrait of a person's face taken usually from a front facing camera on a mobile device, usually a smartphone. Merriam-Webster online dictionary defines the selfie as "an image that includes oneself (often with another person or as part of a group) and is taken by oneself using a digital camera especially for posting on social networks.

In “Seeing Ourselves through Technology,” Jill Rettberg finds the selfie analogous to long held traditions of self-portraiture in visual art and history, however one that has become an everyday occurrence rather than something which is declared as art in galleries. The selfie, by its history and means of distribution, is intrinsically linked to social media. Rettberg mentions research on the selfie by Katie Warfield (Rettberg, 9) Katie Warfield notes that:

> This is the first time we can use a device to simultaneously see our reflection and record it. Mirrors allowed us to see our own reflection, but not to record it. Cameras allowed us to record our own image, but until the digital display and front-facing camera of the smartphone, they did not allow us to see our face as we pressed the shutter. (Rettberg, qtd. Warfield, 9)

In my research, the digital camera on mobile devices is a key point of interest. The “front facing” camera not only allows users to capture, upload and share their faces, it also allows corporations such as Facebook, Snapchat, Google and many more to create databases of these faces (Glaser).

In this thesis I think of the social media filter as a visualizing technology (V*irtual Speculum*, 23). Rettberg’s research discusses the word “filter” and how it has come to be included in our lexicon as a means of describing a particular technological aspect in images and film. Filters are not new in that aspect; the word filter is also used to describe the need to filter out other forms of information, such as spam emails. Filtering also refers to the “ways in which our devices and algorithms have certain technical affordances and constraints that cause them to act much as literal filters do, straining out certain information and making other information more visible” (Rettberg, 21). Social media filters filter out certain information, such as the position of the eyes, nose, or if the mouth is open or not. This “filtering out” allows for the placement of augmented reality objects that are interactable with the face. I am curious about what is “filtered” What is left out? What is invisible? What knowledge is created through this invisibility?

I illustrate how thinking with these technologies played a part in forming the speculative aspect of *An Uneasy Terrain*. I use the selfies I found on the SparkAR platform as an integral part of my video component (Figure 5). The faces are blocked with the use of mirrors, which add a point of reflection for the audience. In doing so, the audience is brought into the dynamics of the space that work to activate thinking about their own relationships to these technologies. It is not meant to be a playful experience; rather, it is meant to be a space that evokes uneasiness and perhaps even exhibits a sense of sinisterism when coupled with the soundtrack of the installation. There is a deliberate use of camera clicks which are timed as faces appear on the scene. As each face appears, the sounds of the camera fill the space to evoke a feeling of being captured, or of being caught.

Figure 5: Screenshot from install 5.

Summary

As a designer I was fascinated by my ability to transform my face using social media filters. These visualizing technologies have great immersive powers. People are increasingly enamored, engaged, or completely engrossed by their digital devices by a variety of means. Because of this, the way in which behemothic technology corporations have positioned themselves inside homes, cities, and countries is a cause for concern (Solon). As interactions with these technologies grow every day, active data collection grows too, without consent on how and what data is collected on bodies. This data is extremely valuable for many actors in this field: The military uses such data to carry out drone attacks and targeted killings (Kessel). Facial data and facial recognition have recently been used by governments to curb protests in Hong

Kong, Chile and India (Mozur). Most prominently, it is used by corporations such as Facebook to create very sophisticated facial recognition systems, through the training of their proprietary artificial intelligence research like Deep face (Glaser 2019). Just as Haraway asserts and questions the "objectivity" of sciences, I question the objectivity and neutrality of this data collection, hence knowledge creation, or that which is done to create utopian narratives driven by "technological innovation".

Chapter Two: Literature Review

"Think we must; we must think"

-Donna Haraway, Staying with the Trouble (page 47, 2016).

My interaction with social media recently has made me wonder if my devices are spying on me. I find it uncanny that when I Google search or even talk about something, I am shown an ad for that exact thing, either on Facebook or Instagram. These do not seem like coincidences; rather, they seem to point to an active extraction of data and knowledge from my interactions with devices. Therefore, I engage with Haraway's quote above to think about my relationship to these technologies.

Donna Haraway asserts and questions the "objectivity" of sciences, I question the objectivity and neutrality of this data collection: Knowledge in this instance is *data*, which is extracted from user interactions with visualizing technologies. In *(Re)framing Big Data: Activating Situated Knowledges and a Feminist Ethics of Care in Social Media Research*, researchers Mary Elizabeth Luka and Mélanie Millette use Donna Haraway's ideas about" Situated Knowledge" to methodologically approach social media research. They challenge the notion that data is "facts or information used to calculate, analyze, or plan something; information that is produced or stored by a computer" (Luka and Millette, 2). They further argue that big data, as collected by social media companies, is "lively". Data doesn't fully represent reality as it is in constant flux of interactions. From Luka and Millete's perspective, I was able to understand data as a dynamic form of knowledge-creation resulting from users' active participation with these technologies.

In thinking about social media filters, I am interested in how the data collected from the face is an invaluable source of knowledge for social media companies. When we use our devices we consent to give our data away. I speculate about the political outcomes of this data collection and the ways in which data is used without our explicit understanding of what consent means.

Politicization of Vision

Social media corporations build vast databases of faces and wield the resulting power of holding proprietary rights to some of the world's best computer vision systems. This allows them to make it easy to be "tagged" in a picture, and to provide hyper-targeted marketing (Metz).

Haraway's text *"Situated Knowledges: The Privilege of Partial Perspectives"* (1988) grounds her discussion of knowledge creation through feminist methods versus the methods of social media companies. Social media companies frequently relay narratives claiming that the knowledge they create isn't biased, despite growing evidence of misuse (Singer and Issac). In *An Uneasy Terrain,* I think with Haraway when she says:

> The visualizing technologies are without apparent limit: the eye of any ordinary primate like us can be endlessly enhanced by sonography systems, magnetic resonance imaging, artificial intelligence-linked graphic manipulation systems, scanning electron microscopes, computer-aided tomography scanners, colour enhancement techniques, satellite surveillance systems, home and office VDTs, cameras for every purpose from filming the mucous membrane lining the gut cavity of a marine worm living in the vent gases on a fault between continental plates to mapping a planetary hemisphere elsewhere in the solar system. Vision is this technological feast becomes unregulated gluttony; all perspectives give way to infinitely mobile vision, which no longer seems just mythically about the god-trick of seeing everything from nowhere, but to have put the myth into ordinary practice. (*Situated Knowledges*, 189)

In the above quote, Haraway states that vision can be an all-consuming power mediated through visualizing technologies. Here, she makes connections between science, objectivity, vision and power. She states that the concept of "neutral" vision–vision from nowhere and everywhere–hides a specific position of power, one that is "White, male, and heterosexual" (198).

For example, dominant narratives of the nuclear family are visually rendered when Haraway thinks of visualizing technologies through "reproductive freedom" (*Virtual Speculum*,

25). She writes about an advertisement by Bell Telephone technologies from the early 1990s that featured a racially diverse cast of characters and reinforced an idea of the nuclear family as a reproductive unit. Pregnancy and motherhood are shown as being mediated through sonography. Women are linked to these technologies and their primary concern is constructed to be that of bearing children. Haraway further states that "Television, sonography, computer video display and the telephone are all apparatuses for the production of the nuclear family. Voice and Touch are brought to life on screen" (26). Screens play a central role in how the world is reflected back in this essay and in my installation. There is a certain level of emotion created by these technologies. The sonogram in the Bell advertisement reinforces the narrative of a happy nuclear family, wherein actors of racially diverse backgrounds depict normative roles. The mother observes her "creation" on the screen, reaching out through the phone to an absent father, to convey the happy news.

In deconstructing this advertisement from Bell Technologies, Haraway implicitly exposes the emotions attached to the dominant narratives woven into these technologies; for example, the emotions that are tied to the idea of a heterosexual couple. In *An Uneasy Terrain*, I am concerned with the emotions produced by such dominant narratives which allow mass participation in screen-based technologies–especially those that reflect one's self like a mirror.

I research emotions to further understand the trouble that I see, as does Haraway, with visualizing technologies. I think with Sara Ahmed, who offers an intersectional feminist understanding of affect theory. In an interview with Sigrid Schmitz, Ahmed comments that she avoids the word "affect" and prefers the word "emotion":

> We assume to know what it means – emotion is about having a feeling in response to something – however, it is much more complicated and socially mediated than that. I actually wanted to disrupt the idea of emotion coming from within and then moving out towards objects and others. Some people use the word affect to describe how you're affected – to affect and to be affected – thereby expressing a bodily responsiveness to the world that the word is used to denote. I rather use emotion

> because that word took me further in not starting with the question of how we are affected by this. (Schmitz, Sigrid, and Sara Ahmed, 97–108)

In *An Uneasy Terrain,* I started thinking about visualizing technologies and how they've encroached upon our everyday by focusing on the human body, and how this encroachment generates emotion. Ahmed points out that "your body is a structure even when we are thinking about the individual body, we should not think of it as unrelated to structural questions" (97–108).

In thinking with Haraway, I consider how dominant narratives structure our understanding of race and gender and how this knowledge is enforced through screens. If Haraway's work speaks to how vision has been politicized, then Ahmed's work is about the impacts of that politicization, through emotions.

In addition to creating structures of knowledge, screens today encourage an obsession with the self, through selfie culture on social media. This preoccupation with the screen has allowed for knowledge to be created by visualizing technologies such as facial recognition.

Social Media

If Facebook were a country, it would be the most populous country in the world (Figure 8) with the combined populations of China and India, at roughly 2.5 billion monthly active users. Overall, Facebook has 2.9 billion users across its combined social media platforms, such as Instagram, WhatsApp and Messenger (Aboulhosn). This brings about a query: what exactly are social medias, and how do they differ from other forms of media?

Facebook and other social media sites have had many predecessors, such as Myspace and Friendster. These sites are commonly referred to as "Social Networking Sites (SNS)" (Boyd and Ellison, 2007). In 2007, researchers Boyd and Ellison conducted a study to come to a stable definition of SNS:

> We define social network sites as web-based services that allow individuals to(1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site. (Boyd and Ellison, 211)

This is a classic definition, one of the first to try and piece together the ever-changing landscape of new forms of media driven by Web 2.0 technologies. In 2018, Wolf, Maxim, et al., published a paper trying to aggregate any and all meanings of social media that have come to be defined in scholarship and research works, in a paper called "Social Media? What Social Media?" (2008). Wolf, Maxim et al. define Web 2.0 "as a set of technologies and ideologies that enable and drive media rich content creation on the internet" (qtd. Kaplen and Haenlein, 2) and not just necessarily those which are "web-based" (Boyd and Ellison, 2007). One of the key points that can be glimpsed through attempting to define social media is that there are no stable definitions. As seen by the multitude of definitions or attempts at defining this media (Wolf, Maxim et al.2018), it is almost as if the speed at which technology moves, enabled by billions of dollars in funding, makes the definitions by nature slippery and unstable.

