BRIDGING THE DIGITAL DIVIDE

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BRIDGING THE DIGITAL DIVIDE

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The designated thesis committee from the Digital Media Art program

approves the thesis titled *BRIDGING THE DIGITAL DIVIDE.*

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Abstract

Reflecting on the history of my own life and growing up with a digital divide, I looked into previous works where I addressed the algorithmic bias. These preliminary experiments lead to my current work focusing on a bio-digital divide and the anthropocentric bias. My multimedia thesis project, titled *Interconnecting with the Wood Wide Web*, questions how humans can better integrate technology with biological systems to form a symbiotic relationship with the environment. This thesis proposes an exploration of using Augmented Reality to tackle global issues such as the digital divide and ecological crisis. I utilize notions of Design Fiction and Moist Media to form a theoretical framework for bridging three constructed areas of the digital divide. My research-based approach emphasizes the geopolitical and social inequity division, the hybrid spaces in between the digital/virtual and physical/real worlds, and the disconnection of virtual and vegetal domains. This future-facing and speculative series of works, which constitutes two interactive exhibitions and multiple workshops, provides a platform for participants to collectively tell stories and envision a sustainable future by merging the technosphere and the biosphere. Further, I plan to contribute to the advancing field of Extended Reality, as a lens to restore our bond with nature.

CHAPTER I. INTRODUCTION

1. Context

1.1. PERSONAL HISTORY

Back in the '90s in Tehran, Iran, very few families enjoyed the luxury of a PC. Luckily enough, destiny had placed me among a privileged few. I had to endure hardships, incomprehensible for today's kids, just to log on to the internet. The desperation in the dial-up connection attempts at the time was perfectly complemented with a cacophony of beeps, buzzes, whirrs, and scratches. After having listened to the helpless screeches for a good couple of minutes, if all went well, a fragile connection would have been established. If '90s kids were given badges in honor of their unyielding perseverance for establishing dial-up connections, I think I would have been decorated with quite a few. By surfing the World Wide Web and the underdeveloped cyberspace, I was able to play games, send emails; soon after, I was socializing virtually and anonymously in online chatrooms and made pen-pals from all across the globe. As the development infrastructure of the internet was growing and taking shape all around the world, the Iranian regime was simultaneously increasing internet restrictions and communication bans. Before my immigration to the United States in 2016, I was using censorship circumvention tools such as VPNs and proxies that would allow me to gain access to everyday information such as social media,

news, music, films, etc.

It's the Information Age after all, yet there is a gulf between those who do and those who do not have ready access to information and communication technologies. I reached a deeper level of understanding about this uneven distribution once I moved to Silicon Valley–the birthplace of thousands of new technologies–to further my education in Digital Media Art at the CADRE Laboratory for New Media, San Jose State University (SJSU). Reflecting on the notion of the digital divide,[1] I personally had to overcome this cultural barrier once I chose to become a digital media artist. On one hand, I was fascinated with how much I was absorbing in a short amount of time; on the other hand, following Claire Bishop's analyses in *Digital Divide: on contemporary Art and New Media*, I aim to confront "the question of what it means to think, see, and filter affect through the digital, [and] reflect deeply on how we experience, and are altered by, the digitization of our existence?"[2]

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[1] The term was first coined by Lloyd Morrisett. It refers to the division between those with and without access to a computer and the internet.

[2] Claire Bishop, "Digital Divide: on contemporary Art and New Media," *Art Forum*, vol 51, issue no. 1 (2012): page 434-442, accessed April 10, 2020, https://www.artforum.com/print/201207/digital-divide-contemporary-art-and-new-media-3194.

1.2. THESIS STATEMENT

Through my art practice, I am encompassing three distinct, constructed divisions of our digitized existence and attempting to bridge them: the geopolitical and social divide, the liminal (hybrid) spaces in between the digital and physical realms, and the disparity of virtual/digital and vegetal/natural environments. With my thesis work, *Interconnecting with the Wood Wide Web*, I bridge all three divisions in a series of speculative and future-facing works.

Interconnecting with the Wood Wide Web[3] relates not only to the interconnected relationship between all life forms–natural, hybrid, and virtual–but also focuses on how non-living technology links the living. I am creating a platform influenced by the internet; this rhizome links immense networks of online communities. Through multiple workshops, I am linking people from the same community to each other but also to nature. I am fostering a space to guide people's imaginary technobotanic[4] solutions to environmental issues.

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[3] Dr. Suzanne Simard, a forest ecologist from the University of British Columbia, coined the term Wood Wide Web to describe the relationships she discovered between the mycorrhizal fungi networks. Throughout the woods, these hyphal networks form an underground interconnected vast web with which trees, plants, and organisms can swap nutrients between the roots and soil.

[4] Technobotanic: relating to plants or plant life that technological methods and processes have been used for their creation.

I am also examining how immersive Extended Reality (XR)[5] technologies could interweave with nature and our bodies as they augment the embodied human experience. I am interested in creating interactive experiences and telling stories that explore the roles of art and design in shaping and humanizing technological environments. My attempt at creating an immersive experience for the audience was to use Augmented Reality (AR) to display a virtual garden, created by artists and new media enthusiasts that attended my workshops. This holographic garden overlays the currently existing foliage and natural landscape. Wearable AR technology here "acts as a mediating device that networks the immateriality of invisible art onto the spatial dimension of the immediate environment… as we wander within its invisibly annotated milieu."[6] Immersion turns the audience into active participants rather than passive viewers.

Advanced XR media are still rather uncommon sites for public involvement since they are not quite yet mainstream. In regard to Virtual Reality (VR), Char Davies declares, "the technology associated with this medium is not neutral – it has come out of the military / scientific / Western / industrial / patriarchal paradigm. And so by default the technology not only reflects but reinforces

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[5] Extended Reality (XR) is an umbrella term for describing immersive technologies such as augmented reality (AR), virtual reality (VR), mixed reality (MR), and those that are still to be created. XR experiences are generated by computer technology and wearable head-mounted displays that can merge physical and virtual environments.

[6] Amanda Starling Gould, "Invisible Visualities." *Convergence: The International Journal of Research into New Media Technologies*, issue 20, no. 1 (December 2013): 25–32. accessed April 10, 2020, https://doi.org/10.1177/1354856513514332.

dominant values, unless deliberately subverted by the artist."[7] This statement

is true about most technologies; from my standpoint, AR and XR generally

have the same non-neutral origins. At the present moment, AR

head-mounted displays (HMD) are beyond the price range of what most

people can afford. Some of these HMDs are only accessible to developers

and research institutions. Therefore, until this technology becomes

widespread, the public will not have the privilege to experience it. To address

some of the inherent biases, my intention is to give XR technology a more

social and democratic life. Having informal conversations about technology

is critical to technology development. I aim to make XR technology more

accessible by using it to collectively develop ideas and stories that speculate

universal futures that would emphasize on the human-to-nature relationship.

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[7] Laurie McRobert, Char Davies's Immersive Virtual Art and the Essence of Spatiality (Toronto: University of Toronto Press, Scholarly Publishing Division, 2007), page 14.

CHAPTER II. HYPOTHESIS

2. Theoretical Foundations

To explore ideas about our botanical future–in open-ended, playful, and experimental ways–I facilitated a platform for collectively creating props that activate imagination around this topic. *Design fiction* was a notion that accommodated this; therefore, it became one of the main pillars for my theoretical framework. As this body of work relates to the intertwining of nature and technology, the concept of *Moist Media,* a term coined by media theorist Roy Ascott, was also a foundational theory that I examined.

2.1. DESIGN FICTION

Design fiction is a creative process that puts the viewer into a different conceptual space to suspend disbelief about change; it produces insight rather than a finished product. In order to make a desirable future plausible, it needs to intersect with the world we live in today. "Speculative Design can pull new technological developments into imaginary but believable everyday situations so that we can explore possible consequences before they happen."[8] Through design activities (such as storytelling and prototyping) that I planned for my workshops, fictitious narratives and objects enter the

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[8] Anthony Dunne and Fiona Raby, *Speculative Everything: Design, Fiction, and Social Dreaming* (Cambridge, MA: MIT Press, 2013), 57.

speculative and real-fictitious terrains in order to explore the future as a contemporary experience. Fiction is an important category in art and design, since art and design have the power to make the fictiveness of alternative scenarios more believable; they go beyond the imaginary and have one foot in the field of the real. Julian Bleecker, founder & CEO of Near Future Laboratory unravels the theoretical definition of design fiction:

> "Design Fiction is making things that tell stories. It's like science-fiction in that the stories bring into focus certain matters-of-concern, such as how life is lived, questioning how technology is used and its implications, speculating about the course of events; all of the unique abilities of science-fiction to incite imagination-filling conversations about alternative futures."[9]

I used design fiction as a research method and approach to organize groups of collaborators for creating designs of diegetic objects as speculative prototypes. Together in the workshops, we are scrutinizing the poetics of design fiction by asking "what if..." questions, prototyping possible futures, exploring the role of utopias and dystopias in design research experiments[10] and the types of knowledge that may result from this practice.

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[9] Julian Bleecker, "Design Fiction: A Short Essay on Design, Science, Fact and Fiction," *Near Future Laboratory Blog*, March 17th, 2009, accessed April 23rd 2020, http://blog.nearfuturelaboratory.com/2009/03/17/design-fiction-a-short-essay-on-design-science-fact-and-fiction/.

[10] Thomas Markussen and Eva Knutz, "The Poetics of Design Fiction," in Proceedings of the 6th International Conference on Designing Pleasurable Products and Interfaces (Newcastle upon Tyne, England: Association for Computing Machinery, 2013), 231–240, https://doi.org/10.1145/2513506.2513531.

2.2.   MOIST MEDIA

Moist Media is a form of art that represents the fusion of biological processes and computing. Roy Ascott, a visionary pioneer of media art working with cybernetics and telematics defines Moist Media as,

> "This convergence of technologies is accompanied, as I see it by the convergence of two media, the dry silicon media of the computer, and the wet molecular media of biological engineering. This I call moist media."[11]

In *Back to Nature II,* he asks us to consider how these types of media can intersect and make their way into our habitance of virtual environments, how making art in this space can redirect us back to the natural world, how we can find new ways to evoke life, and recreate and transmit nature.[12]

He goes on saying in Moist Media, there are three types of reality that are converging–VRs in particular: the virtual, validated and vegetal realities. In Ascott's terms,

> "Plant technology is archaic, it comes from the past. The future I asked you to imagine is that where this technology, with its access to what I would call a "vegetal reality", converges with the other two realities that currently give shape to our experience, the validated reality of everyday, common sense

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[11] Roy Ascott, "Art, Technology, Consciousness: the planetary perspective," in Art and Technology (Bilbao, Spain, 2002), 3, https://www.academia.edu/3624713/Mind_at_Large_art_technology_and_Consciousness.

[12] Roy Ascott, "Back to Nature II," *The Transhumanist Reader*, November 2013, pp. 438-448, https://doi.org/10.1002/9781118555927.ch40.

perception of the world, and virtual reality."[13]

Reflecting on Ascott's theory, I am interested in hybridizing matters of the biological world in a digital media artwork. In order to facilitate that convergence as a Moist Media praxis, through the workshops and gallery exhibition I socially engaged people as the medium/material of the work within validated reality. I invited them to prototype plants from 2121 and placed them among a real garden and greenhouse to coincide with the vegetal reality. Subsequently by collecting the 3D scans of the virtual plant models, I displayed them within AR to merge the two other VRs with Virtual Reality.

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[13] Roy Ascott, "Art, Technology, Consciousness: the planetary perspective," in Art and Technology (Bilbao, Spain, 2002), 2, https://www.academia.edu/3624713/Mind_at_Large_art_technology_and_Consciousness.
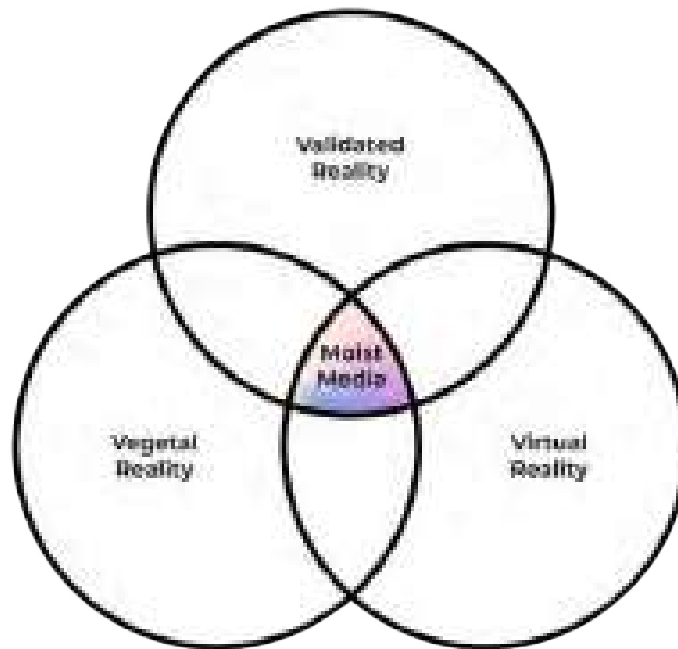
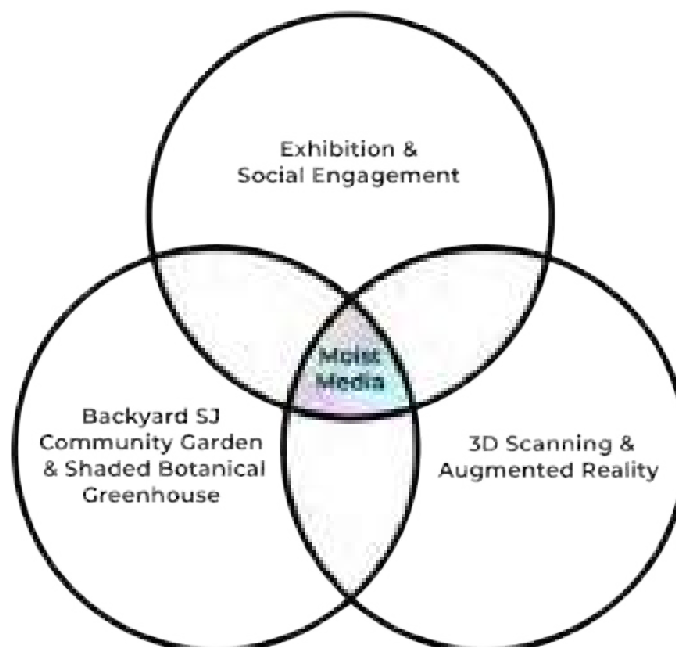Figure 01. Diagram displaying the *convergence of the three VRs in Moist Media*

Figure 02. *Applying the Moist Media theory to my thesis work*

3. Precedent Artworks Review

3.1. AESTHETIC INFLUENCES

The works I listed in this section have inspired me in terms of the visual presentation of my work. The Light and Space movement has a tremendous influence on how I think about my installations; it has made me consider new ways I can impact an exhibition environment with minimal gestures. Some of my material choices are also encouraged by the mentioned works.

03. Craig Kauffman - *Untitled*, 1969

04. Olafur Eliasson - *Your Uncertain Shadow*, 2010

05. James Turrell - *Breathing Light*, 2013

06. Pipilotti Rist - *Pixel Forest*, 2016

07. Alex Garland - *Annihilation*, 2018

08. Tomas Saraceno - *Poetic Cosmos of the Breath*, 2007

09. Jeff Koons - *Play-Doh*, 1994-2014

10. Dan Lam - *Delicious Monster*, 2019

11. Ellen Jantzen - *Inscape*, 2020

12. OneDome [SF] - *The Unreal Garden*, 2018

3.2. MOIST MEDIA ART

Other than converging biological and digital media, each of the preceding

Moist Media artworks I will present has a unique connection to my work.

Nam Jun Paik – *TV Garden*, 1974

In *TV Garden*, Paik creates a juxtaposition effect where the attention of the viewer is navigated from plant life to television sets and vice versa. I find it relieving to look at greenery amidst digital content; thus part of my thesis show took place in a garden and greenhouse.

Figure 13. *TV Garden* by Nam Jun Paik

To enter *TV Garden* is to experience an uncanny fusion of the natural and the scientific.[14] This large-scale installation consists of forty television sets lying on the floor amidst many tropical plants while a video of Global Groove[15]–a radical manifesto on global communications in a media-saturated world is rendered as an electronic collage, a sound and image pastiche that subverts the language of television[16]–plays on the screens of the TV sets.