While I was attempting to ground my research on the rise of the phenomenon known as the social media filter, I came to realize that the foundation itself is shaky, in terms of the research available. It's as if researchers, designers and artists are grappling with and standing on uneasy terrain. Social media too is screen based, and further profits off the presence of bodies constantly looking at screens. User's bodies are also captured by screens and are sources of knowledge in the datasets and generate profit for social media companies. Social media create multiple narratives that are tied to emotions, "thereby expressing a bodily responsiveness to the world that [emotions] is used to denote" (Ahmed, 26-27). In the next subsection, I think with Sara Ahmed in understanding emotions and the things "they do."

Emotions

"Globality is now what would move us to tears". - Sara Ahmed, *Collective Feelings: Or, The Impressions Left by Others* (37).

Despite lacking a stable meaning, social media has allowed people from all over the world to share, shape, and form communities. At least, that is the premise they operate on, which can be seen in the first public filing by Facebook with the SEC (Securities and Exchange Commission) in 2012. According to Facebook's 2012 annual report, in a letter to the shareholders and general public, Mark Zuckerberg states:

> Our guiding compass is our mission: to give people the power to share and make the world more open and connected. This is why we are here. We try to help you stay connected with everyone you care about, give you a voice to share what's important to you, and hopefully make the world a little smaller as a result. (Facebook, 1).

Eight years since this was written, the world is not small. It remains the same size, in fact, unless what is invoked here is that it has gotten smaller for a select few. I would like to further break down this statement by Zuckerberg by referring to the quote at the top of this section by Sara Ahmed (*Collective Feelings*, 37). Here, I argue that this appeal, using words such as "open" and "connected" under the guise of "globality," companies like Facebook are able to deflect the truth, which is that users are freely contributing to the global reach of surveillance culture through widespread data collection.

Ahmed seeks to understand how "collective feelings" and "emotions" work to "*do things,"* and "work to align individuals with collectives–or bodily space with social space–through the very intensity of their attachments" to these spaces (26). I am particularly interested in Ahmed's idea of the "global body".

In the world of social media, connection is invoked by an emotional sense of belonging to "a small world" (Facebook, 1). This world asks us to share everything from our likes, faces, habits, voices, biometrics etc. When we inhabit this virtual space, the feeling of "shared

humanness" is enhanced through the witnessing of other bodies that also share aspects of their lives. People inhabit these spaces and reveal themselves through "selfies" that create feelings of camaraderie, in other words, feelings of belonging are manufactured to form emotional ties. These emotional connections are what form the global body; it is an imagined feeling that ties many users to these platforms.

Emotions are powerful, and they are tied to histories of knowledge. They help bond and form attachments to technologies, movements, companies and especially other bodies.[4] In Sara Ahmed's words "emotions *do things*" (26). She explains: "I want to focus on how the perception of others as 'causing' an emotional response is not simply my perception but involves a form of 'contact' between myself and others, which is shaped by longer histories of contact" (31). For Ahmed, these histories of contact are how "organization of social and bodily space creates a border that is transformed into an object, as an effect of this intensification of feeling" (33). In her paper she focuses on feeling and emotions that make " 'the collective' appear as if it were a body in the first place."(32) In a world where bodies are still subjugated to multiple violence's, emotions work in ways, especially in the case of social media, to attach the body to this idea of the virtual space, and in the case of Facebook, that "the world is smaller"(Facebook).

I connect Sara Ahmed's definition of "emotions" with Donna Haraway's theory of "Situated Knowledges". Whereas these technologies work on making the world a "smaller place," feminists think of the world as a *large place* in which bodies navigate multiple power relations and oppressions on a daily basis, socially mediated through screens that capture and excavate data through the camera. This leads me to ask: How can I, as a designer, bring in a feminist notion of care (Puig de la Bellacasa) to think about emotions, and how are emotions produced by bodies in physical and virtual space?

---

[4] Ahmed here explains how ideas of the global body are also tied to how we see others in relation to ourselves. The differences or our shared connections with others is often exploited to create mutual feelings amongst otherwise dispersed groups of people. She states that "We can see that the surfaces and boundaries of the global body materialize through processes of intensification in which the bodies of others are both felt and read as 'like me' or 'not like me'. Globality becomes a form of attachment; *one can be moved precisely by the imagined form of globality itself*." (*Collective Feelings,* 38).

Emotions evoked by visualizing technologies serve as a way to simplify the complexities of bodies inhabiting physical space. These concepts helped to bring my own body to the forefront, and to think about my own navigation in these social media worlds. These explorations manifest in the construction of an installation space.

Situated Knowledges

I draw on Donna Haraway's essay to question the knowledge created in current visualizing technologies discussed in chapter one. In *An Uneasy Terrain,* I think with Donna Haraway's idea of "Situated knowledges" to bring a feminist notion of care into my work. Maria Puig de la Bellacasa's, reading of Haraway explains: "…that knowledge is situated means that knowing and thinking are inconceivable without a multitude of relations that also make possible the worlds we think with… relations of thinking and knowing require care" (198).

In this way, care and knowledge are like chain links. I ask: how can I bring care into rendering emotions in an imaginative form where data, emotions, knowledge and bodies are entangled? Situated knowledges are an "apparatus of bodily production" (200). It is not knowledge "from above" but rather, *knowledges* that have roots in the many. I was drawn to the idea of situated knowledges as *multiplicity*, which is about seeing the world from multiple points of view, rather than a singular vision or knowledge claim. A singular vision extracts data for "innovation," and is driven by a narrative of achieving solely "human level vision" (non-populated worlds). A singular narrative seeks to control, when in actual fact, even human level vision is in itself multiple. Situated knowledges are about accepting that physical and virtual spaces are lively and generative. Thinking of knowledges as situated provides me with the space to speculate and critique politically and socially dominant narratives that are entangled with visualizing technologies.

In *An Uneasy Terrain* I locate myself as a partial observer, with my own experiences of inhabiting these physical and virtual spaces and observations of a multitude of vision technologies and applications, all which strive to know me and my face as I augment my own body through filter art. At

the same time, these technologies use most of my personal information as data, sometimes for nefarious activities.[5]

In the installation I use live capture of bodies and a series of filtered faces on a moving terrain to actualize these contradictions (Figure 6). I use mirrors to hide the filtered faces on the video. Mirrors allow the audience to have an experience not mediated by screens. However, the mirrors allow the audience to locate themselves by catching their own reflections. These reflections appear where the social media filtered faces are blocked.

Figure 6: An audience member interacting with An Uneasy Terrain

I hide the social media faces because they are assets created for users who make filters for selfies. By placing the mirrors at eye level, I urge the audience to locate themselves within the space of the work. By suspending the mirrors within the installation space, I construct a mixed reality where the

[5] I have used the word nefarious here in relation to Glaser's 2019 article because when thinking especially about Facebook which holds the largest dataset on faces, it is concerning. This article states that yes, Facebook does not sell the data but rather allows for access on how to use data for advertisers and others as Glaser states in this article "There is very good reason to worry that if Facebook ever decides to make additional use of its massive trove of name-to-face data—perhaps as an opt-in form of The recent use of data by Cambridge Analytica (Glaser, 2019).

physical and the virtual intersect. This creates a feeling of disorientation. Although we occupy mixed realities with increasing frequency, these realities are mediated through screens; it is uncommon to experience this conflation in the expanded space of an installation. Emotions are evoked in seeing the self in this context, mediated by the screens that are a part of our daily lives.

The world cannot be reduced to mere data, despite the efforts of corporations and governments. As an observer and participant with these visualizing technologies, it is not about changing the world, but locating oneself in order to speculate on the politically entangled and socially mediated world. Situated knowledges are not about complicity in these systems, but rather, about building a feminist awareness of the multiple layers in which these systems operate. In this way, *An Uneasy Terrain* is my personal deconstruction of these layers, and I invite audiences to engage with my partial understandings of this mediated space.

Chapter Three: Methodologies and Methods

I utilize an iterative process that supports an incremental development of the installation. I chose research-creation as a methodology because it aligns with the research I have engaged with, especially in thinking with feminist scholars like Donna Haraway and Sara Ahmed. As this thesis ties elements of myself into the process, and explores emotions through its installation, it therefore supports an experimental navigation; speculative Design methodology was brought into the project to create an environment that is speculative as well as immersive, critical and spatial. *Thinking with* is a method I have held onto throughout this thesis. *Thinking with* adds a layer to the speculative nature of the project, because, especially with Haraway, *thinking with* supports multiple interpretations for both me as the researcher, and my potential audience.

Iterative Process

I constructed the installation iteratively. Iterative processes are used to develop solutions for problems that arise in design projects that involve user research. In *An Uneasy Terrain*, rather than concentrating on a problem to be solved, I use iteration to think through each install incrementally. Each stage of the installation was constructed to think through my research questions. Emotions in *An Uneasy Terrain* are not a design problem to be solved but are instead a process of *thinking with* responses to the entanglement of visualizing technologies and bodies; elements in the installation such as sound, darkness, and reflective surfaces function as cues to evoke emotional response.

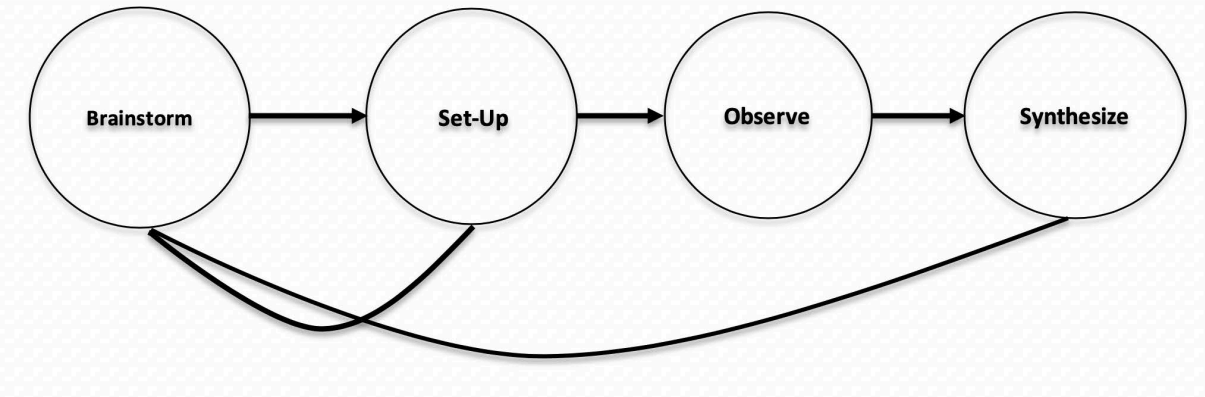


Figure 7: Iterative Process of An Uneasy Terrain

The above figure (Figure 7) is how my iterative process operated. I began each install with a brainstorm and sketch of the install space. The space I was installing impacted the set-up: certain elements needed to be arranged differently depending on the space I was using, and technologies and technical issues often meant I had to quickly brainstorm alternatives. The process of setting up an installation is a very active process, as the set-up itself can be very informative toward the overall design of the installation. The set-up and the actual active process of installing itself were a great opportunity to observe what was working and what needed to be filed away. Through my own observations as well as internal critiques, I was able to collect and collate information on how I would proceed with each iteration. As an example, I chose to add mirrors in install 4 (See Appendix D) after experimenting with various reflective surfaces from install 2 onwards. Eventually the reflective material as mirror took a more prominent place in the mixed space of the installation, as it added in more points to capture the bodies in the space, allowing me to further enhance the immersive qualities of the installation.

Research-Creation

Natalie Loveless' book "How to Make Art at the End of the World: Manifesto for Research-Creation" (2018) guided me in accessing research-creation as one of my methodologies, allowing for an interdisciplinary approach. In *An Uneasy Terrain*, I draw from different disciplines, such as design and art, in order to comment on technology. The installation

operates as a system; it includes code, a live capture camera, video, sound and space. I was inspired by the way David Rokeby borrows from interdisciplinary fields to set up systems as he did in *Sorting Daemon*. Rokeby's artistic practice is situated in "creating systems," much like *An Uneasy Terrain,* that borrow from different fields. Rokeby remarks on his artistic practice as a *creator of systems*, but one with no foreknowledge of what the output of the systems might look like.

In his 1993 essay "Research in Art and Design" Chrisopher Frayling describes three conditions for research in the field of art and design:

1. Research into art and design
2. Research through art and design
3. Research for art and design

An Uneasy Terrain is "research through art and design". Research through art and design combines making with written analysis, and results in a "hybrid written thesis and artistic object, installation, or action and documented in some way" (Loveless, 52). Further research through art and design can be carried out through material research, development work or action research. *An Uneasy Terrain* utilizes action research, which involves a research diary and a step-by-step approach to contextualize the results of the design and artistic experiments. Each install is carried out iteratively, and each is considered an experiment. The results of the experiments are contextualized as a report (See Appendix).

Speculative Design

Speculative Design as a methodology came to be coined by Dunne and Raby at the Royal College of Art in 2013. Speculative Design is defined as a discursive practice that is used to elicit critical thinking and dialogue. In "Speculative Everything" (2013), Dunne and Raby explain what speculative projects aim to do, providing an A/B table to showcase what speculative design projects *are not* (A) in relation to what they *are* (B):

Table 1: Excerpt from A/B manifesto (Dunne & Raby, 2013, p. vii)

A	B
Affirmative	Critical
Problem Solving	Problem Finding
Provides answers	Asks questions
For how the world is	For how the world could be
Make us buy	Makes us think

In keeping with Dunne and Raby conditions for a speculative work, *An Uneasy Terrain* speculates on the participatory nature of surveillance, as it is embedded within current visualizing technologies. It is *problem finding* in the sense that it is thinking about multiple problems, rather focusing on one problem. The final output of the installation is most definitely set up to *ask questions* of the audience, rather than provide answers. However, *An Uneasy Terrain* doesn't ask *"how the world could be,"* but rather is focused on exposing how the world is, especially in thinking with Haraway's metaphors of vision that highlight inherited histories of knowledge production, which are linked to histories of capitalism, colonialism, racism and militarism (*Situated Knowledges*, 186). *An Uneasy Terrain* isn't just about making people *think*, but rather it is an urgency to think in rich multiple formats to produce knowledges. As Haraway asserts, it matters "*what thoughts think thoughts* in the depth of the trouble" (*Staying with the Trouble*, 31).

Dunne and Raby maintain that in order for knowledge creation in multiple and alternative futures, speculation as a tool provides art and design projects to draw research from a critical perspective that isn't attached to a singular outcome, but can incite a conversation around the possibilities in an unknowable future (Dunne and Raby).

I want to acknowledge the problems of this methodology in art and design disciplines. For Dunne and Raby, Speculative Design is about thinking about desirable and undesirable

futures (2013). I find thinking about desirable futures problematic, because this project isn't concerned with desirable futures, but rather, it is a speculation around the entanglements of bodies, emotions, data and visualizing technologies.[6] The speculation questions the narratives of technological innovations that drive to create a singular future through knowledge production. In order to supplement Speculative Design Methodology, feminist approaches, such as *thinking with care,* have been employed throughout this thesis.

Thinking With

I return to Maria Puig de la Bellacasa's essay on reading Haraway, where she states that *thinking with care* with Haraway "requires an effort to sense how each of her stories is situated in crowded worlds; or simply it invites a letting go of trying to systematically control a totality" (202). The idea of letting go of a totality in this thesis is relevant because through the process of constructing the installation, there was always a sense of shifting boundaries between the physical and the virtual, participation and consent. Issues around surveillance, bodies and technologies are complex; they are not about "single issued worlds" (202). The speculation in this thesis doesn't follow a linear trajectory, instead it refracts through multiple situated knowledges.

An Uneasy Terrain builds layered critiques without simplifying the "trouble" (*Staying with the Trouble*, 31). *Thinking with* operates in a world with entanglements, and positioned me in nuanced ways, acknowledging my own participation in a world of devices and surveillance. Feminist thinking allowed me to locate myself outside of a narrow understanding of knowledge making. Puig de la Bellacasa writes that to *think with* is to create relations for multiplicity. In creating relations, researchers can come to care; "caring is more than an affective ethical state: It involves material engagement in labours to sustain interdependent worlds" (198). Thinking about emotions, bodies, machines, visions, and their politically inherited histories wasn't easy, but this

[6] This methodology has come to be critiqued by many practitioners like Luiza Prado seeing speculative design projects failing in their "approach aimed at questioning the complex relationships between gender, technology and social and cultural oppression." (Prado, 2014).

is what *thinking with* does. It requires the researcher's deep engagement to acknowledge that these issues are entangled in "interdependent worlds" (199).

Chapter Four: Prototyping *An Uneasy Terrain*

To construct *An Uneasy Terrain,* my prototyping process went through five iterations. In prototyping, I wanted to use visualizing technologies to immerse an audience (Kwastek) in space in order to engage with emotions and the complexities and entanglements of vision (Haraway, 1988; 1997). In the installation design subsection, I explore how I used space as a parameter to hold and contain the physical and the virtual. In designing for immersion, I reflect on a few elements I employed throughout my process.

An Uneasy Terrain invites an audience to become immersed in a mixed reality space. The audience enters a darkened room and is confronted with a projection of a virtual moving terrain. Six mirrors are suspended and appear like screens on the moving terrain. The moving terrain sets the illusion of an expansive and infinite virtual space.

Sounds-such as the sound of being under water, the clicking of a camera, and a mechanical beep–are used to heighten the atmosphere and elicit emotions. A hidden Kinect Xbox 360 sensor is used to capture the audience's bodies in space. The data is captured as Point Cloud data and reflected back onto a terrain in which sit selfie-like faces that are blocked in space by real suspended mirrors.

I use audio to spatially immerse audiences in a speculative space that also operates as a system that captures them. In the immersive space, viewers are willing participants who are captured by a camera but also reflected back (Figure 8). These entanglements are apparent, and systematically heighten the complicitous and multiplicitous nature of visualizing technologies.

Figure 8: Audience in Install 4 of An Uneasy Terrain

Installation design

"Installation art is a broad term applied to a range of art practices which involve the installation or configuration of objects in a space, where the totality of objects and space comprise the artwork. Installation art is a mode of production and display of artwork rather than a movement or style" (Kelly, 4). It is important to be able to bring my work into a spatial context because it allows for the engagement of bodies within said spatiality. In order to answer the question "how can I render emotions in an imaginative form," I consider space as a component to help me experiment with what emotions can be evoked when an installation space is deliberately constructed. Sara Ahmed in her 2004 essay Collective Feelings, discusses the idea of "the skin of the collective" by stating that: "...sense perception and emotion take place in what I would call the *contact zone of impressions*; they involve how bodies are 'impressed upon' by objects and others"(30). Thinking about bodies in space also requires thinking about how bodies are always moving in physical and virtual space. In my construction of this hybrid installation space, I had to combine the physical and virtual to allow for bodies to move, reflect, and think with emotions.

Kwastek asserts that as our "everyday experience is shaped through media, the more questionable any attempt to draw a clean boundary between the actual and virtual reality becomes" (157). I argue that one of the reasons emotions are evoked in *An Uneasy Terrain* comes from the experience of physical and virtual worlds simultaneously. As an artist, a point of interest stems from inhabiting these worlds, worlds where I'm contributing data that is almost always gathered through multiple entanglements with technology, devices and social media.

Space

Katja Kwastek's discussion on space in the *"Aesthetics of Interaction in Digital Art*" (2013) was a crucial component in the making of *An Uneasy Terrain*. Kwastek states that "spacing and synthesis are thus relevant in equal measure for the configuration of the interaction proposition and for its realization" (100). I use both space and synthesis as concepts throughout *An Uneasy Terrain*. Kwastek writes that space is like a place, it is where the social ordering of things happens, similar to how Sara Ahmed describes "Contact zones of impressions" (Ahmed). Kwastek uses Martina Löw's definition "space as a more or less fluid individual or collective construction, which may be material, or may exist only in perception, in ideation, or in recall" (99). The spacing is the ordering of things, and the "ideation or in recall" happens in synthesis. Thus, spacing and synthesis are mutual conditioning processes, not different. Spacing is the "configuration of the system"–the system being the installation–and the "realization" of that said system is the synthesis (Kwastek, 100). Kwastek further breaks it down by looking at the two main entities in the creation and realization of the work–the author and the recipient–and how these two entities operate within the spacing and synthesis of the installation:

> The author of an interactive work not only arranges objects and data (spacing), but also combines them so as to create a real or potential spatial structure (synthesis). In exactly the same way, the recipient not only constructs spatial structures within his [sic] own perception (synthesis), but also actively configures them by means of his [sic] own movement (spacing). (ibid)

My work is interactive because in each install (Appendix A -E) I arranged objects, visual elements and technology around the space to create an experience (synthesis). As an active subject living in an urban, surveilled environment, I witness the physical and virtual constantly colliding. This is an experience that I wanted to evoke through immersion in a hybrid space. This highlights the subtle give-and-take inherent in these participatory and duplicitous visualizing technologies, and how we move and exist within these entangled realities.

Sound

Bodies are always immersed in sounds. Sounds such as sirens which fill up the city, let bodies know how and when to move. Throughout the development of *An Uneasy Terrain*, I recorded sounds using my phone and a Zoom recorder. I also gathered sound from online resources. In installs 3 and 5 I deliberately stitched together several sounds to form a soundtrack for the installation. I conceptualized the use of sound by drawing parallels between installation and cinema. Cinema is said to be the most immersive art form (Kawstek, 2013), and new media art certainly borrows from cinema. The idea of using sound more deliberately in diegetic and nondiegetic ways to increase the immersive qualities of my installation came from the feedback I received in install 3 (Appendix B). Sounds "do things," just as emotions "do things" to bodies (Ahmed, 2004). For example, the sound of a camera clicking in the installation signals that an image is being captured. The audience is unable to identify where the sound originates, which creates an uneasy space.

Designing for speculation

Designing for speculation was tricky due to *An Uneasy Terrain*'s open nature. Upon reflection I realized that I deliberately placed certain visual elements together to situate my audience at the boundary between physical and virtual space, as in Katja Kwastek's description of physical and virtual spaces:

> When space is simulated by means of digital media, this simulation is not restricted to creating the visual illusion of space behind the picture plane or of interpreting an image as a window (as has been practiced in painting since the invention of central

perspective). Digitally simulated space can be presented as both processual and modifiable, which opens up various possibilities of action for the recipient (105).