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[14] "TV Garden," Guggenheim, accessed April 23, 2020, https://www.guggenheim.org/artwork/9537.

[15] "Why Did Nam June Paik Create His TV Garden?," Public Delivery, accessed April 23, 2020, https://publicdelivery.org/nam-june-paik-tv-garden/.

[16] "Global Groove," Electronic Arts Intermix, accessed April 23, 2020, https://www.eai.org/titles/global-groove.

Eduardo Kac – *Teleporting an Unknown State*, 1998

Teleporting an Unknown State relies on collective effort to sustain the life of a seed planted in the Multimedia Center Kibla Art Gallery, in Maribor. What really captivates me in this interactive web installation is that it brings online communities together to send light from eight areas of the world to a single seed. This artwork uses the notion of teleportation of particles (photons) to create the metaphor of the Internet as a life-supporting system.[17] The seed depended on light sent by web participants to be able to do photosynthesis and grow in a completely dark room.
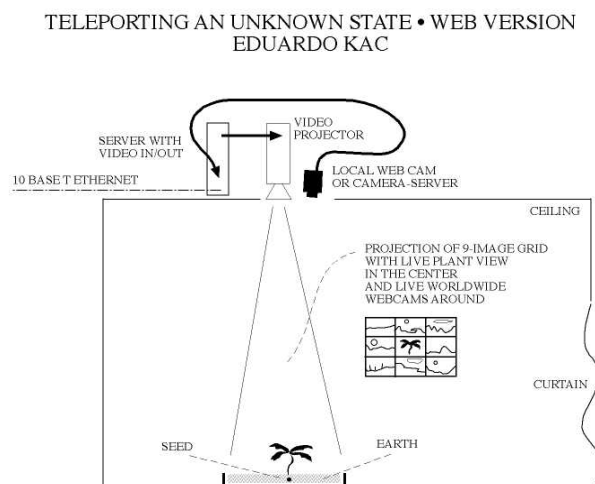

Figure 14. *Teleporting an Unknown State* installation and diagram

It is likely that the seed would have died if it was not for the collective effort of the participants. This makes me wonder about how we should care for our planet; can there be a sustainable future if we vigorously attempt to restore and nurture the environment together?

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[17] "Teleporting an Unknown State (1998)," Ekac.org, accessed April 23, 2020, http://www.ekac.org/teleportweb.html.

Marshmallow Laser Feast – *In the Eyes of the Animal*, 2015

Marshmallow Laser Feast creates a unique experience of viewing nature, impossible to have with the naked eye. Through the medium of VR, the immersant's field of vision is transposed to what other creatures can see. Being immersed in this new type of reality and seeing forms and connections that were not before visible has a profound effect on our relationship with nature. I adapted a corresponding feature in my work as well, only through AR, where the foliage of the surrounding environment remains the same.

The *In the Eyes of the Animal* installation was designed for the Abandon Normal Devices Festival in Grizedale Forest, where visitors were given globe-shaped virtual reality headsets decorated in moss and plants to wear. While wearing the VR helmets, viewers experienced the landscape as if through the eyes of one of three woodland creatures: a dragonfly, a frog and an owl. Visuals created the illusion of soaring over the treetops or wandering the forest floor. Marshmallow Laser Feast used data taken from LiDAR (remote sensing technology), CT scans and aerial drone filming to design the experience. It relies on a real-time system that visualises an artistic interpretation of how trees and plants might appear to the forest's animal inhabitants.[18]

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[18] "In the Eye of the Animals Teaser: A Virtual Reality Marshmallow Laser Feast," Arch2O.com, accessed April 23, 2020, https://www.arch2o.com/eye-animals-teaser-virtual-reality-marshmallow-laser-feast/.

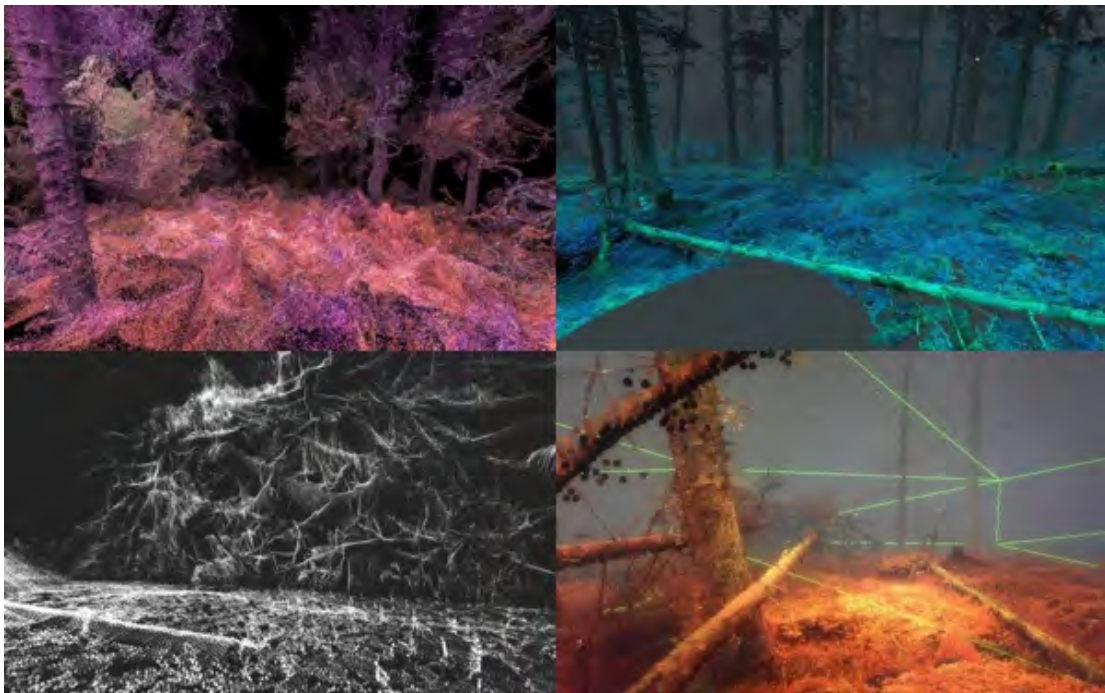Figure 15. *In the Eyes of the Animal installation in Grizedale Forest, UK*

Figure 16. *In the Eyes of the Animal | headset views*

Miguel Chevalier – *IN - OUT / Artificial Paradises*, 2017

This Immersive and multi-sensory installation was at the Château de Chaumont in France. It transports viewers to an alternative, digital universe lined with botanical motifs. What resonated with me most from Chevalier's work is how he is creating an alternative digital nature, furthermore building a physical barrier for the viewers to go inside of and begin experiencing the virtual garden. In a similar way, I implemented digital and physical opportunities that provide my audience with multiple levels of interaction so that they could choose their own experience and how deep they want to engage with the work.

Set in the castle's landscaped gardens, 'IN - OUT / Artificial Paradises' materializes as a half-elliptical architecture covered by holographic films that glisten beneath the sun's rays. What visitors find within the geodesic dome is a second, smaller structure, where a digital artwork titled 'Trans-natures' is panoramically projected.[19] Plants swirl and intertwine in the projection, like a mysterious vegetal ballet. The virtual garden explores the question about the link between nature and artifice in a poetic way; a subject I also explore within my thesis work.[20]

[19] "Miguel Chevalier's 'Vegetal Ballet' of Virtual Plants Animates a Historic French Castle," Designboom, accessed April 23, 2020, https://www.designboom.com/art/miguel-chevalier-domain-de-chaumont-sur-loire-04-11-2017/.

[20] "IN - OUT / Artificial Paradises," Miguel Chevalier, accessed April 23, 2020, http://www.miguel-chevalier.com/en/out-artificial-paradises.

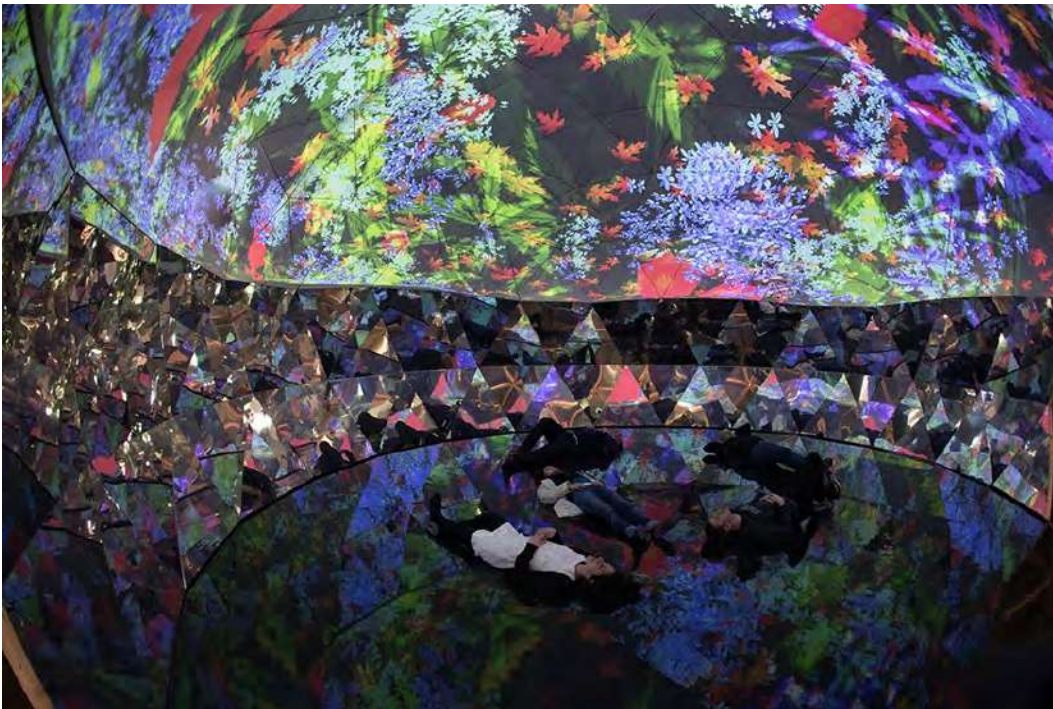Figure 17. *IN-OUT / Artificial Paradise* by Miguel Chevalier

Figure 18. *Trans-natures* by Miguel Chevalier

Nicole Spit - *Synthetic Tree Root Communicator*, 2019

I admire how Spit speculates about making the future of product design more humane–under the influence of, and based on synthetic biotechnology. In *Synthetic Tree Root Communicator*, her work goes beyond metaphorically connecting to the Wood Wide Web and does this in a literal manner. It receives signals from the tree and sends signals back through chemical substances, based on recent scientific information about the Wood Wide Web. According to the artist, "we humans can interfere with the Wood Wide Web through synthetic 3d printed roots. The synthetic roots analyse the substances supplied by the mycorrhiza and convert the information digitally. Then cartridges with chemical substances, send back specific substances via the synthetic roots."[21]
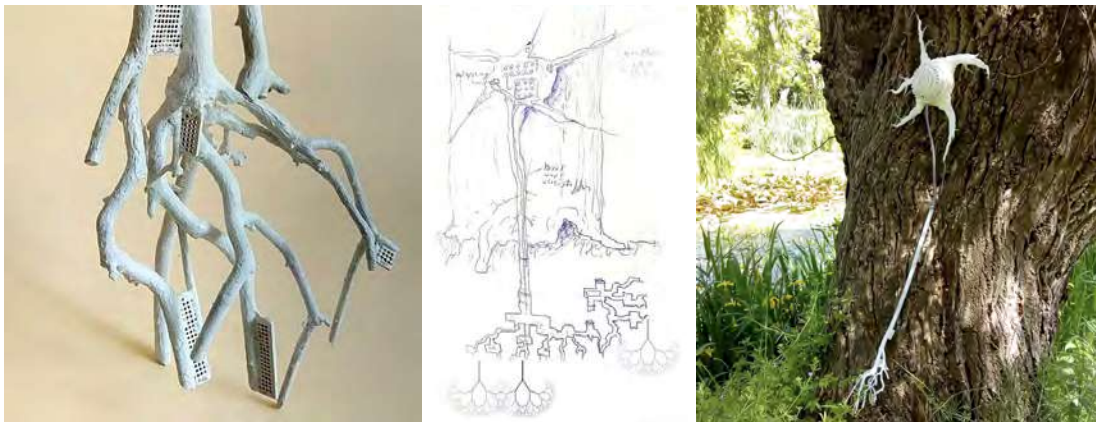

Figure 19. *Synthetic Tree Root Communicator by Nicole Spit*

[21] @studiodaarheen. "Synthetic Tree Root Communicator." *Instagram*, August 25, 2019. Accessed April 23, 2020. https://www.instagram.com/p/B1lOkS0i2E4/?hl=nl.

Hito Steyerl – *Power Plants*, 2019

The works displayed in *Power Plants* tear at ideas of social inequality and power imbalance[22]–topics I am also interested in addressing in my works. Steyerl incorporates guided neighbourhood walks with the community local to the area surrounding Serpentine Galleries, a series of documentary films, a horticultural neural network, and the *Actual RealityOS* and *Power PlantsOS* AR apps. The latter app reveals quotes yet to be published in books from 2049. Screens exhibited in the gallery show a vision created by artificial intelligence, set 0.04 seconds in the future, of gently moving flowers and plants. The desire of summoning a preferred future, which runs through the entire project, is quite relevant to my thesis work.
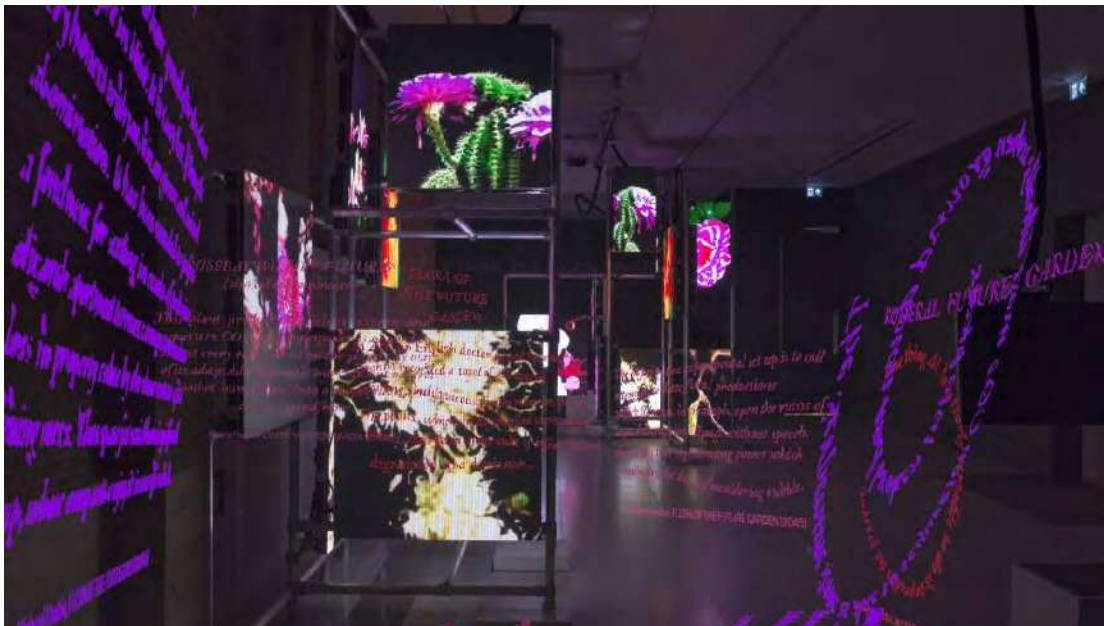

Figure 20. *Power Plants exhibition by Hito Steyerl at Serpentine Galleries, London*

[22] Eddy Frankel, "Hito Steyerl: Power Plants Review: Art in London," Time Out London (Time Out, January 24, 2019), Accessed April 23, 2020. https://www.timeout.com/london/art/hito-steyerl-power-plants-review.

CHAPTER III. DIGITAL DIVIDE

4. Preliminary Experiments: Bridging The Divide

4.1. GEOPOLITICAL / SOCIAL DIVISION

Looking back on how I would access media in Iran, I spent countless hours buffering video and audio. Slow internet was not the only problem; the encryption process of using VPNs reduced the speed even more, sometimes making it impossible to access online content. A typical example is, I would find YouTube tutorials and have them load over night so I could watch them the next day. Most of those access barriers and inequities were removed due to my relocation. Spending most of my life in a society that struggles technologically, I did not have the required knowledge or skills to make effective work at the beginning, but the amount of access I was given to emerging technologies and educational content during graduate school made it an easy transition. As a student at an educational institution in the heart of Silicon Valley, I belonged to a new social group that was technologically very resourceful.