In my installation, multiple actions are made available to the audience. For example, they can identify themselves in the mirror, they can see themselves on the terrain, they hear themselves potentially being captured through the use of camera clicking sounds, and they also create shadows on the virtual terrain. I set up multiple ways of looking as well for audiences to ask questions and speculate on the nature of the art and design of the work. The following are a few visual elements which I used to enhance the space for speculation:

Mirrors

Mirrors are suspended over a grid with a fishing line (Figure 9). The use of mirrors is crucial in allowing audiences to make contact with their own faces. The faces on the projected videos are blocked with the use of mirrors. When the audience makes contact with these mirrors, rather than seeing the projected faces on the video, they are confronted with their own reflections. I do this because in thinking about visualizing technologies, especially when thinking with feminists such as Haraway, I've come to experience that there are multiple ways of looking.

The mirrors serve multiple purposes in the final iteration of each install. The use of mirrors also signals my own reflections on screen-based technologies like the social media filter. I wanted to turn this concept around: The experience of a social media filter is done through taking selfies, but in *An Uneasy Terrain* the mirror operates as a layered, abstracted construction of the front facing camera. When an audience sees themselves in the mirror blocking the social media faces, I observed that the projections also reflected onto the faces of the audience within their reflections, recreating the illusion of the social media filter in physical space. The mirror itself operates as a "selfie", but one that cannot be recorded.

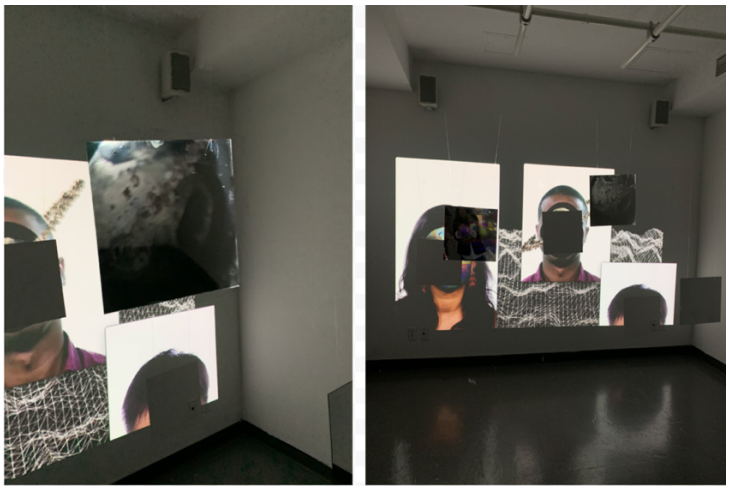


Figure 9: Use of mirrors in install 4 of An Uneasy Terrain

Terrain

The terrain was the perfect way for me to connect the physical installation space with the virtual projection. I added the terrain to the second iteration (Figure 10).

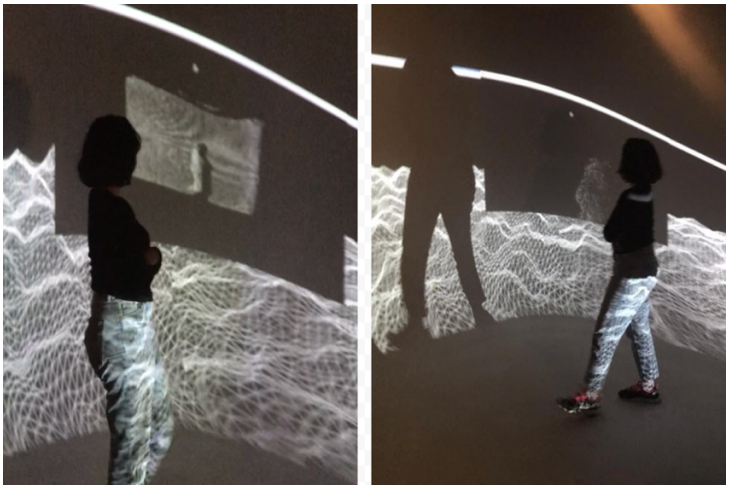


Figure 10: Install 2 of An Uneasy Terrain

The terrain was constructed using processing software and is set up to give an expansive feeling as it moves in real time. When I was thinking about capturing bodies in space, I experimented with Point Cloud code for the Xbox Kinect 360 camera. Which showed bodies in space. To juxtapose this movement, I wanted the bodies to sit on something that was moving too. The idea for the terrain emerged from my thinking about surveillance technologies, especially

how they map and lay grids when capturing spaces and the bodies that inhabit them. When thinking about facial recognition especially, the image that comes to mind is that of a grid that is mapped onto the face. In the SparkAR software, through the use of a facemesh, a 3D material can be laid on the face (Figure 10). Augmented reality here works through the process of mapping physical space in the virtual. The terrain also provided an immersive and speculative virtual element, giving the illusion that the audience was both virtually and materially present within a constructed environment.

I experimented with many types of animated terrain (Figure 11), however I chose to use a black and white image, as it added an illusion of heightened darkness which is an important emotive quality of the installation's atmosphere. The terrain is built using a Perlin noise function: "Perlin noise is a random sequence generator producing a more natural, harmonic succession of numbers than that of the standard random() function. It was developed by Ken Perlin in the 1980s and has been used in graphical applications to generate procedural textures, shapes, terrains, and other seemingly organic forms" (Processing.org). The code works by overlaying a noise function on a 2D grid, which moves the vertices to make it appear 3D.

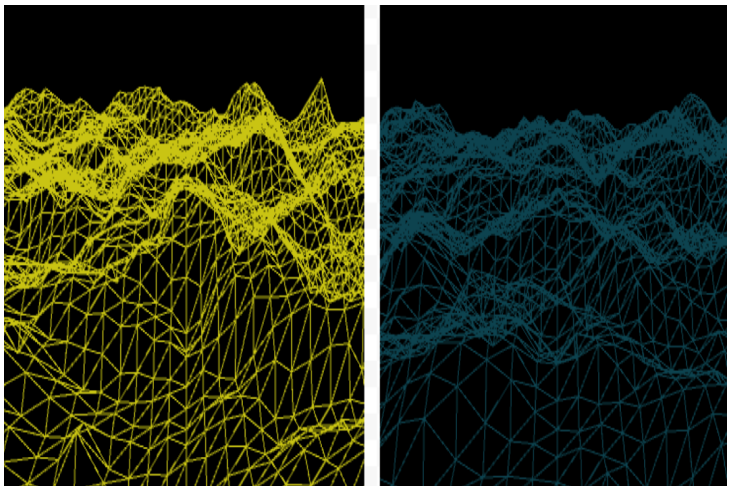


Figure 11: Different types of animated Terrain

SparkAR Portraits

In install 4 (Figure 12), I place these portraits of people from diverse racial backgrounds on this moving terrain. These selfie-like faces come as stock, pre-recorded face clips in the

SparkAR software. I used these portraits because I was curious about the predominance of racialized bodies on the platform.

I contacted the SparkAR community[7] and found out that they were in fact employees of Facebook. I use these faces as a form of speculation. Why these particular faces? How does this data create knowledge for Facebook?

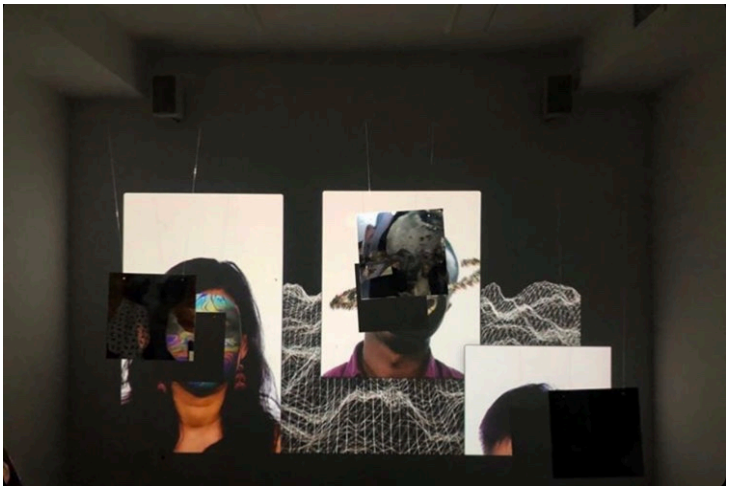


Figure 12: Install 4

These virtual faces display a range of emotions on the face as they move. These movements and staged emotions (Figures:13, 14) attracted me to the faces, because as a maker, participating in this artform causes me to question the line between entertainment and surveillance. It goes back to this idea of Facebook's making a "smaller" place for people in this world (Facebook, 2012). The use of racialized bodies may seem inclusive here, but it gives me an uneasy feeling.

[7] The SparkAR community page. This is a Facebook community page that allows for makers of social media filters on SparkAR.

Figure 13: Movements of face in SparkAR

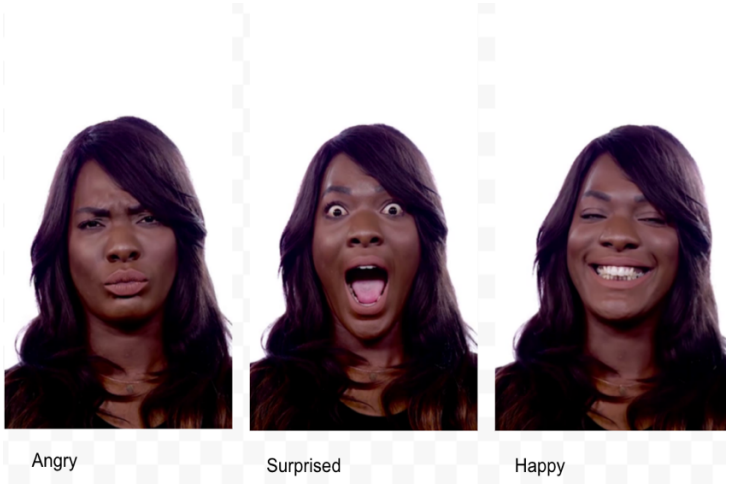


Figure 14: Emotions displayed on face in SparkAR

Point Cloud Kinect Xbox 360

Point Cloud allows for the capture of raw depth data. Through code, this data can be manipulated to recreate the 3D physical space in the virtual. Using the Point Cloud code allowed for the real-time mapping of the installation and of bodies within it (Figure 15).