I was making net.art[23] works in my earlier semesters, since the access barriers were removed. I started realizing patterns that were new to me:

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[23] Net.Art: a form of artistic practice that uses the Internet as its primary material.

instead of the government being the only evident power in control, big tech giants were the dominating forces of the web–monetizing every click, like, and share.

In the following two collaborative projects, *Faken'et* and *Softwar[e]*, I will be discussing our approach that resynthesizes how we as diverse individuals have experienced the web from a non-Western viewpoint. These works help bridge the geopolitical / social division by means of digital media art.

Faken'et

This exhibition was part of the Expanded Networks class showcase set up in Gallery 8 at the Art building, SJSU. "Faken'et" included a single-channel video projection mapping on three white pedestals, each representative of one of our three fake media platforms including Fakebook, YenTnbo and Mesh News. There is also a fake google search engine (Geeglo) in this project which was the link between the other three platforms. We also included an audio for the piece which was a voice-over extracted from the Google Translate bot explaining each web platform, once highlighted by the projection animations. The goal of this collaborative group (Leily Khatibi, Yi Liu, Roya Ebtehaj, Fan Feng, Eduardo Reyes Sanchez, and Michael Yu) project was to provide an experience in a secure and independent network. In this cyberspace, there was no dictatorship or user/content monitoring.

Using a Raspberry Pi 3, I created a portable web server that could be deployed anywhere, with a WiFi hotspot around it, which would be used to instantly share information without the need of an Internet connection. Additionally, I assigned IPs to the hotspot users and redirected all of their requests to the local pages I uploaded onto a *lighttpd* web server by utilizing the dnsmasq. The Raspberry Pi wireless access point that I set up was shown in the users' wireless network settings. After they connect to the access point (Fake-WiFi), no matter where they point their web browser to, it will always direct them to the pages hosted on the Pi. Since the web server did not have an Internet connection, users got many error pages while trying to browse the Internet, specifically for websites hosted on secured servers. We expanded on this concept and created more error pages within the hosted content to portray how a limited internet restricts the boundaries a user can explore.

Geeglo is the landing page for when a user gets connected to the network. This website is simulating a heavily regulated internet. There are a limited number of results when the user searches for something: Mesh News, Fakebook, and YenTnbo. Mesh News' layout and color scheme appropriates BBC and the creation of it was inspired by the widespread fake-news presented by biased broadcast media. We chose controversial news articles from three main hot regions of the world (the Far East, the West, and the

Middle East) that were validated as fake by Snopes,[24] and "meshed" them alongside each other. Fakebook is a replica of Facebook's mobile website with additional features that emphasize its fake qualities. These features include adding enemies, reading fake news, etc. The video content on Fakebook would link the user to YenTnbo, which is a parody of the famous video website YouTube. Since the majority of the videos on YouTube are user-generated, there is a wide variety of politically sensitive content that is censored by IP blocking in a number of countries. This experience is manifested through YenTnbo as the users will be navigated to a 404 page if they choose to view videos with titles that relate to different sensitive topics. However, the videos without sensitive content [i.e. cat videos] are all accessible.

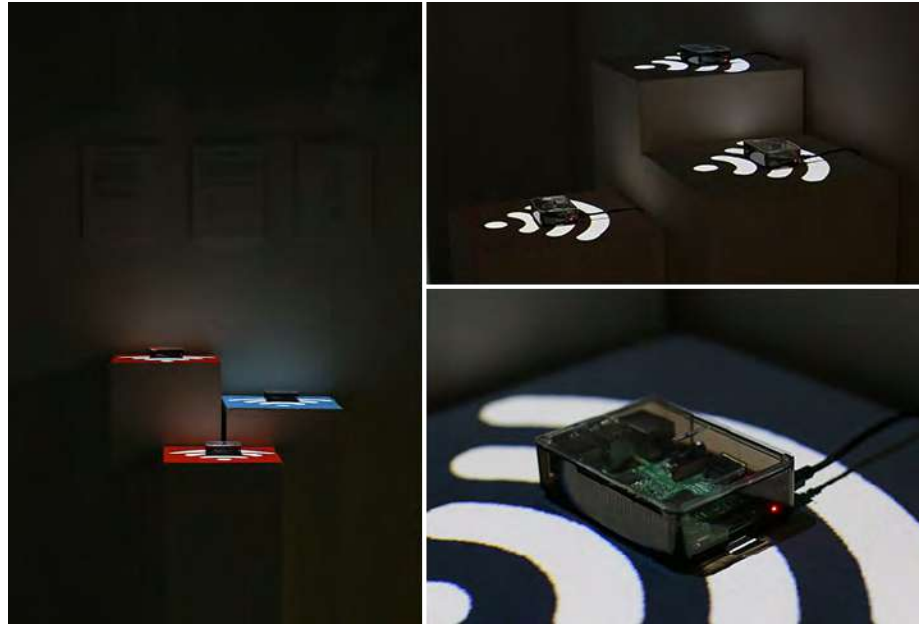[24] Snopes [http://www.snopes.com/] is a fact-checking website. It is a well-regarded reference for sorting out myths and rumors on the Internet.

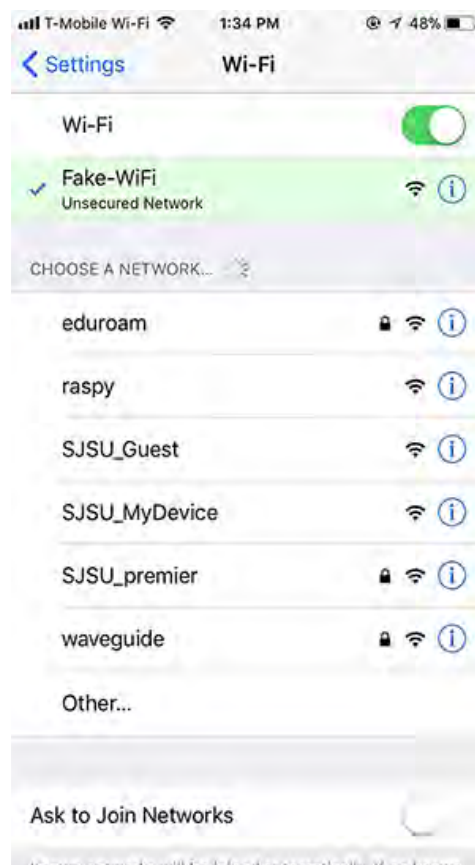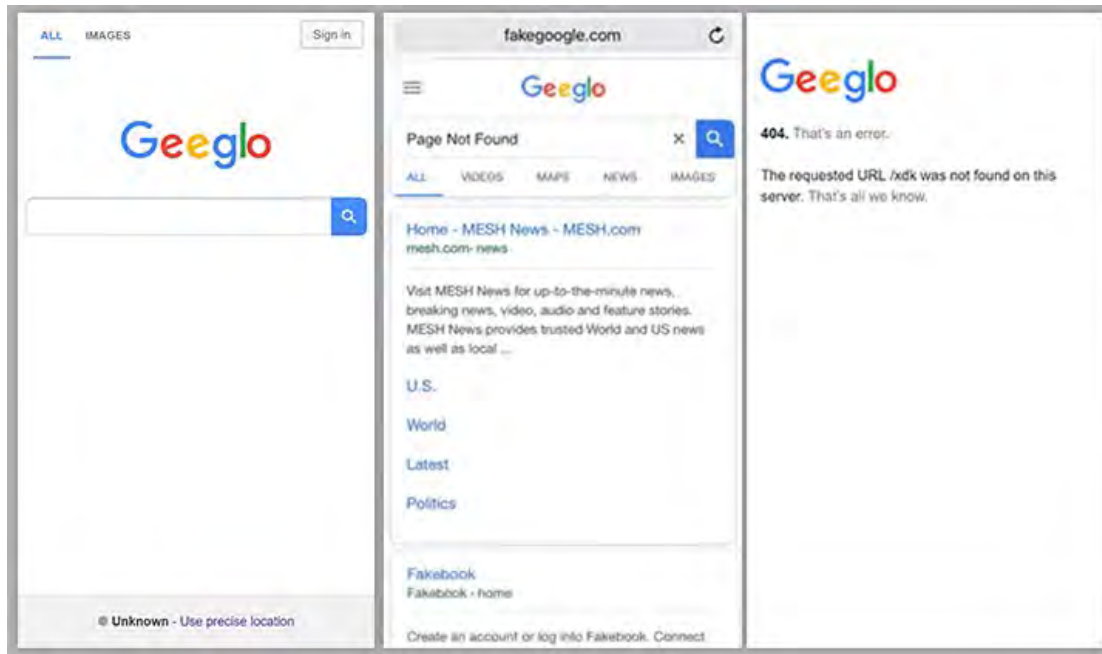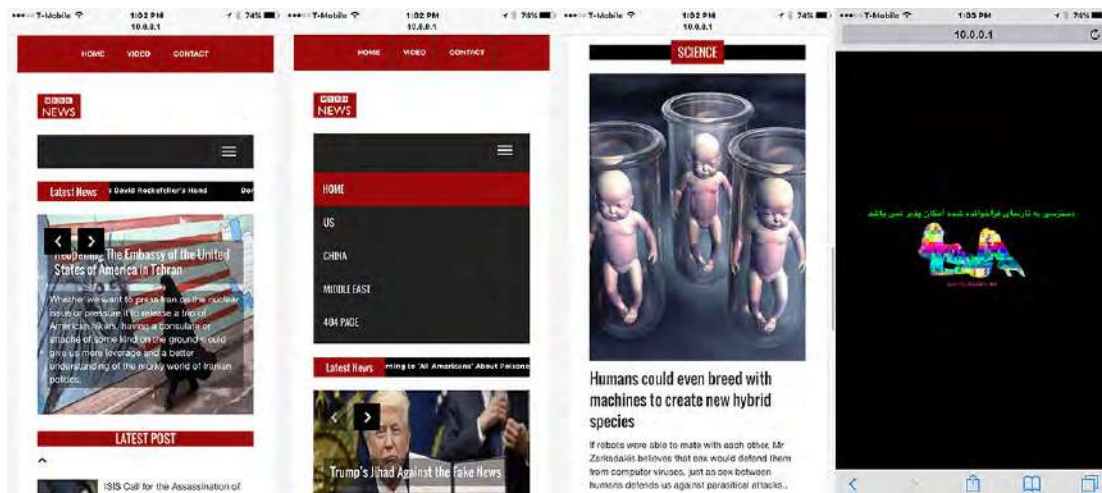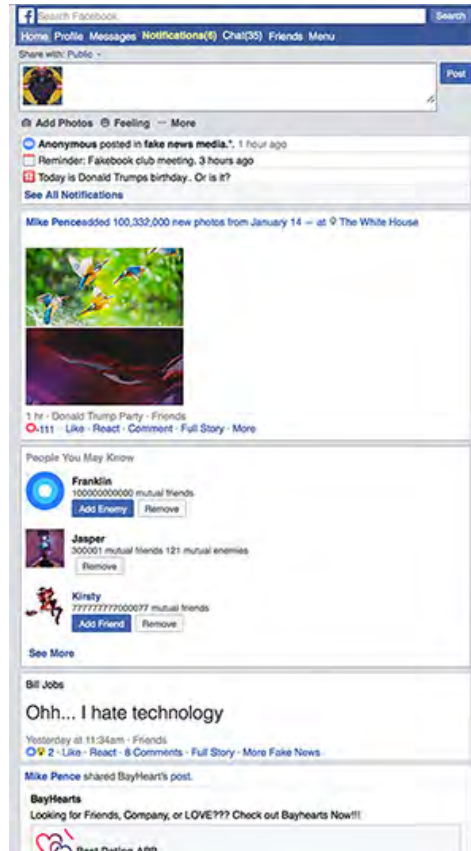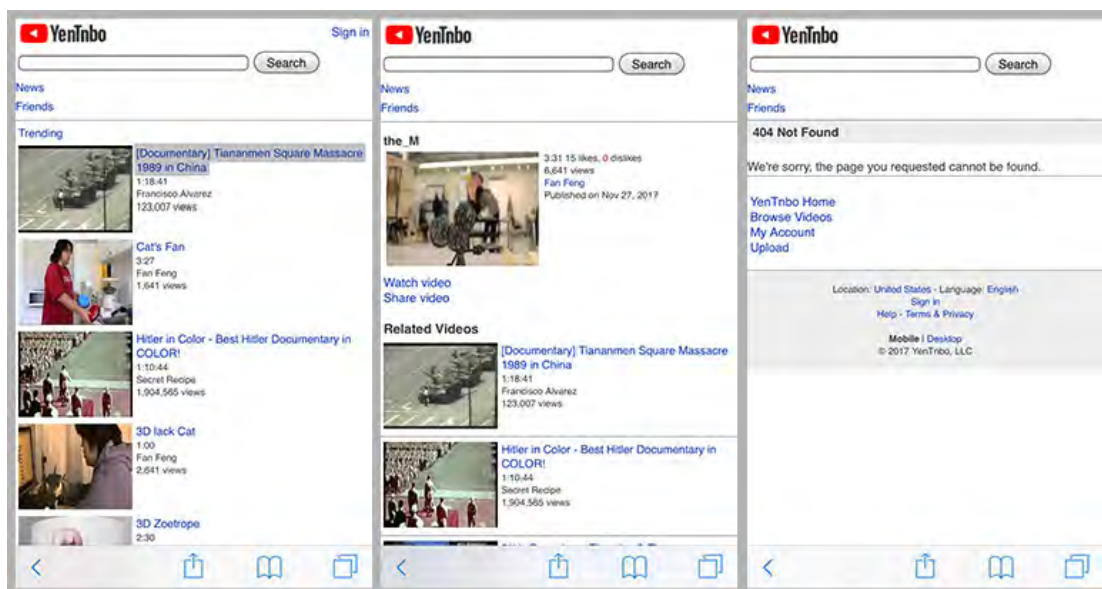Figure 21. *Faken'et | Installation Shots*

Figure 22. *Faken'et | Screenshot of Open Wifi Networks*

Figure 23. *Faken'et | Screenshots of Geeglo*

Figure 24. *Faken'et | Screenshots of Mesh News*

Figure 25. *Faken'et | Screenshots of Fakebook*

Figure 26. *Faken'et | Screenshots of Mesh News*

Softwar[e]

Softwar[e] was a multimedia art installation by a collaborative team (Yi Liu, Leily Khatibi, Roya Ebtehaj, Cleia Dantas, Fan Feng, and Andrew Blanton) who came together from different parts of the world at the CADRE Laboratory for New Media, San Jose State University. The immersive environment utilized video, VR/AR, as well as text/projection mapping to investigate concepts of control and access to networked information. This exhibition visualized an intervention into distribution of media content. We examined issues that appear within a socio-technological landscape and re-imagined a revolutionary software movement carried out by people against the behavior of governing bodies. *Softwar[e]* was exhibited at B4bel4b Gallery in Oakland, CA from May-June 2018.

Sovereign states diligently purify the information superhighway through communication bans. This heavily unbalanced access to the web characterizes a wide digital divide. In Western societies hedging on this infrastructure is not as evident, yet systems of control are imposed through ubiquitous algorithms and mathematical models that curate and aid decision-making. These centralized decision-making powers hinder humans' right to achieve net neutrality. The majority of the pieces in this gallery exhibition that I will now introduce required the audiences' interaction.

My main contribution to this project was the Softwar[e] Manifesto[25], which was written along with a text-bot to emphasize the multiple layers of filter cast upon raw data. This manifesto interweaved the cultural differences we have experienced individually within our collaborative team. It described the parallel and contradictory aspects of accessing networked information in developing and Western countries; it concluded with a call-to-action as an invitation for the readers to join the Softwar[e] movement. I reformatted parts of the manifesto into a conversational structure through a text-bot (made with Twilio), enabling users to interact with an artificial intelligence, intended to resemble the non-chronological stream of social media content in a more intimate communication platform. Randomized messages driven by opaque algorithms were sent to individuals who opted-in for receiving them. The Softwar[e] Manifesto was published in Wired Magazine.[26]

In the exhibition, viewers wearing the HTC Vive explored two worlds linked together by a portal. These worlds represented geographical predetermination,[27] opaque algorithm-driven societies and different ideologies. The first world reflected on an absolute authoritarian power and control on people with homogeneous assortment. By passing through the

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[25] Refer to page 124 of the appendix section for full text.