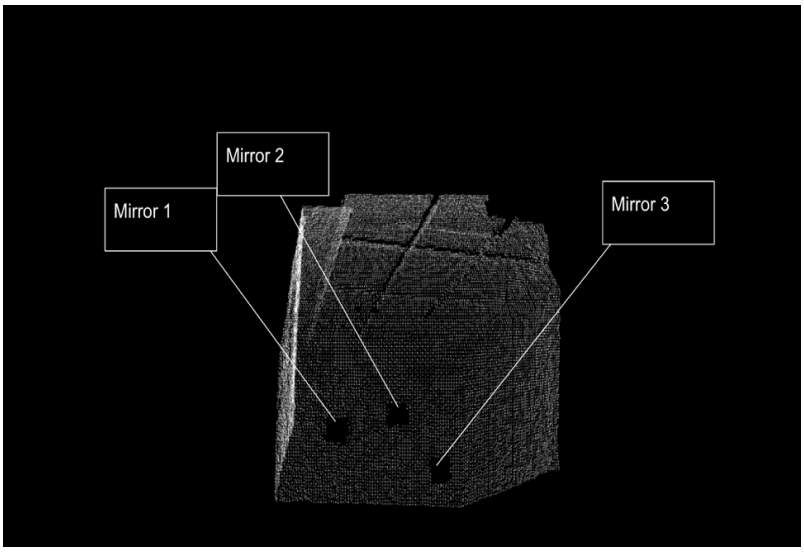


Figure 15: Space mapped on Kinect from Install 4

Instead of having a static Point Cloud, I used the code to give the illusion that the room was spinning in 360 degrees. This additional movement was added to provoke the audience to move in the space and find themselves in this virtual constructed scene. To build a layer of *thinking with* multiplicities of this research, the Point Cloud captured raw data and allowed for complex interactions in interesting ways. Point Clouds use LIDAR scanners to assist technologies of surveillance with the collection of massive amounts of data. I use Point Clouds in *An Uneasy Terrain* to heighten the not-so-obvious relationship between the audience in physical space and the audience in the projected virtual terrain. These “mirrored” copies of the body in the virtual serve to heighten the feeling of uneasiness. The Point Cloud allows for bodies to be represented in 3D data so that they appear less real, more like shadowy figures gliding on an uneasy terrain .

Chapter Five: Reflections and Future Work

Final Install

Due to Covid-19 the final install of the project was unable to be brought to fruition, as this project relies heavily on space and equipment. However, documentation of the work's development exists online at https://an-uneasy-terrain.format.com/. The translation of the work to a flat format such as a website was difficult because the research process was dedicated to thinking about bodies in space. Translating the installation to a website document required thinking of without the main components that I had worked on throughout the year. The website provides a breakdown of the main components of the work, but the hope remains that *An Uneasy Terrain* will one day be experienced as a physical installation. The image below illustrates how the installation *would have been* installed at the Toronto Media Arts Centre (TMAC) in Toronto (April 3 – April 5, 2020).

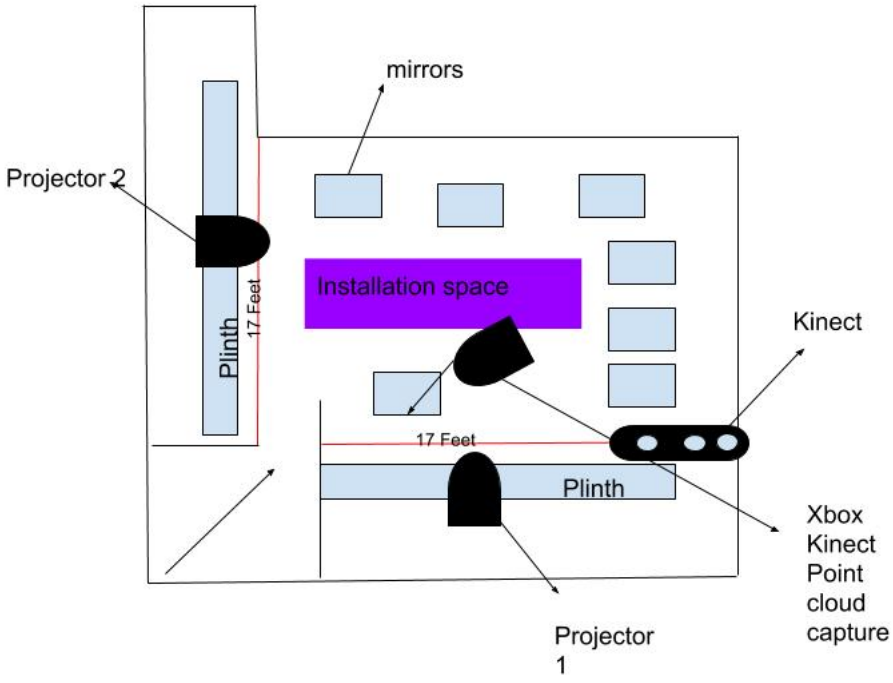


Figure 16: Floor plan for physical exhibition

Future Work

Due to the circumstances of Covid-19, my process in thinking about the future iterations of the installation has shifted. I see an opportunity here to complete the work in a completely virtual format by building an install in either *Unreal Engine* or *Unity* game engine. This does change the scope of the research, because the main focus of the work will not only be about engaging with a bodily response in space.

I have been thinking about this in terms of emotions recently. My idea was to elicit a bodily response, however that can be achieved when one plays a game or watches a movie in ways similar to how one experiences a virtual installation. The downside is that it doesn't require the body to be fully engaged in terms of movement. The movement of bodies was very important to *An Uneasy Terrain;* it asked the audience to be engaged in a very physical way. I used the space and sound as a means to immerse and speculate on our relationship to our devices. So, in moving the installation to a screen-based work (using *Unrea*l or *Unity)*, I see the role of emotions changing; not being tied to the physical movement of the body, but tied instead to the uncanny relationship that is created between the body and its relationship to a virtual, 3D environment.

If the opportunity presents itself to construct a physical installation, in terms of technology, I would like to work with the new Microsoft Kinect Azure which provides a more sophisticated capture of bodies due to its advanced computer vision systems. Even though I critique the use of computer vision through a dominant narrative of knowledge, the question of vision has always been a feminist concern for me. The use of these vision tools to make speculative and immersive art provided me with the space to question and engage with ideas of knowledge creation. This helped me understand my own relationship to my devices through a feminist lens. As a practitioner, I am drawn to these devices, as they are more than just tools. These devices are *active* in producing knowledges within a participatory framework; users provide data when they engage with their devices (*tools*), and a complex relationship is formed through this engagement. As a designer, I speculate upon and critique the outcomes of this engagement through the creation of an immersive installation.

Conclusion

Feminist approaches to knowledges are webbed with rich roots, they allow for multiple possibilities to exist. In retrospect and reflection, I believe that in using installation design, I was able to hold these multiple possibilities together visually and imaginatively. I started out the process by thinking about visualizing technologies which are trained to see, observe, record and interpret the human face and the human body. This position came through my experiments with machine vision software, such as Ml5.js, and creating social media filters for Instagram. My research interests also stem from my awareness and feelings of "being surveilled," be it walking around the city or when I use my devices.

An Uneasy Terrain therefore is a research output that speculates on a world where the role of surveillance within visualizing technologies is problematic, embedded and participatory. It is an ability to think with the multiplicities that come from thinking in a complex social, political and technologically mediated world. Donna Haraway is a source of inspiration in thinking in a multiplicitous fashion. Recall that "Thinking with Haraway is thinking with many people, beings and things; it means thinking in a populated world" (Puig de la Bellacasa, 199). In my reading of Haraway in thinking in a speculative way, I too am thinking in populated worlds. These populated worlds are places where physical and virtual bodies, emotions and technologies interact in a lively, complex way, and where data holds possibilities for multiple interpretations.

The installation was a physical way to think in a multiplicitous way. I became aware of how engaged the body of the maker needs to be in the process. My own body's movement in the set-up of the installs influenced the way I constructed the work. There was a reliance on intuition in some of the planning. Throughout the planning and then the actual set-up, a number of things could go wrong, be it with technology or in adapting to the space. This is where the system urges the maker to intuitively and actively solve the problems that come in thinking in a physical way. This is the part of the process that I enjoyed the most, it required a sense of problem solving that required the body of the maker to be very present in the act of creating.

Unfortunately, apart from the work being experienced in committee critiques, this work did not get to be experienced in its spatial format, so I do not have the feedback from the

presence of bodies in the space that activate the work. However, this experience was invaluable to me as a maker in learning about how I have come to view my own practice. I love working with raw materials such as space, immersion, bodies and technology as a means to research. Here I am inspired by what David Rokeby says about his own work: “I create systems rather than a picture, and it is an inherent part of my process that I will not know what the results of the process will look like. I have defined the processes, but that is very different from defining the actual resulting output” (davidrokeby.com). Thinking along the lines of Rokeby, in creating *An Uneasy Terrain* I have set up this experience for audiences by diligently working with space, sound, video, and live capture technology. My experience of the subtleness of surveillance in our devices and how that is speculated through the design of the system may not be how members of the audience experience the installation. Installation allows for multiple experiences–it allows for knowledges, and for the emergence of multiple stories from multiple bodies.

Work Cited

Aboulhosn, S. (2020, January 21). 18 Facebook statistics every marketer should know in 2020. Sprout Social. https://sproutsocial.com/insights/facebook-stats-for-marketers/. Accessed March, 2020

Ahmed, Sara. “Collective Feelings: Or, the Impressions Left by Others.” Theory, Culture & Society, vol. 21, no. 2, Apr. 2004, pp. 25–42, doi:10.1177/0263276404042133.

Ballard, H, Dana and Brown, M. Christopher. 1982. Computer Vison (1st.ed.) Prentice Hall Professional Technical Reference.

Boyd Danah M, Ellison Nicole B., Social Network Sites: Definition, History, and Scholarship, Journal of Computer-Mediated Communication, Volume 13, Issue 1, 1 October 2007, Pages 210–230, https://doi.org/10.1111/j.1083-6101.2007.00393.x

Bordwell, David. "Functions of Film Sound: A Man Escaped." *Davidbordwell.net*, www.davidbordwell.net/filmart/manescaped_soundanalysis_filmart_293.pdf. Accessed 7 Mar. 2020.

Chapman, Owen & Sawchuk, Kim. (2012). Research-Creation: Intervention, Analysis and "Family Resemblances". Canadian Journal of Communication. 37. 10.22230/cjc.2012v37n1a2489.

Chung H., Iorga I, Voas J. and Lee S., "“Alexa, Can I Trust You?”," in Computer, vol. 50, no. 9, pp. 100-104, 2017.

Collie, Meghan. "‘Just Walk Away from It’: The Scary Things Companies Like FaceApp Can Do with Your Data." *Global News*, 19 July 2019, globalnews.ca/news/5653531/faceapp-data-mining/.

Das. A, et al. "Assisting Users in a World Full of Cameras: A Privacy-Aware Infrastructure for Computer Vision Applications," *2017 IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, Honolulu, HI, 2017, pp. 1387-1396.

Dunne A. and F Raby. 2013. Speculative Everything: Design, Fiction, and Social Dreaming. The MIT Press.

Facebook Annual Report 2012.
https://s21.q4cdn.com/399680738/files/doc_financials/annual_reports/FB_2012_10K.pdf

Feng, Emily. "How China Is Using Facial Recognition Technology." NPR.org, 16 Dec. 2019, www.npr.org/2019/12/16/788597818/how-china-is-using-facial-recognition-technology. Accessed 15 Jan. 2020.

Frayling, Christopher "Research in Art and Design." 1993. *Royal College of Art*. Accessed Nov. 2019.

Glaser, April. "Facebook's Face-ID Database Could Be the Biggest in the World. Yes, It Should Worry Us." Slate Magazine, 9 July 2019, slate.com/technology/2019/07/facebook-facial-recognition-ice-bad.html. Accessed 3 Mar. 2020.

Haraway, Donna J. "Staying with the Trouble: Making Kin in the Chthulucene", 2016. Print.

Haraway, Donna J. "The Virtual Speculum in the New World Order." Feminist Review, vol. 55, no. 1, Mar. 1997, pp. 22–72, doi:10.1057/fr.1997.3.

Haraway, Donna. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." Feminist Studies, vol. 14, no. 3, 1988, pp. 575–599. JSTOR, www.jstor.org/stable/3178066. Accessed 1 Mar. 2020.

Hawkins, A. J. (2019, June 24). “Alphabets sidewalk labs unveils its high-tech ‘city-within-a-city-plan for Toronto”. The Verge. https://www.theverge.com/2019/6/24/18715486/alphabet-sidewalk-labs-toronto-high-tech-city-within-a-city-plan. Accessed 21 Jan. 2020

Hill, Kashmir. "The Secretive Company That Might End Privacy As We Know It." The New York Times - Breaking News, World News & Multimedia, Condé Nast, 18 Jan. 2020, https://www.nytimes.com/2020/01/18/technology/clearview-privacy-facial-recognition.html

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53(1), 59—68.

Kessel, Jonah M., et al. "A.I. Is Making It Easier to Kill (You). Here’s How." The New York Times - Breaking News, World News & Multimedia, 13 Dec. 2019, https://www.nytimes.com/video/technology/100000006082083/lethal-autonomous-weapons.html

Kwastek, Katja. “Aesthetics of Interaction in Digital Art.” Aesthetics of Interaction in Digital Art.”Cambridge, MA: The MIT Press, 2013. 89-175.

Levin, G. "Computer Vision for Artists and Designers: Pedagogic Tools and Techniques for Novice Programmers". *Journal of Artificial Intelligence and Society*, Vol. 20.4. Springer Verlag, 2006.

Lange, Christy. "Surveillance, Bias and Control in the Age of Facial Recognition Software." *Frieze*, 4 June 2018, frieze.com/article/surveillance-bias-and-control-age-facial-recognition-software?language=de. Accessed 7 Feb. 2020.

Loveless, N. How to Make Art at the End of the World: A Manifesto for Research-Creation. Duke University Press, 2019.

Luka, Mary Elizabeth, and Mélanie Millette. “(Re)Framing Big Data: Activating Situated Knowledges and a Feminist Ethics of Care in Social Media Research.” Social Media + Society, Apr. 2018, doi:10.1177/2056305118768297.

Luka, Mary Elizabeth, and Mélanie Millette. “(Re)Framing Big Data: Activating Situated Knowledges and a Feminist Ethics of Care in Social Media Research.” Social Media + Society, Apr. 2018, doi:10.1177/2056305118768297.

Matsakis, Louise. "The WIRED Guide to Your Personal Data (and Who Is Using It)." Wired, Condé Nast, 15 Feb. 2019, www.wired.com/story/wired-guide-personal-data-collection/. Accessed 10 Feb. 2020.

Metz, Cade. "Facial Recognition Tech Is Growing Stronger, Thanks to Your Face." The New York Times, 13 July 2019, https://www.nytimes.com/2019/07/13/technology/databases-faces-facial-recognition-technology.html?auth=login-email&login=email. Accessed 20 Jan. 2020.

Mozur, Paul. "In Hong Kong Protests, Faces Become Weapons." *The New York Times - Breaking News, World News & Multimedia*, 26 July 2019, www.nytimes.com/2019/07/26/technology/hong-kong-protests-facial-recognition-surveillance.html. Accessed 6 Feb. 2020.

Nussbaum, Martha C, Joshua Cohen, and Immanuel M. Wallerstein. For Love of Country: Debating the Limits of Patriotism. Boston: Beacon Press, 1996. Print.

Proulx, S., Heaton, L., Choon, M. J. K., & Millette, M. (2011). Paradoxical empowerment of producers in the context of informational capitalism. New Review of Hypermedia and Multimedia, 17, 9–29. Retrieved from http://www.tandfonline. com.proxy.bibliotheques.uqam.ca:2048/doi/full/10.1080/1361 4568.2011.552646

Prado,Luiza,2014 “Privilege and Oppression: Towards a Feminist Speculative Design”. https://www.academia.edu/7778734/Privilege_and_Oppression_Towards_a_Feminist_Speculative_Design. Accessed 10 Oct. 2019

Puig de la Bellacasa, María. ‘“Nothing Comes Without Its World” : Thinking with Care. The Sociological Review, vol. 60, no. 2. May 2012, pp. 197–216. DOI.org (Crossref), doi:10.1111/j.1467-954X.2012.02070.x.

Rettberg, Jill. Machine Vision in Everyday Life: Playful Interactions with Visual Technologies in Digital Art, Games, Narratives and Social Media. 2017. www.uib.no/sites/w3.uib.no/files/attachments/partb1_machinevision.pdf.

Rettberg, Jill "Machine Vision." University of Bergen, 19 Feb. 2020, www.uib.no/en/machinevision. Accessed 12 July 2019.

Rettberg, Jill Walker. Seeing Ourselves Through Technology. Palgrave Macmillan UK, 2014. DOI.org (Crossref), doi:10.1057/9781137476661.

Rogowska-Stangret, Monika. "Situated Knowledges." New Materialism, 22 Mar. 2018, newmaterialism.eu/almanac/s/situated-knowledges.html. Accessed 8 Oct. 2019.

Rokeby, D. (2003). David Rokeby : Sorting daemon. David Rokeby. https://www.davidrokeby.com/sorting.html. Accessed 18 Feb, 2020.

Sawyer, Jonathan. "Instagram Is Letting Users Create Augmented Reality Filters." *Highsnobiety*, 14 Aug. 2019, www.highsnobiety.com/p/instagram-augmented-reality-filters/. Accessed 10 Feb. 2020.

Salim, Saima. "Digital Information World." *Digital Information World*, 4 Jan. 2019, https://www.digitalinformationworld.com/2019/01/the-most-important-insights-on-the-world-of-social-media.html, Accessed 3 Mar. 2020.

Schmitz, Sigrid , Ahmed, Sara: Affect / Emotion: Orientation Matters. A Conversation between Sigrid Schmitz and Sara Ahmed, FZG, 2014, pp. 97-108. https://doi.org/10.3224/fzg.v20i2.17137.

Simonite, Tom ‘Facebook creates software that matches faces almost as well as you do’, MIT Technology Review, 17 March 2014.

Singer, Natasha, and Mike Isaac. "Facebook to Pay $550 Million to Settle Facial Recognition Suit." *The New York Times*, New York Times, 29 Jan. 2020, www.nytimes.com/2020/01/29/technology/facebook-privacy-lawsuit-earnings.html. Accessed 6 Mar. 2020.

Smith, Cooper. "Social Big Data: The User Data Collected By Each Of The World's Largest Social Networks — And What It Means." Business Insider, 2 Feb. 2014, https://www.businessinsider.com/social-big-data-the-type-of-data-collected-by-social-networks-2-2014-1

Solon, Olivia. "'It's Digital Colonialism': How Facebook's Free Internet Service Has Failed Its Users." The Guardian, 20 Apr. 2018, www.theguardian.com/technology/2017/jul/27/facebook-free-basics-developing-markets. Accessed 10 Feb. 2020.

Syed, A. (2020, January 19). How do Snapchat filters work? Simple explanation. Technobyte. https://www.technobyte.org/how-snapchat-filters-work/. Accessed 1 Mar. 2020

Taigman, Yaniv, Ming Yang, Marc Aurelio Ranzato. and Lior Wolf, "DeepFace: Closing the Gap to Human-Level Performance in Face Verification," *2014 IEEE Conference on Computer Vision and Pattern Recognition*, Columbus, OH, 2014, pp. 1701-1708.

Tunney, Catherine. "RCMP Denied Using Facial Recognition Technology – Then Said It Had Been Using It for Months.” CBC, Canadian Broadcasting Corporation, 2 Mar. 2020, www.cbc.ca/news/politics/clearview-ai-rcmp-facial-recognition-1.5482266. Accessed 4 Mar. 2020.

Voulodimos, Athanasios, et al. ‘Deep Learning for Computer Vision: A Brief Review’. *Computational Intelligence and Neuroscience*, edited by Diego Andina, vol. 2018, Hindawi, Feb. 2018, doi:10.1155/2018/7068349.

Wylde, Kaitlyn. "This New Kylie Jenner Instagram Face Filter Is Perfect If You Love Her Lip Kits." Bustle, 31 July 2018, www.bustle.com/p/how-to-get-kylie-jenners-instagram-face-filter-get-the-lip-kit-look-without-even-trying-9953365.

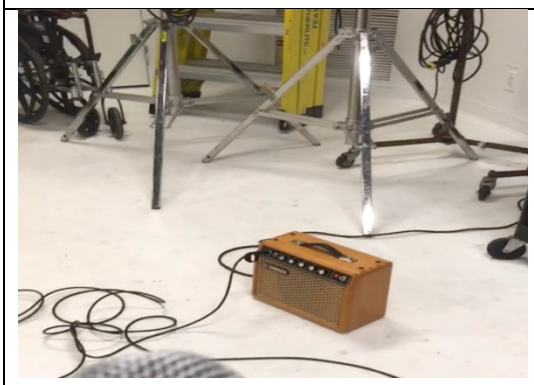
Wolf, Maxim et al. “Social Media? What Social Media?” UKAIS (2018). Accessed 10 Mar. 2020

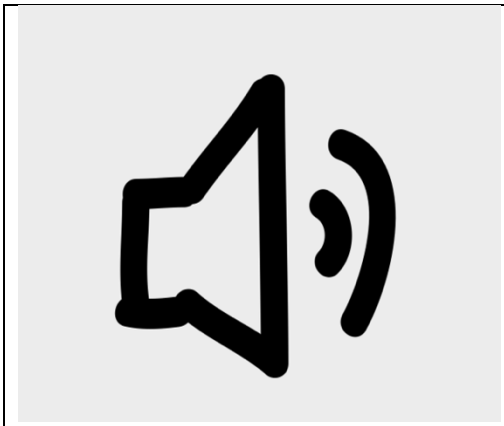
Wong, Julia C. "Google Reportedly Targeted People with 'dark Skin' to Improve Facial Recognition." The Guardian, 4 Oct. 2019, www.theguardian.com/technology/2019/oct/03/google-data-harvesting-facial-recognition-people-of-color.