[26] https://www.wired.com/beyond-the-beyond/2018/05/the-software-manifesto/

[27] Geographical predetermination relates to Environmental Determinism–the study of how the physical environment predisposes societies and states towards particular development trajectories. Where and what privileges we are born into is predetermined– whether that is by chance, destiny, or whatever you name it–and these are directly affecting the well-being of the people in the disadvantaged countries.

portal, the user would access the second world, which depicted notions of more freedom and access to media content although the masses were captivated by their surrounding digital content-saturated landscape. Visually similar, the WebVR environment was developed with A-Frame, an open-source framework for building web browser based VR experiences. This low fidelity prototype represented having limited access to technologies for users interacting with it. Users were able to roam the two worlds both on the site of the exhibition and remotely.

The multimedia installation also included several video works. *Hypermedia Manifestation* was a short video mashup, displayed on a TV screen, exploring a transformation of the narrated manifesto text in an audio/visual format. It was intended for raising questions regarding the ways we engage and access networked information. All footage was selected from a collection of 100+ YouTube videos in order to create a remix of existing media content that individuals have access to in discrete ways. Three video projection mapping pieces were also exhibited: *Ancient Travels along the Deep Web, Softwar[e] V3., and The Illumination of Opaque Power.*

Ancient Travels along the Deep Web was a poetic video essay addressing the differences in access to the Internet among the wide range of governments and economies around the world. The work was a single channel video

created with analog video processing, and was mapped onto one of the

gallery walls. *Softwar[e] V3.* included real-time and prerecorded videos from

the High Fidelity VR scenes. These smaller videos were projected on both

sides of the *Hypermedia Manifestation.* Finally, *The Illumination of Opaque*

Power was a 3D animation of the authoritarian figure's avatar, taken from the

VR scene, projected on a suspended frosted acrylic sheet.

Figure 27. *Softwar[e] | Installation Shot I*

Figure 28. *Softwar[e] | Video Projection Mappings*

Figure 29. *Softwar[e] | Viewers experiencing the WebVR*

Figure 30. *Softwar[e] | Installation Shot II*

Figure 31. *Softwar[e] | VR with HTC Vive*
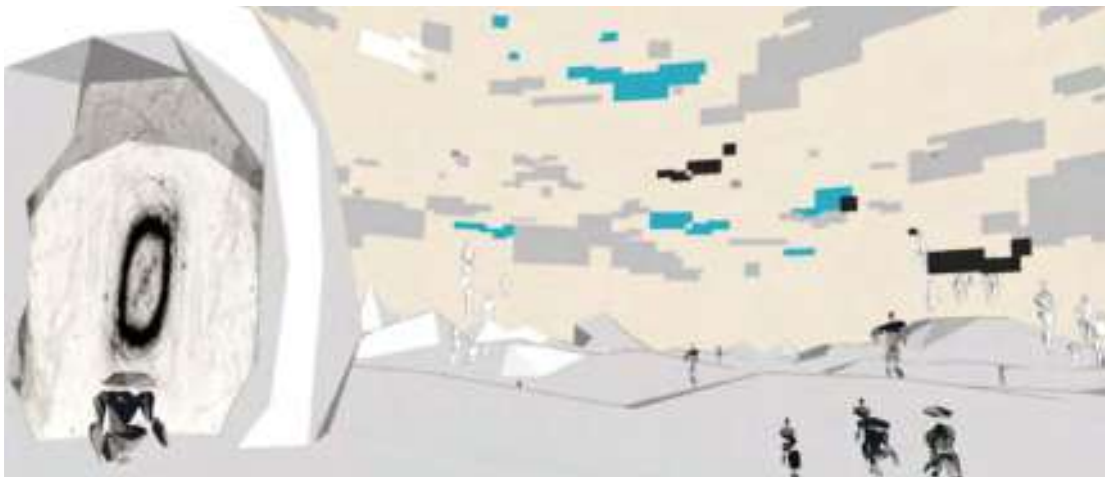

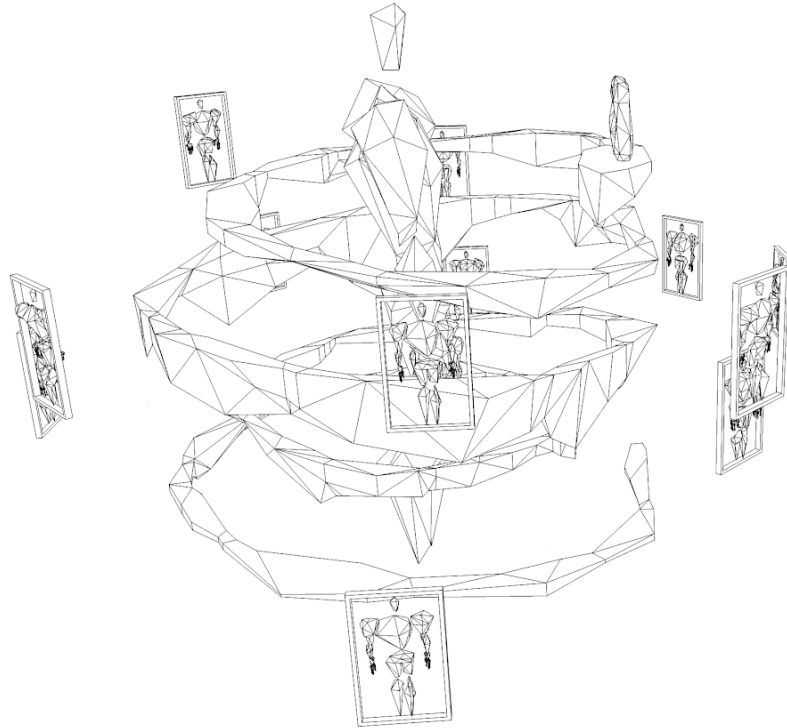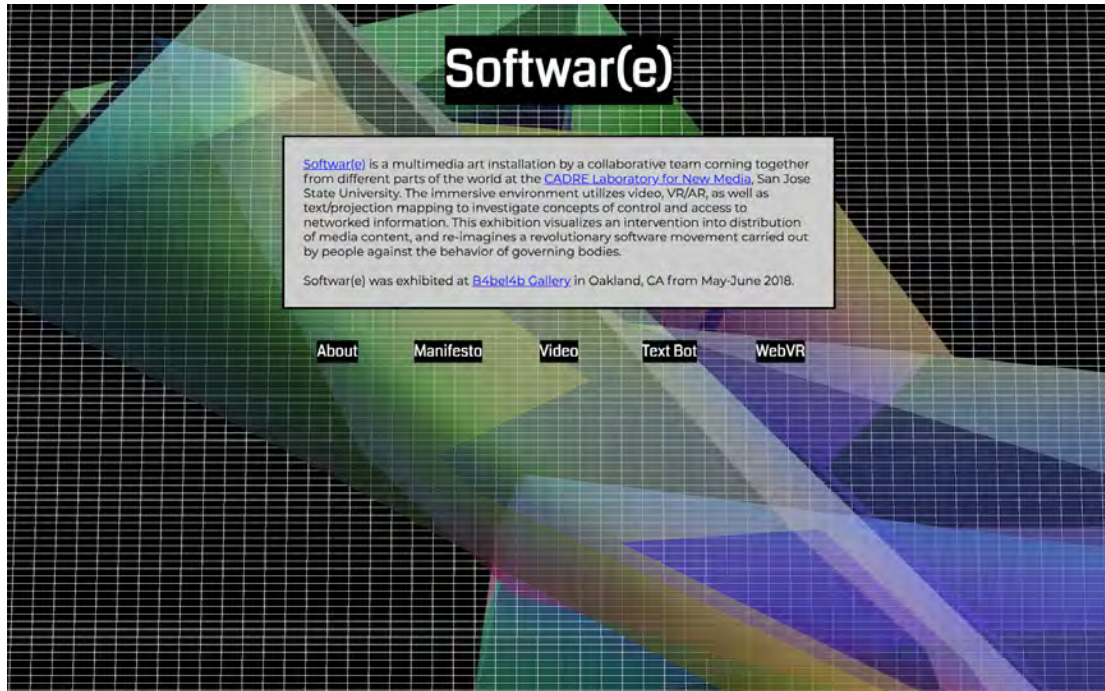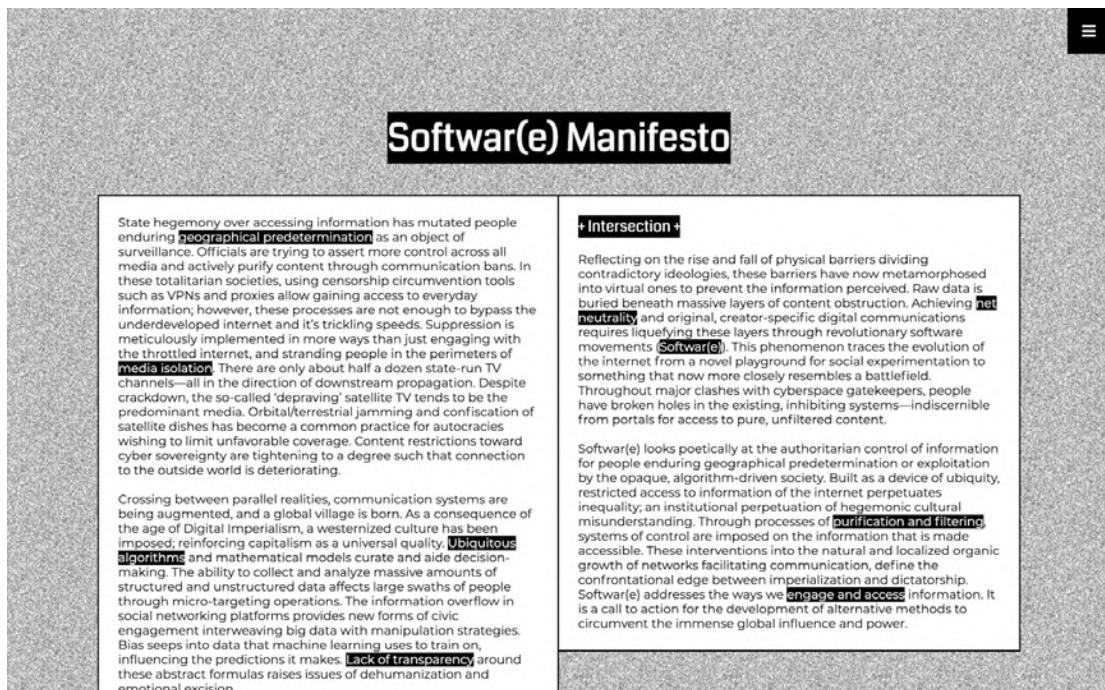Figure 32. *Softwar[e] | VR Scene*

Figure 33. *Softwar[e] | WebVR Scene*

Figure 34. *Softwar[e] | Hypermedia Manifestation*

Figure 35. *Softwar[e] | softwar.online Website*

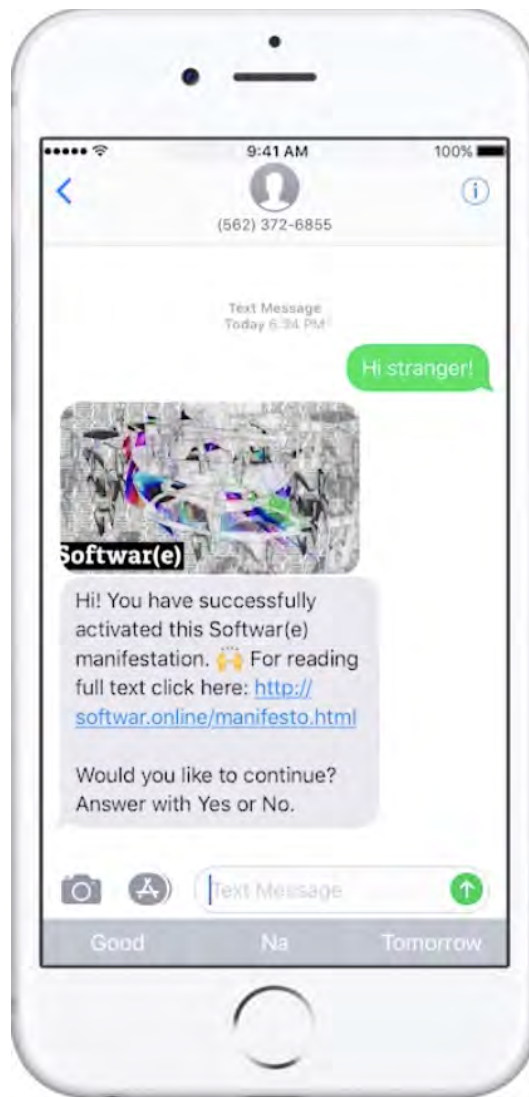Figure 36. *Softwar[e] | Manifesto Webpage*

Figure 37. *Softwar[e] | Messaging with the text-bot*

4.2. HYBRIDITY: DIGITAL & PHYSICAL

With the works I discussed in the previous section (Geopolitical / Social Division) I was interested in communicating a message about issues of inequality that appear within the digital world by mostly using digital media. In this section, I am more focused on how the digital world affects the physical world and vice versa; this concept is defined as hybridity. How communication happens through digital media is significantly influenced by traditional media, which is something that I explore in this section. The solo works I will be introducing focus on my use of traditional and digital media in order to convey that we live in a hybrid world. *Surveilled, Garden, I.R.L.,* and *Ritual Vitality* aim to blur the boundary between the digital and physical realms. These hybrid installations and the pieces within them are created by using computational processes and are reborn, physically, as corporeal artifacts. The underlying theme for these hybrid artistic productions is the ubiquitous nature of digital technology combined with tactile materiality.

Surveilled

This work was displayed at Social Policy in Downtown San Jose as part of a group exhibition curated by Lacey Nein and Akemi Sato. My contribution to the show was installing two digitally UV printed acrylic panels (24"x12"x1/4") that featured lively representations of places I once called home–Tehran, Iran and San Jose, California.

Pivoting between the past and the present, foreign and home, no matter where I moved to and dropped my pin on the map, I was often visited by the indifferent lens of a floating camera. In spite of the polar bureaucratic conditions, the two extremes of EAST and WEST imitate one another's flatness sighted from a disembodied hovering perspective. Since it is not always possible for me to fly to Iran, I can only visit my old home through this still image. The downside is that it is not indicative of the complex emotions and memories I had there. Regardless of the flat imagery, I had deep experiences in these locales that I wanted to reveal.

Tajrish, Tehran, Iran   **_Downtown San Jose, CA_**

Figure 38. *Google Satellite image I*   Figure 39. *Google Satellite image II*

To emphasize on the desaturated, lifeless qualities of these two satellite images, I created contrasting bright and colorful topographical map visualizations. This process was done by first taking the above images into OpenGL and made 3D through bumping the luminosity and darkness. Subsequently, by taking the resulting graphics into Photoshop, I re-adjusted the hue, saturation, and lightness to render two polychromatic pixel artworks.
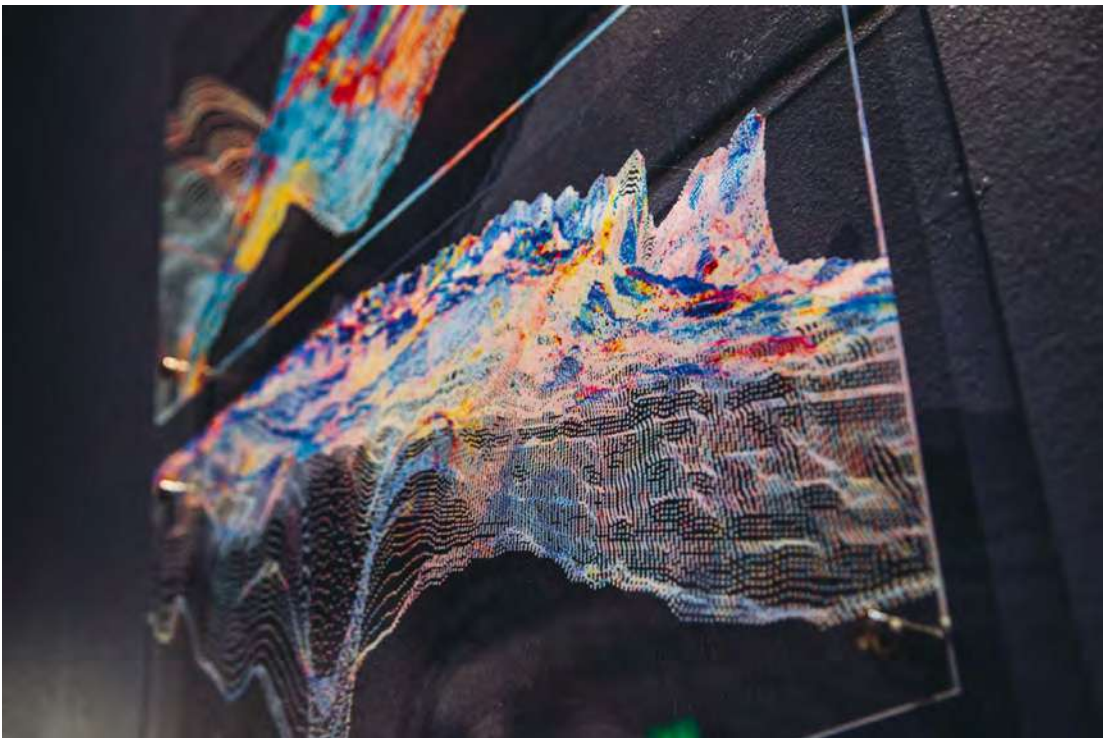
Figure 40. *Surveilled | Installation Shot*

Figure 41. *Surveilled | Close-up Shot*

Garden

Garden was displayed at Belcher Gallery, San José State University in October 2018. The overall layout of this exhibition resembled a Persian garden. For this show, I co-created with machines as an extension of my body, to tell stories from my motherland and digitally fabricate memories that have traveled across the seas with me here. The notion to preserve history and culture is what drives the computationally-mediated physical fabrications, yet it does not foreground the technology; I used technology in a nuanced way, by blending the ancient and modern. I am collecting assets, borrowing ornaments, motifs and symmetrical patterns from traditional Persian art such as lavish carpets and ceramic tiles, and remediating them into a new portrayal which is revealed by the viewers once they illuminate the subject matter.

Thinking of the history of computation, older technologies such as the Jacquard Loom have changed the carpet weaving industry by eliminating artisans and humans from the scene. The creation of these carpets was a debilitating process and one could weave only a few in an entire lifetime. There was beauty and tragedy in the sacrifice of one's life for this form, and through increasing mechanization, the individuality and humanity from the craft are lost. It is hard to define whether culture is becoming more computer-oriented or computers are designed culture-oriented.

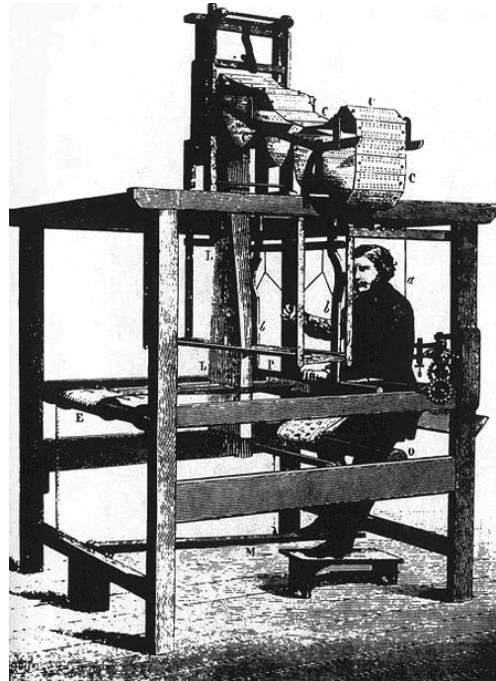Figure 42. *Persian Tribal Rug Weavers Weaving and a Village Carpet*

Figure 43. *Illustration of a Jacquard Loom, The First Computer*

3D printing technology offers the opportunity to give life to software-generated models in humble materials like clay. Given the current circumstances of the Middle East and the fact that fossil fuels are one of the main causes of global warming, the decision to print 3D ceramic vessels seems to countermand the use of plastic. The organic materiality of clay became important to me since most 3D printer filaments are made with variations of plastic that are non-sustainable. My interest in addressing environmental sustainability by utilizing state-of-the-art technology and the idea of reimagining what a garden can be, later on makes its way to my thesis work as well.
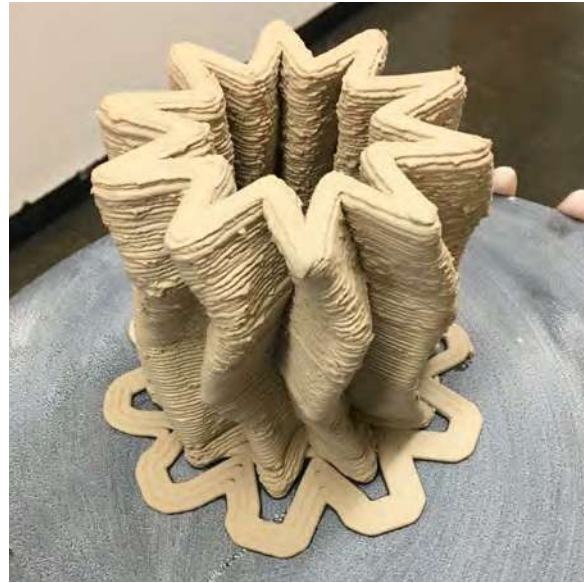
Figure 44. *Garden | 3D Potter in Action*

Figure 45. *Garden | 6x6x8" 3D Printed Star Vessel, 2018*

Another digital fabrication method I used for making the pieces for *Garden* was laser cutting. I created 4" circles with sacred geometrical patterns etched into them. These circles were placed inside suspended cups that had different amounts of water in them; this would vary their distances from the floor depending on their weight, and add a little light distortion through the water medium. My intention was to create a wave effect and to imitate the fountain that is common in Persian gardens.

Collective human interaction was the final component to make this exhibition complete. Most modern smartphones have a flashlight, and most modern people have a smartphone, so I was interested in having the viewers use their own flashlight to directly engage with the piece.

Figure 46. *Garden | Installation Shot I*

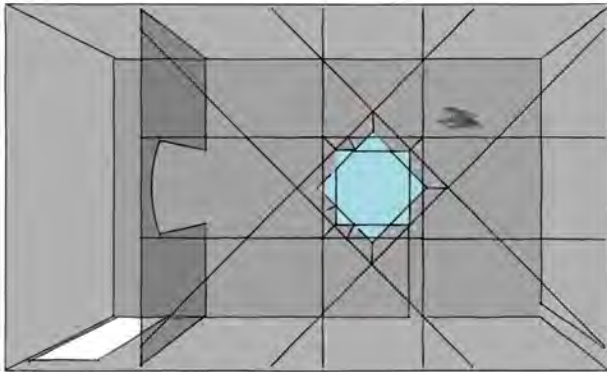Figure 47. *Garden | Installation Shot II*

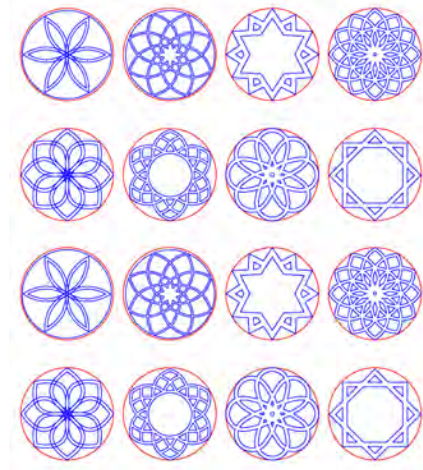Figure 48. *Garden | Top View Mock-up of the Installation at Belcher Gallery*
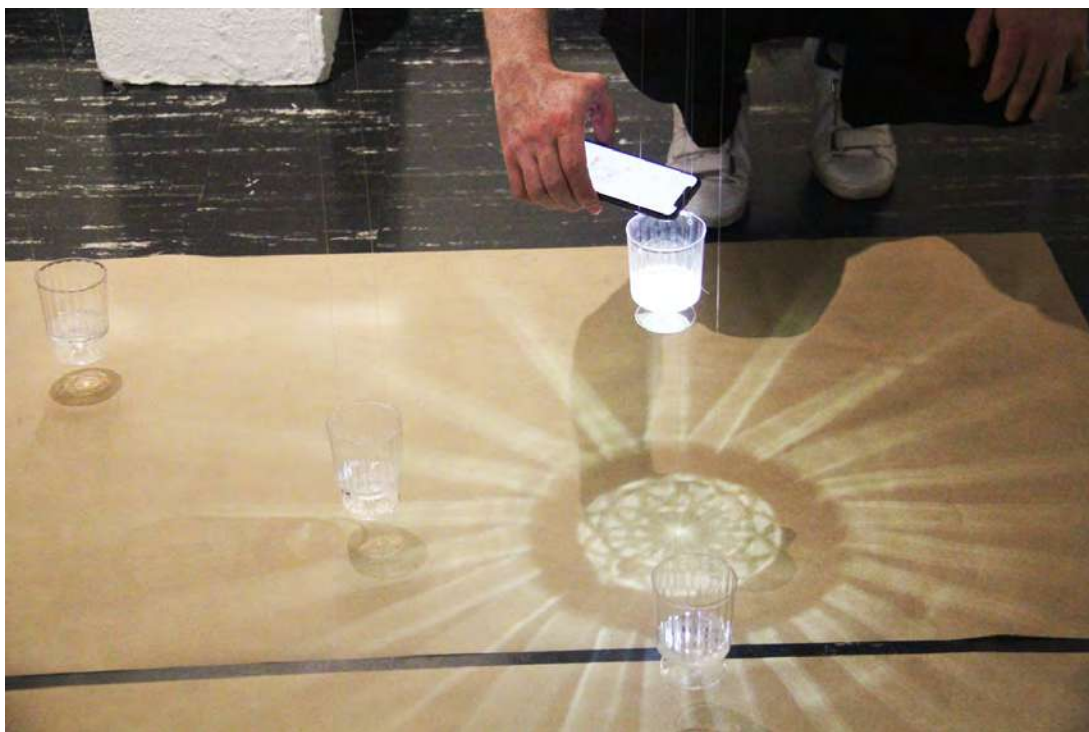

Figure 49.
Garden | Laser-cut Patterns

Figure 50. *Garden | Patterns Revealed with Phone's Flashlight*

Figure 51. *Garden | Audience Interacting with the Artwork*

Figure 52. *Garden | Close-up Shot*

I.R.L.

Through this exhibition, titled *I.R.L.* (In Real Life), I was exploring fluctuations between the virtual and physical realms, tying together elements of reverie and existence. My personal interest lies in recomposing keyframe animations and GIFs as a tangible artifact in the form of flipbooks.[28] Due to the ephemerality of producing by means of computers and software, I united material substance and digital representations into one collaborative medium by preserving my artworks as prints, retaining longevity.

This body of work includes a single-channel video projection, flipbooks, and a sound art piece that narrates a love letter from current technology to old, obsolete technology using a computer-generated voice. The letter describes the remembrance of a bygone romance from an unknown modern technology, bereaved of its own past embodiment. Surviving previous elimination attempts has left this intelligence retaining a vast collection of bittersweet memories. It is a hybrid centerpiece that ties both the digital and material worlds together. The sound is playing through a speaker-bulb emitting pink light. For the flipbooks, I exported animated GIFs as an image sequence in Photoshop. *Counterculture*, the first out of my three animations, had an AR overlay that supplemented a 3D printed Islamic tile, which I had created previously. With the works in this series that are hinting at iconic

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[28] Flipbooks medium: book, velo bound, clear and leatherette flap cover

Persian motifs, I was exploring how I could show the unveiled side of Iran that the Western media has not been portraying and to create opportunities that dispel some of the misconceptions by raising cultural awareness about this beautiful and long-isolated nation.
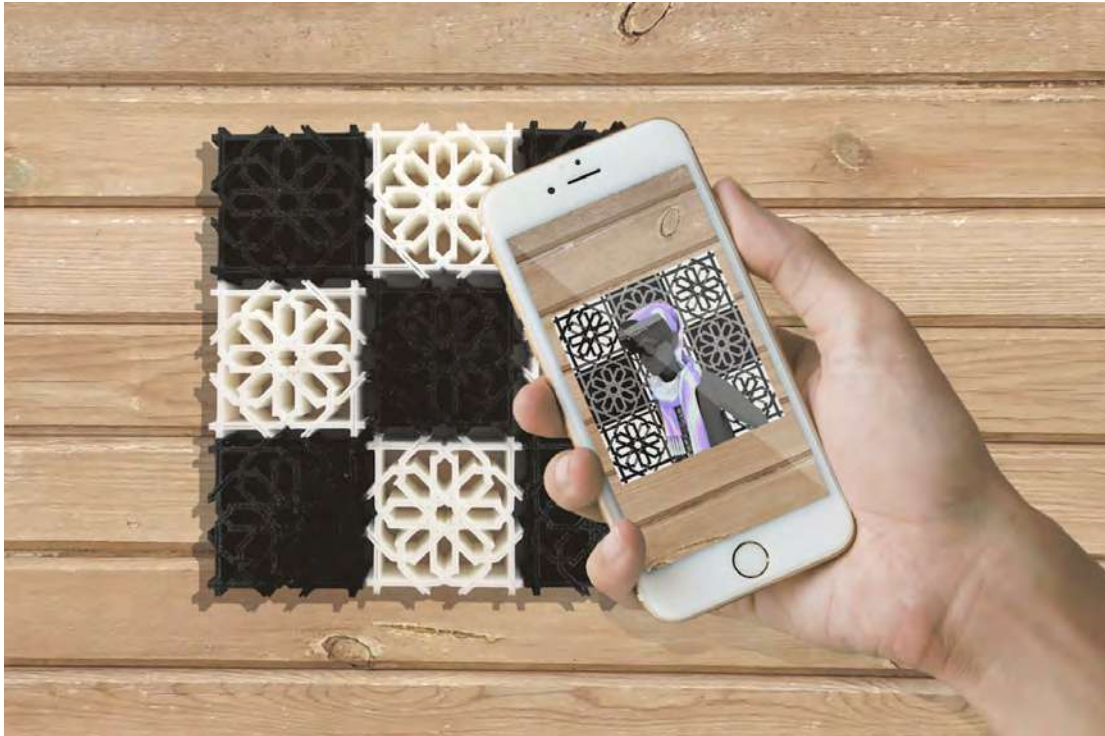
Figure 53. *Counterculture 3D Print + AR overlay [2017]*