Appendices

Appendix A: Install 1 Documentation

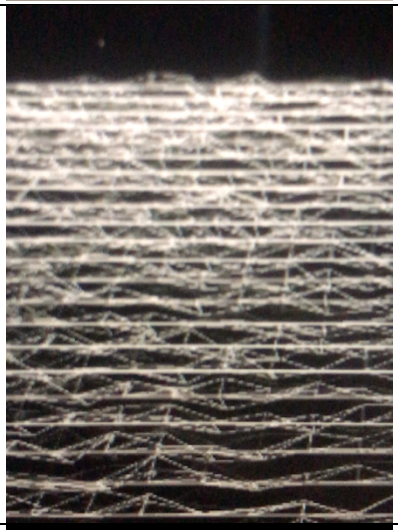
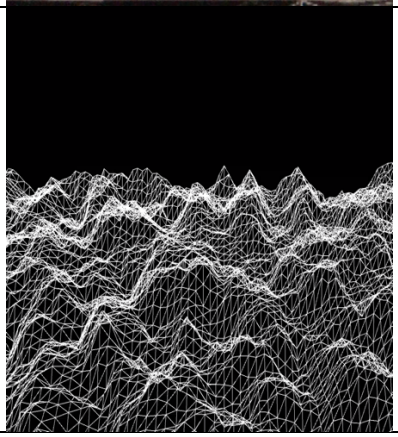
Install 1

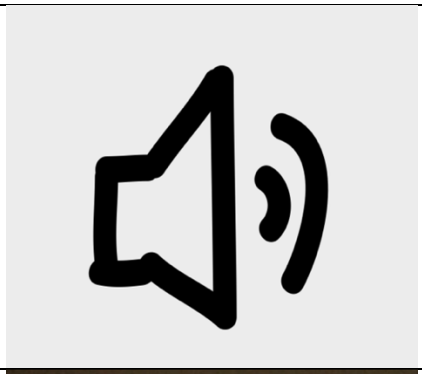
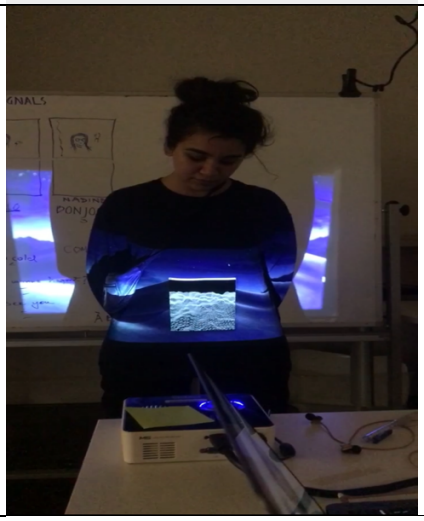
	Setting up the space. I chose to use tripods to create and attach LED lights. On the LED lights I attached a red Gel, which is a red plastic material. This gave the light are red hue and also gave the room a redish hue. I liked the effect it created. The lights were added because I was worried the XBOX kinect will not be able to detect the bodies in space. In reflection, this ended up being a good call accroding to the feedback it produced a sense of eeriness, which from the feedback made the partipants feel they were in a field of surviellance.
	When I was setting up the space, I decided to have the tripods face each other because they seemed machinic. With the lights on it felt as if they were surveying each other.
	For the sound I decided to also add an audio recorder with a mic attached to it to pic up sounds from the space. I wanted to capture more than the body. I wanted to also capture the sounds coming in from bodies being within the space. I chose to leave the sound system in a position where it was on the floor on the side so it would capture sounds such as footsteps.

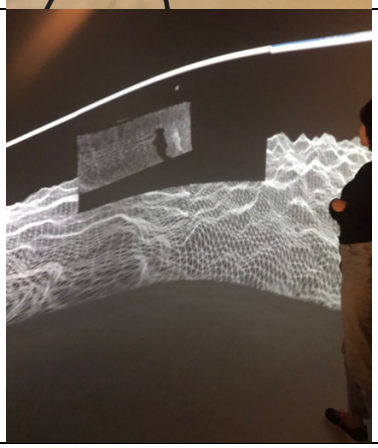
	An additional element of the sound that I had was a rough recording of the sounds I collected on my walks around the city. I played these sounds on loop.
	During my practice set up, I also experiemented with different backgrounds to conceptualize how the space will look. In this picture I added a video of clouds I found on Yotube, so I could know where to place my sketch once I had it on the Processing software.
	The processing sketch I chose had this eerie feeling. It wasn't fully capturing elements rather it was capturing a a depth image. I understood the code with the help of Daniel Shiffman whose Kinect Library helped me immensely with this project.

Appendix B: Install 2 Documentation

Install 2

	In Install 2, I decided to add an extra tripod to the space. In my first install I had two. I wanted to further investigate if the presence of the tripods added to. The new scene I was creating is where I wanted them to appear like, they were sitting on a moving Terrain. I wanted to invoke the feeling of machines and humans all moving along an unknowable territory.
	At this point in my thesis I got interested in terrains. One of the reasons I thought of a terrain was because I was reading a lot about facial recognition at this point. There was constant news on how these technologies were infiltrating daily life. It felt to me like humans were on new terrain. Thinking with feminists I understood that these conditions further. I relied on Daniel Shiffmans video on how to build a terrain using the Perlin Noise (https://www.youtube.com/watch?v=IKB1hWWedMk) Terrains are interesting and beautiful. Aspects of topography add layers. This layering of the world here suggests there is more than meets the eye.
	I projected this terrain to expand the space. The movement added by the Perlin noise, brought an element of constant unknowable movement. It's like looking at the sea, stormy. The fact that this is in the virtual causes there to be an illusion. It's not real but very much present.

	Sounds of the city were played. I sampled sounds of tof wind and passing conversations. Sounds collected from the TTC are added to the track. Here with my recorder, I became a collector of sounds. In understanding how we are constantly captured, I started capturing sounds as a way to understand what can be picked up. I have been recording sounds on my commute, especially every time I spot a surveillance camera, I hit record on my phone.
	Experimented with the terrain. Though briefly about what it looks like on the body. Used myself as a reflective surface. I love the way bodies intersect the work. In placing myself as canvas for projected light, I allowed for brief experimentations with extending bodily space.
	I set up three tripods this time. The two tripods I had set up worked well the last time. This time around I wanted to add an extra one to see if it works or adds to the atmosphere of the work. I also set up a projector on the tripod, this allowed some flexibility with the short throw.

		Reflective material was hung at the back of the wall. This was added and inspired by observing the city with its glass buildings always reflecting everything in sight. I want to create an abstract city that spies even through its reflective materials.
		The projection of the Point Cloud sits on the terrain. Due to this being live, it made it difficult to get rid of the software screen, that make it appear as if the terrain and the Point cloud were one. Feedback: When point cloud was is reflected onto the terrain it takes care of the problem of two separate windows

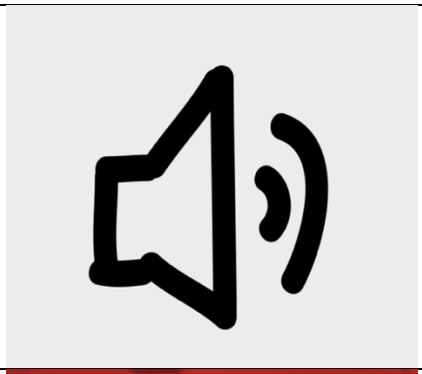
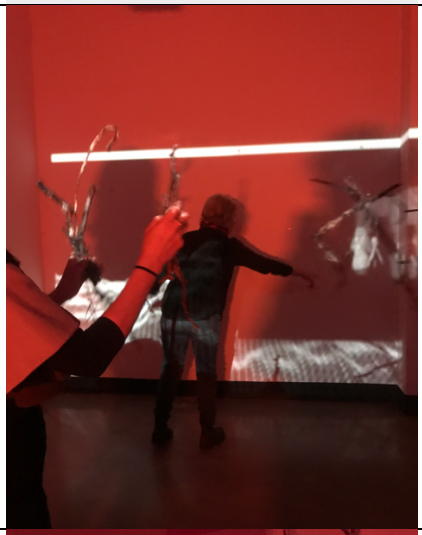
Install 2 Feedback

A lot of elements worked well in this install. The terrain added a layer of richness and gave the audience a feeling of expansiveness of the virtual. The reflective material did not work as they distracted from the overall atmosphere of the work. The tripods worked but it seemed slightly more crowded this time around.

Appendix C: Install 3 Documentation

Install 3

	This time around, due to not being able to figure out how to place the projectors, I decided to use extension poles to help me out. This would allow short throw projectors to be mounted easily in space and I would be able to create an overhead grid if necessary. I wanted to create an overhead grid also to add certain elements that I was bringing into this install such as dead tree branches. This again was to test out of creating shadows on the projection screen using physical elements could add a certain element of the physical and virtual space coming together.
	The pole could also be added as a vertical pole which allows for multiple projectors to be placed in different direction.
	Instead of flat reflective surfaces, I decided to add a 3D object which is the disco ball. The refractions on the disco ball when the light hits it is interesting to watch. I wanted to place it in the middle of the scene to make it appear like a spattering of data across the project space.

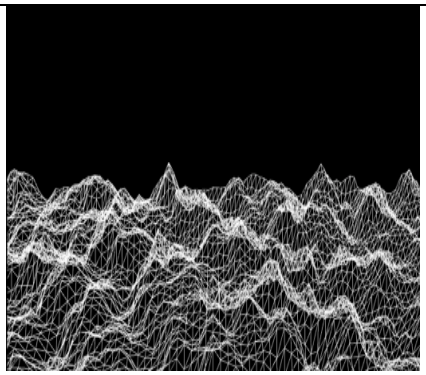
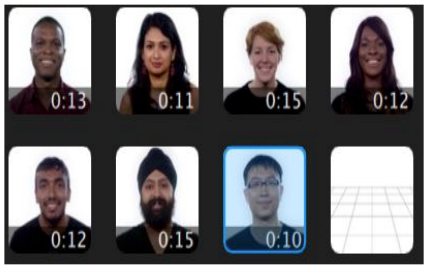
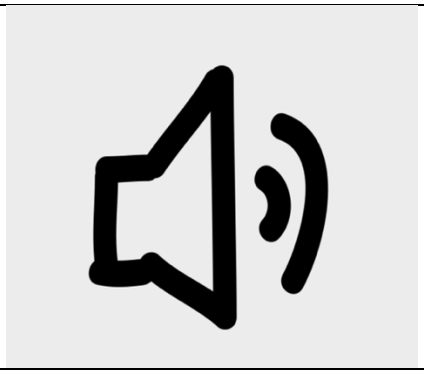
		Sound from the last iterations were refined for this install. In this install, I stitched together city sounds with recordings of gushing winds. As I was using dead tree branches, I wanted the atmosphere to be cold. I want the feeling of winter, the death and the coldness to be reflected in this mixed space.
		We had invited Judith Doyle for this internal crit. She gave some excellent suggestions. One of them was that the branches were not working, and the work did not have a finished quality to it. The branches especially distracted from the scene of the installs.
		The disco ball, which is 80 inches, also was a point of distraction from the projected scene. We moved out the ball and striped away the scene.