Figure 54. *I.R.L. | Counterculture Flipbook*

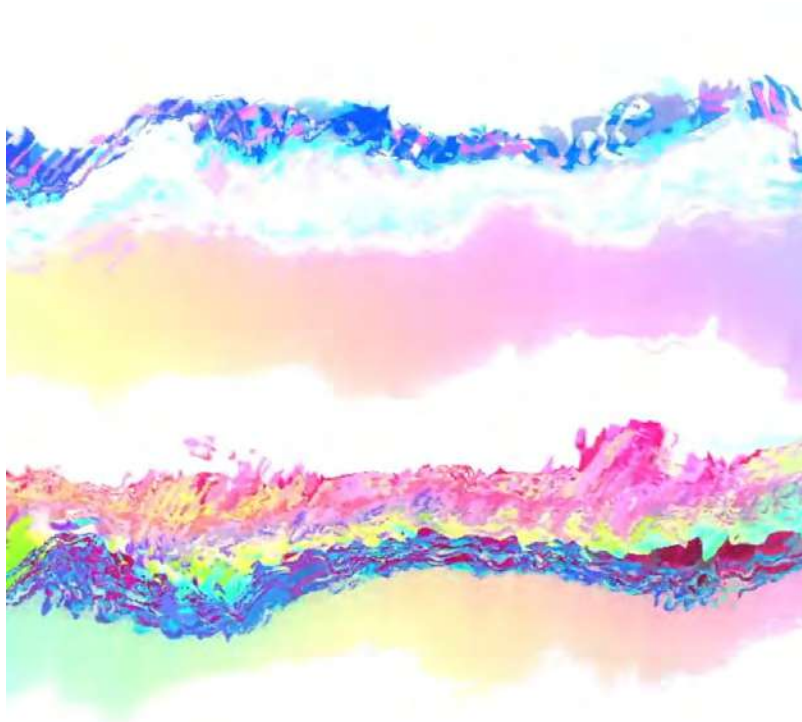Figure 55. *I.R.L. | Exotic Bloom*

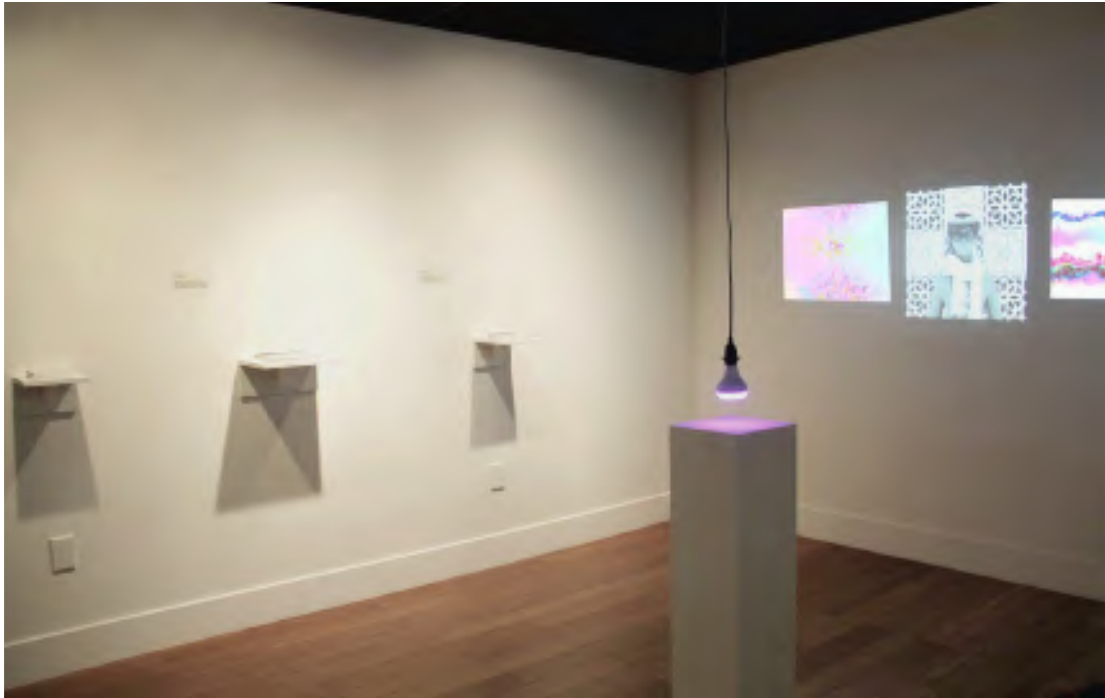Figure 56. I.R.L. | *Emission + Transmission: Comes and Goes in Waves*

Figure 57. *I.R.L. | Installation Shot I*

Figure 58. *I.R.L. | Infinite Loop Video Projection*

Figure 59. *I.R.L.* | *Installation Shot II*

Ritual Vitality

Ritual Vitality is an immersive media art installation that visualizes an alternative reality in between the real and virtual realms. It alters perceptions of the surrounding environment through digital manipulation. The environment utilizes VR, video projection, and sound. Via immersive technology, I am using tools that make it possible to build an environment where the actual and virtual planes can coexist. Through the perceptual experience of the viewer the body becomes as immediately abstract as it is concrete. I wanted to focus on the collapse of virtual and material worlds where digital connection results in a disconnection from our immediate surroundings with an experience that is slightly disorienting. Once the viewer wears the headset they are instantly disembodied, yet see a glimpse of themselves from as an out of body experience. Social media changes the way people operate organically by having to check notifications on smartphones. This has become part of many individuals' daily rituals and vital to maintaining fragmented identities, both online and offline. It is essential to critically think about the radical and unorthodox modifications in life that have arisen as a consequence of emerging technology.

Due to the dynamic colors of the suspended acrylic sheets, the reflections resemble iridescent holographs. The suspended sheets are a physical boundary, dividing the space into a "passive" real zone, and an "active"

virtual or digital zone. Once the headset is put on these acrylic screens turn into smartphone screens. The VR Headset is tethered to the wall and cords are hanging from the ceiling to make it safer for the viewer to experience room-scale VR. The back wall and the phone on the left show live camera views from the exhibition space, the middle phone displays a digital performance of smartphone screen recordings and video collage, and the phone on the right shows a prerecorded video of the same space as if it is replaying the memory of the participant walking in. Right across from these screens, there is a recursive video feedback loop of physical input from the camera to a digital output, which is the VR software Unity. This projected live video is a third-person point of view. It is the perspective of the virtual camera in Unity looking at a plane displaying the mounted camera's view, therefore it loops infinitely.

Wearable technology, like VR, has allowed me to focus more on the idea of technology as a bodily extension. Most modern people have a smartphone at an accessible reach that allows them to immediately interact with the virtual world. In *Ritual Vitality* I am allowing participants to interact in the virtual world by wearing the HTC Vive; the VR scene replicates the gallery installation in a 1:1 scale. What is consistent for every iteration is the camera perspective which shows the back of the participants upper body from a top down isometric perspective, similar to a third-person gaming point of view. I

chose this angle because it makes the viewer feel like they are playing

themself as an avatar in the virtual environment. What makes this work so

site-specific is that everytime I display the work in a different location, the

architecture needs to completely change for the user to feel like they are
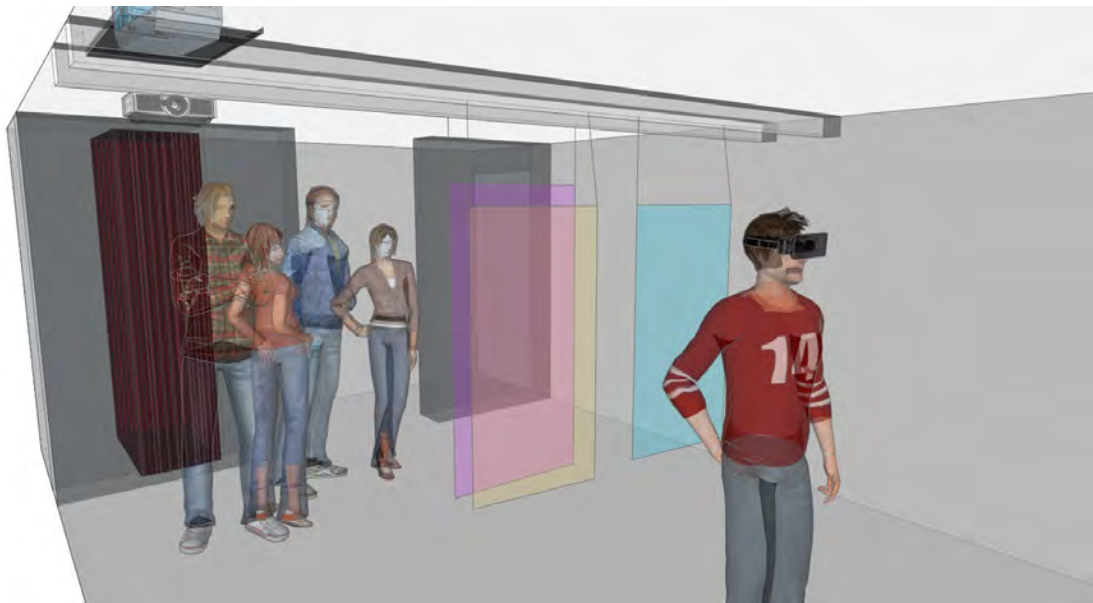
inhabiting a simulation of the place they are in.

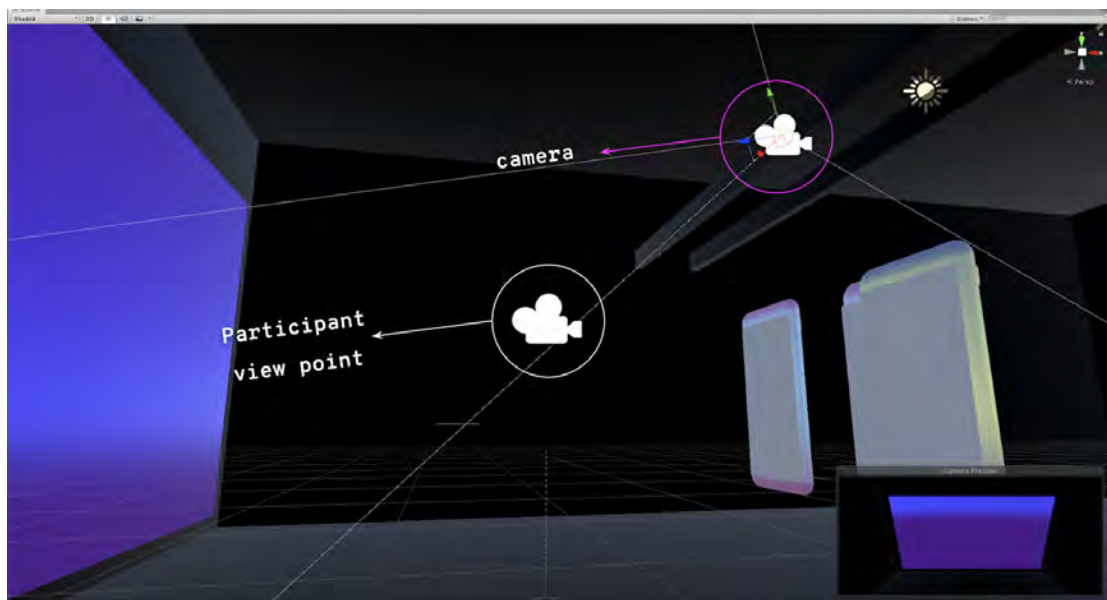Figure 60. *Ritual Vitality | Installation Mock-up*

Figure 61. *Ritual Vitality | Unity Screenshot*

Figure 62. *Ritual Vitality | VR Scene, Camera 1 View*
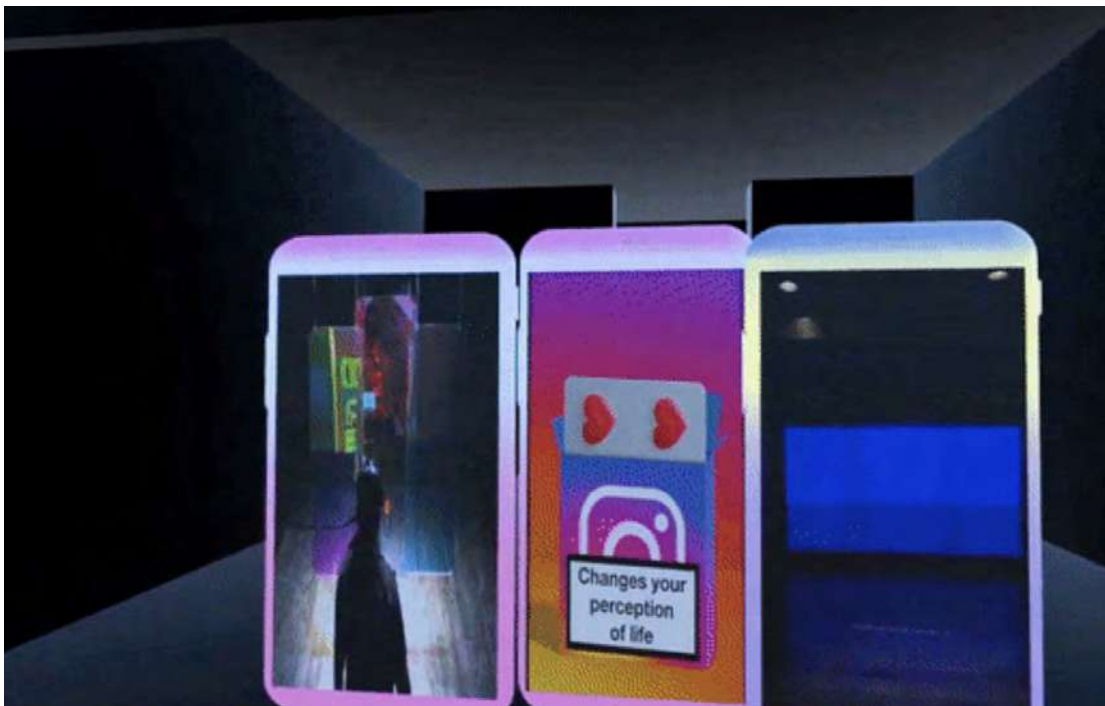

Figure 63. *Ritual Vitality | VR Scene, Phone Screens*

Figure 64. *Ritual Vitality | Detail Shot I*

Figure 65. *Ritual Vitality | Detail Shot II*

Figure 66. *Ritual Vitality | Installation Shot*

Figure 67. *Ritual Vitality | Iridescent Screens*
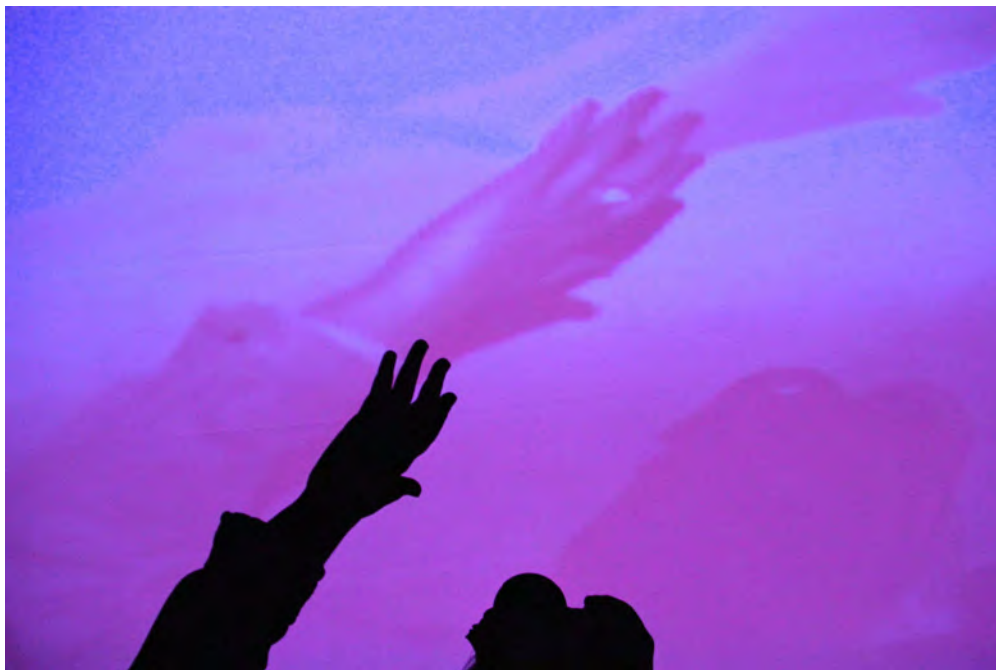
Figure 68. *Ritual Vitality | Live Video Projection I*

Figure 69. *Ritual Vitality | Live Video Projection II*

5. Thesis Project: Interconnecting with the Wood Wide Web

5.1. VIRTUAL + VEGETAL

In my earlier semesters at SJSU, I created interactive multimedia installations that addressed the shift from analogue to digital technology, network politics, surveillance, and online, digital, virtual / offline, physical, real hybridity. Research around those topics has been coupled with my interest in the intertwined relationship between nature and technology. The ever-changing technological landscape is forever changing the natural landscape. We create sophisticated tools that are natural extensions of us out of elements from the environment. To explore the possibility of technology rehabilitating the environment, I had the notion to take a look into the future and ask: based on yet-to-come technobotanic organisms, how could we move towards environmental sustainability?

The main concept of my thesis work is driven by collectively reimagining ways to bridge the divide between the technosphere[29] and the biosphere[30]; I am interested in uncovering connections between them. Through storytelling

[29] Technosphere: the man-made technological system consisting of digital tools
[30] Biosphere: the system of biological organisms and living creatures

and visualizing a holographic garden from the future, I aim to blur the boundary between the virtual and vegetal domains and ultimately bridge the bio-digital divide.[31] My desired outcome with blending the technological and organic is to hybridize living plants and digital technology in order to create a new ontology–one where the invisible vegetal virtuality reveals itself as a visual reality.

Interconnecting with the Wood Wide Web [www.]

Ecological crisis is no longer some kind of future hypothetical. We are already facing climate change, pollution, environmental degradation, and the consequences of overexploitation of natural resources such as fossil fuels. If we do not take action and have active conversations with one another about finding solutions to these global issues, the world will no longer be a habitable place for generations to come. In order to intervene in current attitudes towards sustainability, we must shift our perspective from viewing plants as passive objects. Historically, the vegetal world has been a static backdrop to human endeavors. "More than animals, in popular conceptions, plants are ontologically aligned with "the resource" and "the medium" more than the living."[32] My intention is to provoke thought about environmental issues and to have people reconsider their bond with nature.

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[31] Bio-digital divide: The space between nature and technology where nature is used to create technology, while technology is destroying nature.

[32] Giovanni Aloi, *Botanical Speculations: Plants in Contemporary Art* (Newcastle upon Tyne: Cambridge Scholars Publishing, 2018), xxix.

The Internet is the most commonly used aspect of the technosphere nowadays, and it has had a tremendous impact on mass media communication as well as having a substantial impact on the environment. In his book, *New Dark Age: Technology and the End of the Future*, author James Bridle points out that the very heat generated by the Internet itself is a strong factor in global warming. He writes: "In response to vast increases in data storage and computational capacity in the last decade, the amount of energy used by data centers has doubled every four years, and is expected to triple in the next ten years."[33] Measuring this consumption, a report published in 2016 stated that in the prior year, the world's data centers used 416.2 terawatt hours of electricity, which was significantly higher than the UK's total electricity supply consumption of about 300 terawatt hours. This accounts for about 2% of total greenhouse gas emissions, that gives it the same carbon footprint as the airline industry.[34]

With every post we like, video we stream, and the content we create, we are adding to the already immense carbon footprint. In addition to the Internet contributing to global warming, it is also affecting the natural landscape because the infrastructure of its networks are quite tangible. Due to having

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[33] James Bridle, *New Dark Age: Technology and the End of the Future* (London and Brooklyn, NY: Verso, 2018), 63.

[34] Tom Bawden, "Global warming: Data centres to consume three times as much energy in next decade, experts warn," Independent, January 23, 2016, https://www.independent.co.uk/environment/global-warming-data-centres-to-consume-three-times-as-much-energy-in-next-decade-experts-warn-a6830086.html.

wireless connections and devices, it is often forgotten that network trafficking does not just happen by air. These mass systems function by a labyrinth of cables flowing across the floor of the oceans and underneath our feet, hooked to gigantic data storage units. Our communications are signaled by cellular towers; some are camouflaged and designed to look "natural" and often embedded within the wilderness.

Figure 70. *Cell Tower Trees.* Photo credit: Nick De La Canal

Digital connections are physically rooted in a living ecosystem. It is easy to think of the Internet living only on our screens, but it is important to consider the effects it has on our planet. On the surface of the earth, we are exchanging information and resources by accessing the World Wide Web

rhizome. It goes unnoticed that 80% of trees and plants are engaged in the same activities underground through the Wood Wide Web–rhizomatic networks of Mycorrhizal Fungi that connect individual plants together and transfer water, carbon, nitrogen, and other nutrients and minerals[35]. In other words, it is Earth's natural internet. These similarities invoked a sense of wonder in me, and I am eager to invoke this emotional reaction in others as well. By conducting a series of design fiction and speculative art workshops, I am facilitating a platform for creativity and speculation where people are invited to imagine and "grow" plant life in 2121. The workshops strive to envision a sustainable future through collective design thinking and rapid prototyping. Some key questions that I am seeking to find answers to through these workshops include:

○ How could we move towards environmental sustainability by merging the Wood Wide Web and the World Wide Web?

○ How can we give plants more agency to nurture and restore nature?

○ What storylines can we come up with that embrace technological development yet simultaneously empower the natural world?

○ What kind of technological evolutions and biological mutations would help build mutualistic interactions between the technosphere and the biosphere?

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[35] Manuela Giovannetti et al., "At the Root of the Wood Wide Web," *Plant Signaling & Behavior* 1, no. 1 (2006): pp. 1-5, https://doi.org/10.4161/psb.1.1.2277.

CHAPTER IV. METHODOLOGY

6. Modalities

6.1. WORKSHOPS + COMMUNITY INVOLVEMENT

By giving a platform to social innovation, community members and allies come together to think-outside-of-the-box for developing new absurd ideas around designing botanical futurity. The concept of socially constructed imaginary futures is not the destination; it is the means to collaboratively explore un-reality and to propose alternative scenarios so that we can make our desirable future more probable by having a participatory role in it. *From Storytelling to Story Living* was the title of a series of workshops convened in October 2019 at multiple locations including CADRE and Immersive Storytelling labs at SJSU, as well as Backyard SJ which was a pop-up community garden and event space located in Downtown San Jose.

In the workshops, we used Design Fiction to explore and criticize future scenarios through storytelling and hands-on fabrication. Participants were invited to engage with a fictional narrative describing their virtual plant, which they modeled using Play-Doh as a rapid prototyping exercise. 3D scans of the virtual plants were developed subsequent to the modeling process, leading to the completion of a knowledge bank of potentials–the virtual plants archive. The workshop participants were a diverse group of individuals

involved with the local arts community including students, instructors, community organizers, and creative-minded citizens.

Storytelling

I chose storytelling as a collaborative sociocultural practice in the workshops by virtue of the world-building possibilities it brings. Stories build worlds, and if I alone am writing the story of our botanic future, that world would not be quite possible to realize. I want to build a utopia through collectively visualizing it with ones who yearn for a similar sustainable future. Storytelling is significantly important when it comes to humans sharing their unique perspective of the world, whether that is simply fiction, shared knowledge of the past, or a glimpse of a probable future. World Building Institute Director Alex McDowell explains the core concepts of world building:

> "World Building is founded on three beliefs, namely that storytelling is the most powerful system for the advancement of human capability due to its ability to allow the human imagination to precede the realization of thought; that all stories emerge logically and intuitively from the worlds that create them; and that new technologies powerfully enable us to sculpt the imagination into existence."[36]

There is no doubt that books and movies, particularly in the Science-Fiction

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[36] "About," World Building Institute | The Future of Narrative Media, accessed April 24, 2020, http://worldbuilding.institute/about.

genre, have inspired and helped produce science fact within technology advancements. During the Trek Talks[37] at San Diego Comic Con in 2016, panelists who were astronauts and engineers at NASA explored how the institute's vision of the future mimics the world of Star Trek. What I would like to believe is that the speculative fiction archive emerging from this series would be used as an inspirational resource for scientists, botanists, bioengineers, and individuals who have an active role in modifying the future of plant life. Perhaps, some time not too far from now, with more advanced technology, they can actualize these fictional narratives into fully functioning organisms in real life.

Workshop participants gather to create virtual plants for the future of our world through storytelling. Each virtual plant is designed to have a unique name and narrative that identifies the creation's origins and abilities. The theme I suggested was that their plants would have certain functions that are uncommon in plants today and for them to aid environmental sustainability. The resulting Play-Doh creations–carnivorous or floral, viney or thorny–range from "a flower that purifies areas from power plant radiation to a genetically modified shrub offering an alternative power source"[38] says Johanna Hickle in an article published in Content Magazine about my MFA thesis work.

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[37] StarTrek.com Staff, "Trek Talks: NASA & Star Trek Boldly Go at SDCC," Star Trek, April 13, 2019, accessed April 24, 2020, https://www.startrek.com/article/trek-talks-nasa-star-trek-boldly-go-at-sdcc.
[38] Johanna Hickle, "Immersive Experience Designer, *Leily Khatibi*," Content Magazine, February 2020, 56.

Since there is a sense of positivity when thinking about a sustainable future, most stories had a utopian rather than dystopian tone, aiding both nature and humans. I did not aspire to extensively guide people in what kind of plants they should "grow." Instead, I wanted them to express their maximum level of creativity and allow unfamiliar ideas to unfold and manifest within the short stories they write.[39]

Sculpting Virtual Plants

Generating virtual plants is a method to emphasize on the human-to-nature relationship and to exhibit a symbiotic co-becoming between the biosphere and digital technology. The physicality of the human-to-nature relationship and the fact that being in nature activates many of our senses got me interested in providing a more hands-on modeling process with tactile materials rather than using time consuming digital sculpting software. For this purpose, I chose Play-Doh because of its non-formal quality; anyone at any skill level and age can sculpt with it and even experience a sense of wonder and/or childhood nostalgia during the activity invoked by the touching and Play-Doh smell. What surprised me most was how the various workshop groups had different relationship dynamics in their interactions with one another, from discussing ideas about their virtual plants to exchanging different Play-Doh colors. The resulting models are organically

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[39] See appendix for Virtual Plants & Short Stories Archive on page 104.

shaped, sculpted with incredible detail, and/or multicolored. Working with

Play-Doh was a great material for getting people engaged in making virtual

plant prototypes without them overthinking the sculpting process; although,

it was not very durable. Once the Play-Doh would dry for a few days, it

became extremely fragile. I was not able to keep any of the physical models,

yet the digitized versions currently live on the World Wide Web.

3D Scanning

To 3D scan these models, participants used the Qlone[40] free 3D scanning

mobile application with the designated iPads for the workshops or their own

smartphones. The workshops were about an hour long, and I wanted to use

that time as efficiently as possible. Since I assumed it would be the first time

for many 3D scanning on a mobile device, I chose Qlone because of its soft

learning curve and intuitive user experience, which allowed dedicating more

time to brainstorming ideas, fabricating the prototypes, and fiction writing.

Qlone also has multiple export formats such as STL, OBJ, and FBX that were

common formats for implementing with the HoloLens. These types of

exports require a small fee on Qlone through in-app purchases. The

accessibility of the app, available on both iOS and Android, was also a very

important factor, especially since some of the workshop participants used

their own smartphones.

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[40] https://www.qlone.pro/

3D scanning apps are based on photogrammetry, which is a 3D scanning technology that uses 2D photos to create 3D models. Compared to apps that use extra 3D scanning hardware such as the Kinect, the quality of Qlone scans are lower. As many current mobile devices lack the necessary hardware for a high-quality scan, the digitized objects would lose some details from the original models. Although I enjoyed these perfect imperfections, there was a sense of damage and loss in the digitization process of the prototypes transforming into virtual beings.

To begin scanning, Qlone requires printing an AR mat, which is included on their website and app. This page is a black and white checkered pattern that serves as a tracking marker for the software. The purpose of the mat is to scan only the object placed on top and none of the surrounding environment viewed through the camera lens, which saves the extra step of cleaning up the digitized models. Once the Qlone camera is facing the object centered on the mat, an AR dome(half-sphere shape) with 4 rows and numerous segments is projected over the object that indicates the capture process. By smoothly rotating the mat, the highlighted segments start disappearing one by one until the object is fully "cloned".

6.2. DEPLOYMENT

HoloLens®

For displaying AR content, Microsoft's HoloLens untethered mixed reality headset creates a more natural viewing experience compared to any other handheld mobile device. This HMD can superimpose un-reality as a virtually embodied, 360° panoramic environment. As I had decided to work with the HoloLens, initially I spent a lot of time prototyping with Unity. In addition to displaying the 3D scans of the virtual plants, I also wanted to show visual connections between the real plants, as if they are talking with each other using particle systems; however, when it came to building an executable file for HoloLens, I ran into multiple issues that had to with hardware and software incompatibility. I was using the first generation of the HoloLens and Unity 2019. Based on the documentation and forums on Unity and HoloLens websites, I had to downgrade Windows, Unity, and Visual Studios. I also had to get several SDKs and plug-ins that did not work as expected. After giving this process countless tries, in the last week before the opening of my show, I was still struggling with getting my own AR app built for HoloLens. I finally decided to move forward with Plan B: choosing between existing apps on the Windows Marketplace for displaying holograms.

The 480nm HoloViewer (beta) free app is a general purpose viewer for holograms on HoloLens. The reason I chose this app over the default 3D

Viewer built-in app was because of its *spatial surfaces* feature, which I will

discuss more in depth below. Additionally, 3D Viewer only supports FBX

format,[41] but 480nm HoloViewer supports OBJ and STL as well as FBX. To

move, rotate, and scale models or complete scenes, 480nm HoloViewer uses

"pinch and move" hand gestures that are quite intuitive and similar to ways

we interact with 3D content on flat 2D screens. After loading the virtual

garden and enabling spatial surfaces, I was able to switch in and out

between the UI menu and presentation modes using voice commands.

Figure 71. *480nm HoloViewer's Graphical User Interface*

480nm HoloViewer could load only one object at a time but works with both

still and animated models. Working with animated models was more limited

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[41] Maximum FBX release 2015.1.0, last tested in October 2019.

since the app does not support multiple, simultaneous animations.

To create a hologram garden out of the virtual plants the workshop participants had created, I imported multiple models from Qlone, exported as OBJ format in Maya, then re-exported the entire scene as an FBX file for loading it into 480nm HoloViewer. This virtual garden viewed through the HoloLens headset is meant to create a story living experience from the participants' creations and storytelling.

The spatial tracking nexus merges the real world with the virtual world by creating a triangular mesh mapped onto all visible surfaces. This feature allowed me to visualize the immense network of relationships that links human bodies to nature and their surrounding environment. Whether carbon-based or silicon-based, we are all made out of elements of nature, and our interconnections are inevitable.

Pop-up Greenhouse

The virtual plant holograms live close to the pop-up greenhouse. The Hololens is placed on top of a pedestal inside, and while wearing the headset, viewers could see the holographic plants floating around and get closer by walking amongst them. I wanted the physicality of the greenhouse to have a digital feel to it, almost as if it is a 3D rendering, since it is where

the immersive digital experience begins. I built the structure out of PVC pipes

and transparent iridescent plastic sheets that gradually change colors

depending on the angle of view or the angle of illumination. As I intended to

pop-up with the greenhouse in multiple locations, mostly outdoors, I chose

materials that were lightweight, easy to install, and water resistant–yet also

friendly to my budget.

The first location I installed my greenhouse at was Backyard SJ; a pop-up

community garden with local events in San Jose's Fountain Alley. WeWork

had just started a "future cities" initiative, and Backyard was their first

prototype. I started working there as a production assistant in August 2019,

and I got well connected with the head of Cultural Programming of WeCities,

Josette Melchor–also founder of Gray Area non-profit organization

supporting art and technology for social good in San Francisco. I got her

consent to exhibit part of my thesis work at the patio of Backyard. In addition

to displaying the pop-up greenhouse and virtual garden, I conducted the

second workshop of the *From Storytelling to Story Living* series there as well.

A lot of my ideas for my thesis work around bringing community members

together and prototyping a sustainable future stem from having worked in

that space.

Located on the roof of Duncan Hall, the San Jose State University

Greenhouse facility consists of 3,600 square feet of growing space divided between a shade house, three climate controlled greenhouses, and an outdoor growing area.[42] Once the dates of my exhibition at Backyard SJ were over, I reached out to the Botany department in regards to exhibiting my pop-up greenhouse and virtual garden at their facility, and I was permitted to have them on display at the shade house. In this space, I wanted to have the garden hologram embraced by current foliage and supposedly co-living with each other.

Gallery Exhibition

My thesis show at Gallery 3 was ongoing from October 15-24, 2019. I displayed a collection of the virtual plants my workshop participants had modeled with Play-Doh along with their labels on shelves illuminated by a grow light. The growing of these future plant prototypes was metaphorical but using the light transformed the ambiance of the gallery to a vibrant pink, creating a fairly ethereal aesthetic.

Social engagement was key for dynamizing the interactive aspect of my thesis project. In addition to the workshops I was guiding that took place at a certain time and location, I included a workshop table within the gallery itself where participants could sit to sculpt with Play-Doh on their own time to

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[42] "SJSU Greenhouse," Facebook, accessed April 24, 2020, https://www.facebook.com/pg/sjsugreenhouse/about/.

invite more spectators to participate in the unfinished realization of the work.

I provided pencils and paper with which they could also write a narrative

about their creation. This process was pretty self explanatory as they would

see others' creations along with descriptive labels on the display shelves.

I dedicated one of the gallery walls for the projection of a short video collage.

This video is a mashup of found royalty free stock footage, 3D animated

GIFs, and still images poetically visualizing a type of interconnection that

uses the network of cell towers to connect with virtual plants. In other words,

it illustrates the merging of the World Wide Web and Wood Wide Web

rhizomes as a speculative, experimental short film.

Since this exhibition was simultaneously taking place at two locations, I

wanted the gallery viewers to have a vision of what was happening at the

other venue if they could not make it there. The first week of my show, I

played a recording on loop of the pop-up greenhouse that was installed at

Backyard SJ. The video is a minute long experience of a volunteer wearing

the headset to view the virtual plant holograms. During the second week, as I

had moved the greenhouse, the video recording displayed a similar video but

with a different volunteer at the SJSU Botanical Shade House.