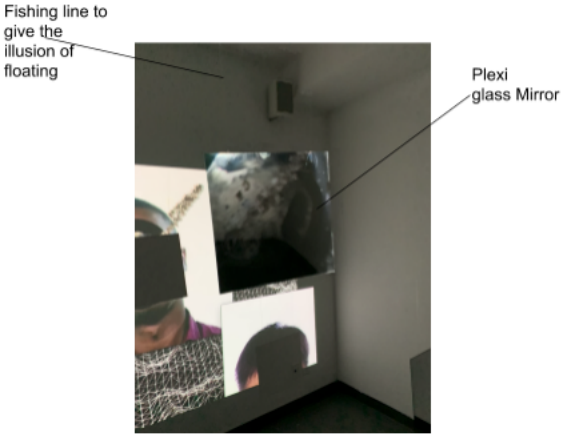
Feedback Install 4

The overall feedback was to strip it down. To focus on what is important in the creation of this mixed space. It was suggested that I have too many live elements running on my laptop and I should focus on maybe working with video. Recording elements like the terrain would help in not having to run 3 processing sketches. The recording of the elements might even provide a great freedom in working with the sound.

Appendix D: Install 4 Documentation

Install 4

	I kept the terrain for the third install as it was the most successful element from the previous installs. I want to signify uneasy ground, uneasy territory. It also signifies a feeling of land, movement and a cartographic condition due to our current global political landscape.
	Since the last install, I have spent considerable amounts of time thinking about and making filters. I developed three filters using SparkAR. The development of the filter can happen by choosing a face, which then AR objects can be mapped on to. The view finder of the software allows for the viewer to choose a "face" of a person or it allows for the "camera view" which uses your own devices camera and your face. The faces presented in this platform are a point of curiosity for me.
	I developed 3 Instagram filters. Two of which are designed by me and one was from a tutorial I was following https://filtroo.com/vendor/alexandrus/, which the moon face.
	This install does not have sound.

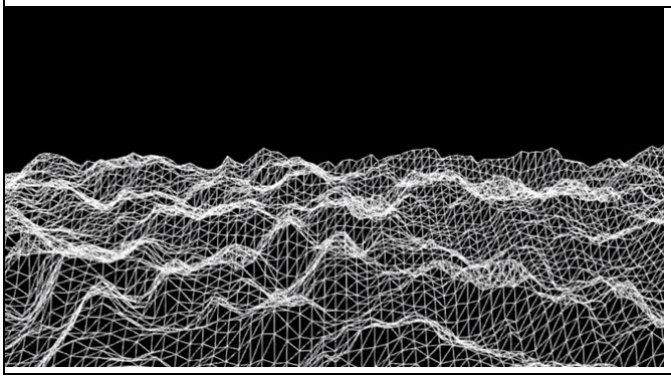
	I decided to play around further with reflective materials. This time around I decided to place them directly on to the project screen. I used three plexiglass mirrors which were hung to obstruct the face. The obstruction was a play on mirror technologies, but also a way to play with reflections and shadow. The use of mirrors came about from experimenting with materials in trying to understand the scope for using different screens. I wanted to use mirrors to signify a quality of reflection, which could be caught at the back of the room to create spatiality.

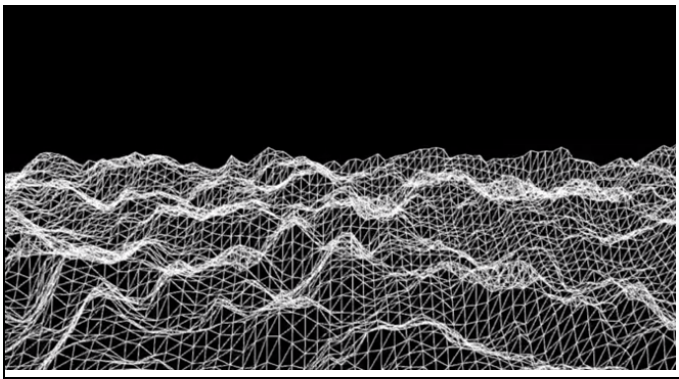
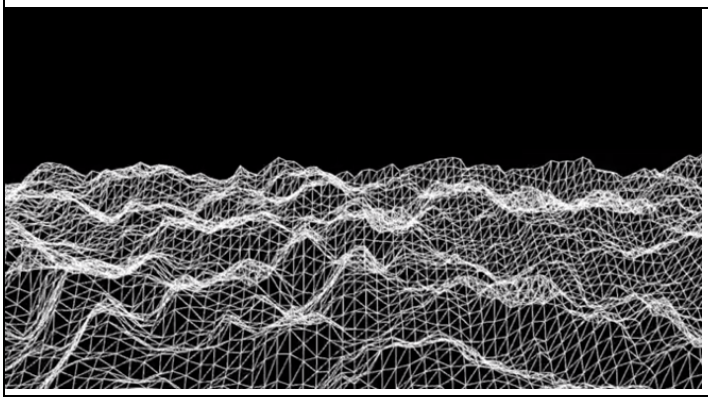
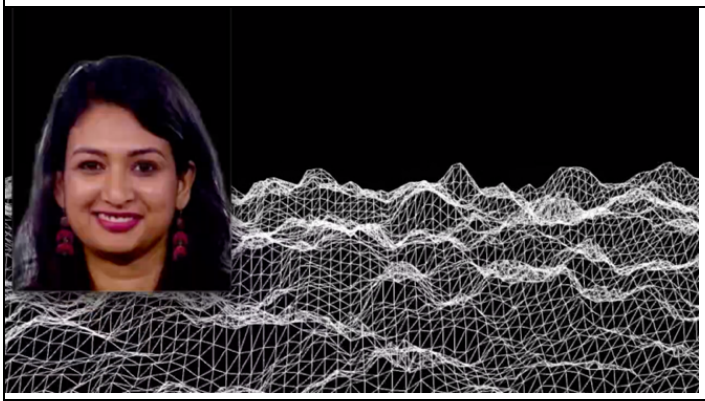
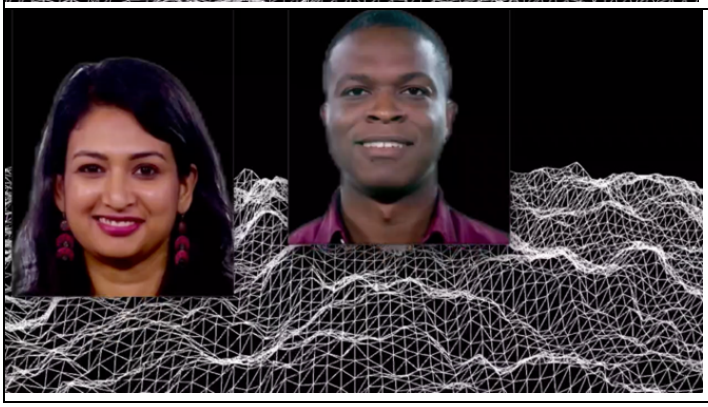
Feedback Install 4

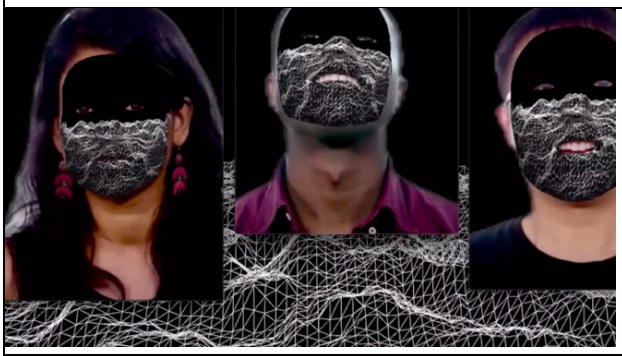
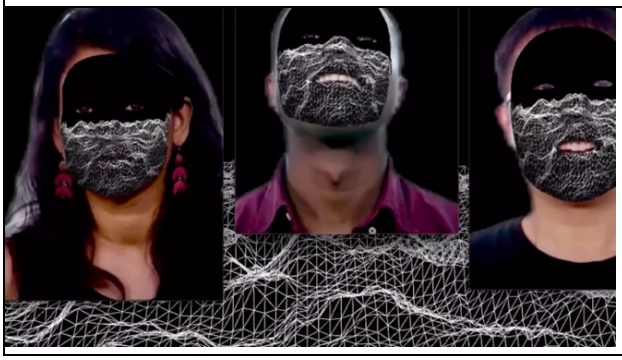
Once I have the dimensions of the space, I need to finalize the measurement and the distance from the projectors. I need to understand if I need to build three screen set up or even two walled projected area. There were many questions from the audience such as, is it responsive? Maybe reduce the elements, there were too many things going on. Is theory being “mirrored in this install”? Is there opportunity where a critter can emerge? This is an interesting line of thought that I will need to consider for the next install.

Appendix E: Install 5 Sound Documentation

Throughout the development of *An Uneasy Terrain*, I recorded sounds using my phone, a Zoom recorder and found sounds. In Install 3 and Install 5 I use sound deliberately by stitching several sounds together to form a soundtrack for the installation. I use sound here by drawing parallels between immersion and cinema. Cinema is said to be the most immersive form (Kawstek, 2013) and new media art certainly borrows from cinema. The idea of using sound more deliberately in a diegetic and non-diegetic way came from the feedback I received in Install 3 (Appendix B). It was stated that due to the install having cinematic qualities, I should consider recording my visual elements rather than having it be a live projection of code using. In doing it allowed for me to use sound more deliberately. In doing, I was surprised that there was narrative element which emerged in the making, especially in install 5 leading up to the final installation. In this reflection on sound and how I used in creating an immersive installation, I looked at David Bordwell's analysis of *Robert Bresson's French film A Man Escaped (Un Condamné à mort c'est échappé)* (Bordwell). There was a huge jump from install 4 to install 5, because in install 4, I went the opposite way, I used no sound. I wanted to test out the piece, without adding this element of installation, just so I could gage on how to use sound more effectively. What I observed was that the recipients were intrigued by the visuals but because I had not incorporated sound, I failed to create an immersive quality of the work. In install 5 I made a specific soundtrack which is developed and further used in the final install of *An Uneasy Terrain* exhibition. Inspired by Bordwell's deep frame by frame analysis of Bresson used sound in his film, in the below figure I chose to use this analysis for how I used sound in *An Uneasy Terrain*. I have organized the figure below into frame, time, reasoning and feedback.

Frame	*Sound effects*	*Time*	*Reasoning and feedback*
	*Sound of being submerged inside of the water. The sound of a submarine travelling underwater, or the sounds experienced while scuba diving.*	*0 seconds-0.57 seconds*	*I want the audience to feel like they were submerged in the visual of an ever-expanding, moving terrain.*

	*Sound of an owl whistling.*	*0.57 seconds-1.00 Minute*	*I want to draw the attention of the audience to signal to pay attention.*
	*Sound of being submerged inside of the water. The sound of a submarine travelling underwater, or the sounds experienced while scuba diving.*	*1.00-1.58 minutes*	***Feedback:*** *The terrain element took too long.*
	*Camera click when the face portrait appears.*	*1.57*	*I wanted to elicit the sound of a camera, or a phone camera taking a picture which could also be a selfie.* *Feedback: Sound worked well for this action.*
	*Camera click when the second face portrait appears.*	*1.59*	

	*Camera click when the third face portrait appears.*	*2.06*	.
	*Machinic sound. The sound is from a synthesizer which sound like a click or sound designated to machines.*	*2.15*	*I wanted this sound to show the change in faces. The terrain appears on each face, which I developed using SparkAR.*
	*A sound of a crowd, that which shows a crowd or a group of spectators.*	*2.22-End*	*I wanted to signify a these feeling of spectatorship.*