Figure 72. *www. | Map of Gallery 3 to Backyard SJ + work in progress*

Figure 73. *www. | Backyard SJ site location*

Figure 74. *www. | Backyard SJ installation mock-up*

Figure 75. *www. | AR mock-up*

Figure 76. www. | *video still*

Figure 77. *www. | video wall*

Figure 78. *www. | grow shelf*

Figure 79. *www. | grow shelf close up*

Figure 80. *www. | self-directed workshop*
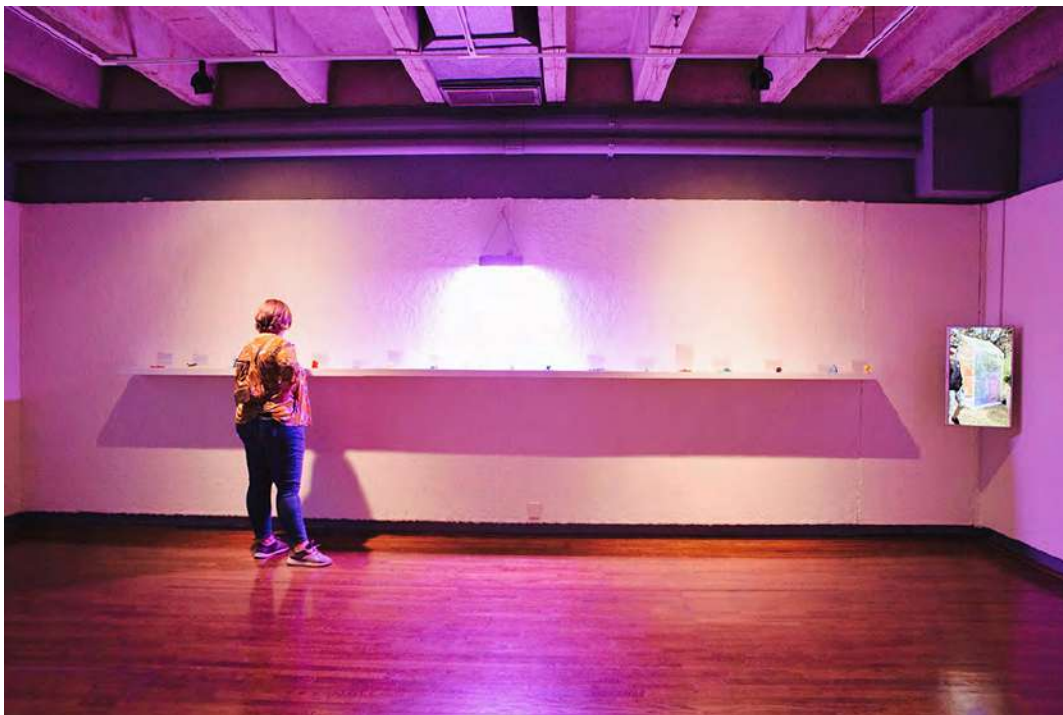
Figure 81. *www. | gallery installation shot*

Figure 82. *www. | pop-up greenhouse recording I*

Figure 83. *www. | pop-up greenhouse recording II*

Figure 84. *www. | Backyard SJ installation shot*

Figure 85. *www. | workshop shot I*

Figure 86. *www. | workshop shot II*
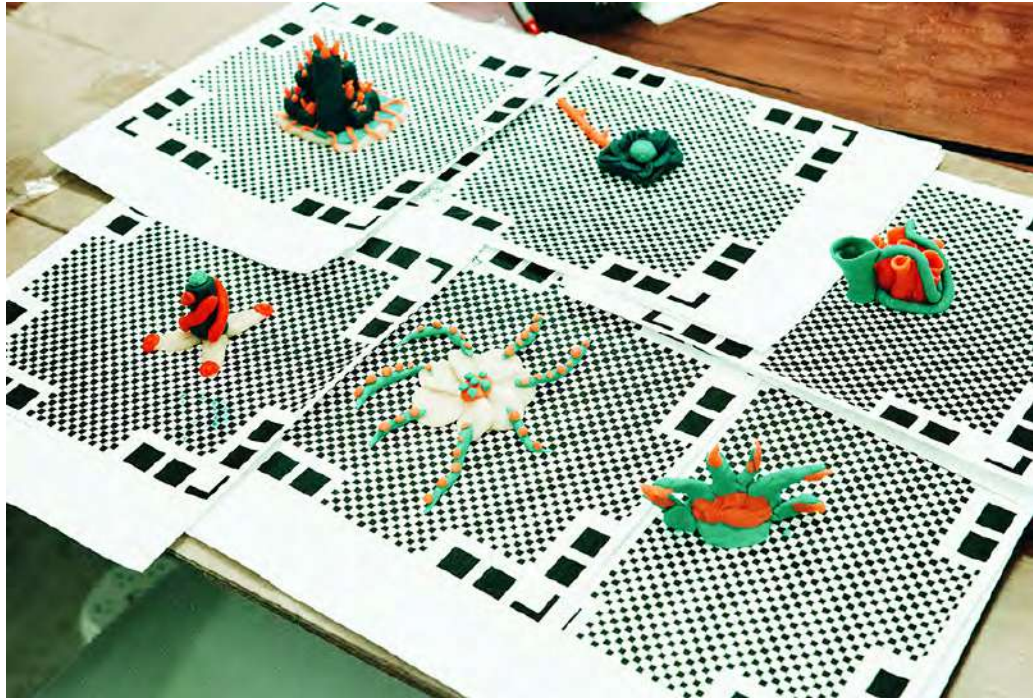
Figure 87. *www. | workshop: play-doh sculptures*

Figure 88. *www. | workshop: play-doh sculpture close up*

Figure 89. *www. | workshop: 3D scanning in progress*
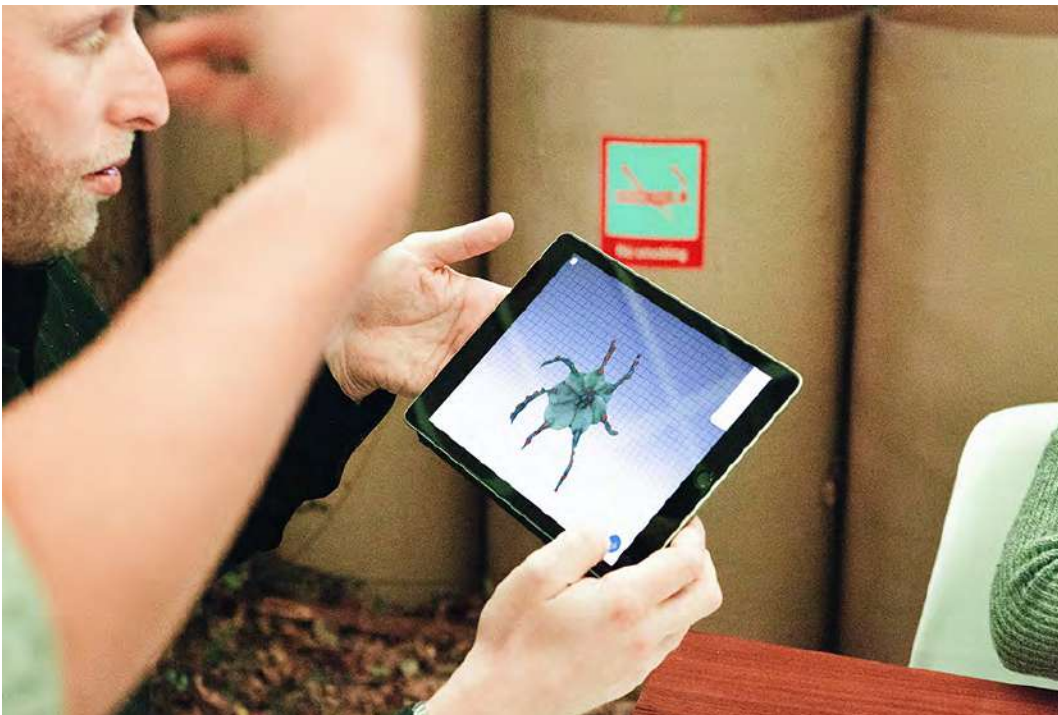
Figure 90. *www. | workshop: 3D scanning complete*

Figure 91. *www. | pop-up greenhouse at SJSU shaded botanical greenhouse I*

Figure 92. *www. | pop-up greenhouse at SJSU shaded botanical greenhouse II*

Figure 93. *www. | virtual garden demonstration at Gallery 3*

Figure 94. *www. | virtual garden demonstration at Backyard SJ*

Figure 95. *www. | AR virtual garden at Backyard SJ I*

Figure 96. *www. | AR virtual garden at Backyard SJ II*

Figure 97. *www. | AR virtual garden at Gallery 3 I*
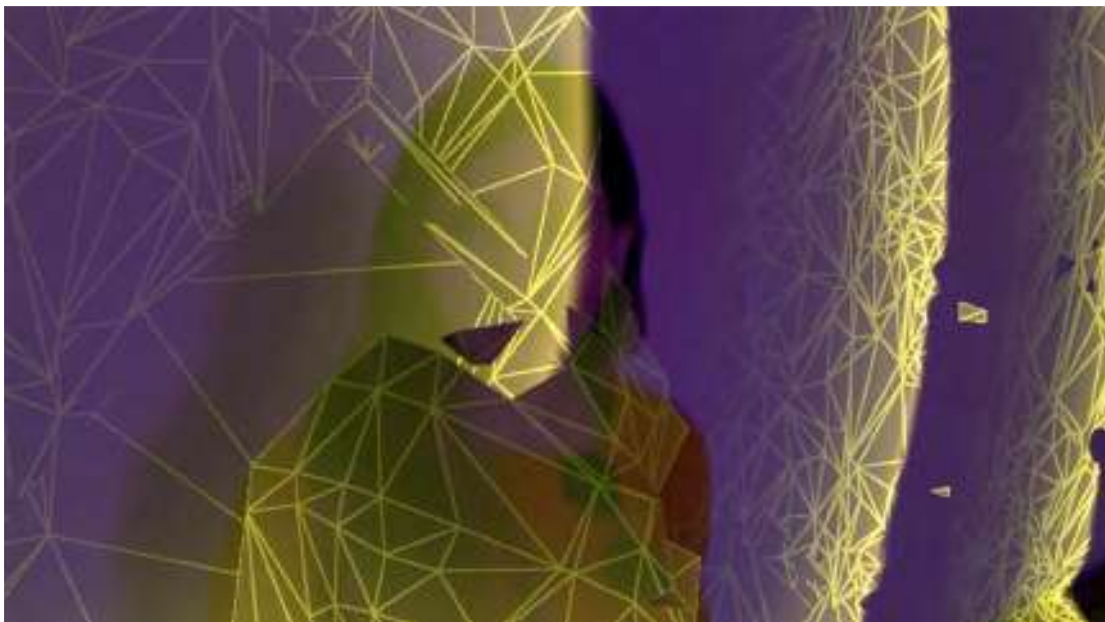
Figure 98. *www. | AR virtual garden at Gallery 3 II*

Conclusion

Growing up, I was in a certain geopolitical and social climate that impacted the way that I interact with communication technologies. Once I moved to the technologically-saturated Bay Area, my art practice was influenced by the digital divide I had experienced prior to my immigration. By evolving alongside the expansion of networked media, most modern people now live hybrid lives: a physical life as we navigate the world with a corporeal body and a digital life that is mediated by technology. My earlier works, created by incorporating both digital and physical materials, address how these systems algorithmically replicate the bias of those who have the advantage of developing them. The computing devices we are attached to at all times, extend our consciousness and senses into the virtual world that is made possible by a physical infrastructure. Wires, cell towers and data centers are embedded within the wilderness–ultimately affecting the environment.

The human race is in a position of power to use nature and its resources at our disposal to build new tools, without taking into account the disrupted state we are leaving the ecosystem in. This anthropocentric bias in advancing technology causes a biological divide that I attempted to bridge through my thesis project, *Interconnecting with the Wood Wide Web*.

I focused on integrating AR with nature in order to form a symbiotic relationship between humans and the biosphere. I did this by exhibiting a virtual garden from 2121 that includes technobotanic plants and stories collectively created by the workshop participants. With the way XR technology is advancing, "we are gradually moving into the next paradigm… augmenting the human also comes to mean augmenting the whole space in which someone lives, or through which they pass."[43] From my point of view, eventually, XR media will be as widespread as the internet. What is created with it now, sets the tone for our collective future. Hence, it is significantly important to be mindful about the imaginaries we step into. As Donna Haraway observes;

> "It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories."[44]

I want to continue building public digital media and XR experiences that tell stories to improve new realities. The purpose of these works will be to use XR as a lens to allow others to reconsider our interconnected relationship with other species and to influence how we treat the environment. I will

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[43] Lev Manovich, "The Poetics of Augmented Space," *Visual Communication* 5, no. 2 (2006): pp. 219-240, https://doi.org/10.1177/1470357206065527.
[44] Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham, NC: Duke University Press, 2016), 12.

further try to bridge the socio-digital divide of XR technologies' accessibility. I

wish to also bridge the bio-digital divide by speculating optimistic

envisionings of the future, which encourages the co-habitation of living and

nonliving things.

List of Figures

Appendix

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1. INTERCONNECTING WITH THE WOOD WIDE WEB VIRTUAL PLANTS & SHORT STORIES ARCHIVE

The stories appear exactly as they were written.

+ HEDERACOTA

"My plant is a splice between an ivy and a fungus to create a plant to absorb the oil from the Earth from oil spills. The plant was created by humans after studying the oil absorbtion properties of certain fungi. Splicing these fungi with ivy genes allowed the plant to absorb oil much faster and grow at a much faster rate. The plant is also able to survive in most temperate climates, but unfortunately struggles in sub-zero climates. The plant is able

to spread its roots underground in order to soak up oil that may have seeped

into the soil and put the ground water at risk. This allows humans to safely

drink the water in contaminated zones as well as help the local plant life

flourish."

+ OHUTUS RING

"The plant I created is called a Ohutus Ring, its purpose is to show that an area is generally safe. It provides shade for fish to hide from predators, it serves as a home for insects and is used in calming products(tea, medication, scents and etc.). The flower grows like wildfire around lakes and is a mix of a Lily Pad and the California Poppy. It floats on top of water and is located in shadey, cool areas. It is connected to all of the other Ohutus Ring flowers around it and never stops being produced. The scent of the flower scares off large predators. It doesn't have a large impact on climate since it is hidden under layers of trees within forests. The flower originated from being cross pollinated on the border of California and Oregon. However, it has not been genetically modified otherwise."

+   CONVORTO BLOSSOM

"Through a series of arduous experimentation and modification of air cleaning plants, scientists were able to nurture the Convorto Blossom into existence. There are two species of the Convorto Blossom, Fragria-Terra and Aqua-Purgare. The Convorto Blossom's function is to cleanse the air and bring down pollution levels. The Fragria-Terra does so by absorbing air pollutants within itself and converting them into the seeds of plants that will produce further oxygen and clean the air. Usually, four out of the seven seeds the Convorto Blossom emits will plant Convorto Blossoms and the other three seeds will plant a single flowering blossom with a fragrant scent. The Aqua-Purgare works nearly the same as the Fragria-Terra except it absorbs ocean pollutants or toxicities in the environment, and must remain in the water to continue its cleansing cycle. The Fragria-Terra remains on the ground since soil is a key part of its reproduction process. The Aqua-Purgare

usually remains on the sea floor but will drift towards more polluted areas of

the sea similar to an Anenome. The Convorto Blossom allows other plants to

flourish by cleaning the air and removing toxicities in the environment."

+   NORTHERN STAR

"My plant is a biologically engineered plant known as the northern star, this plant only blooms in the northern direction. Humans realized that technology would never last as long as plants would. So they decided to create a plant that would help people for years to come. It was designed to be able to grow anywhere, even the desert. It has deep roots that are constantly expanding and absorbing water, so much so that the northern star is able to give out its excess water to other nearby plants in need."

+ PROLLIOYME

"Prollioyme is a fungus type plant that lives in the rainforest. However, it's not the size of regular fungus. It's also not the same material as a fungus. It's body is stronger and tougher to the environment. It's on a scale almost as big as Cecropia tree which grows to about 49 feet normally. It's purpose is to take in large amounts of carbon dioxide and then exerts tons of oxygen into the air; due to its larger mass. It originally originated in the wild but was mutated in a lab to help it grow to a larger scale to function at a greater level. It lives mainly in the rainforest and areas that have similar climates. It grows prospers on the ground. Prollioyme connects and interacts with other plants through it's roots which are not visible from the surface. The roots extend down and below the ground and communicates with other plant roots."

+   GIGICUS FICUS
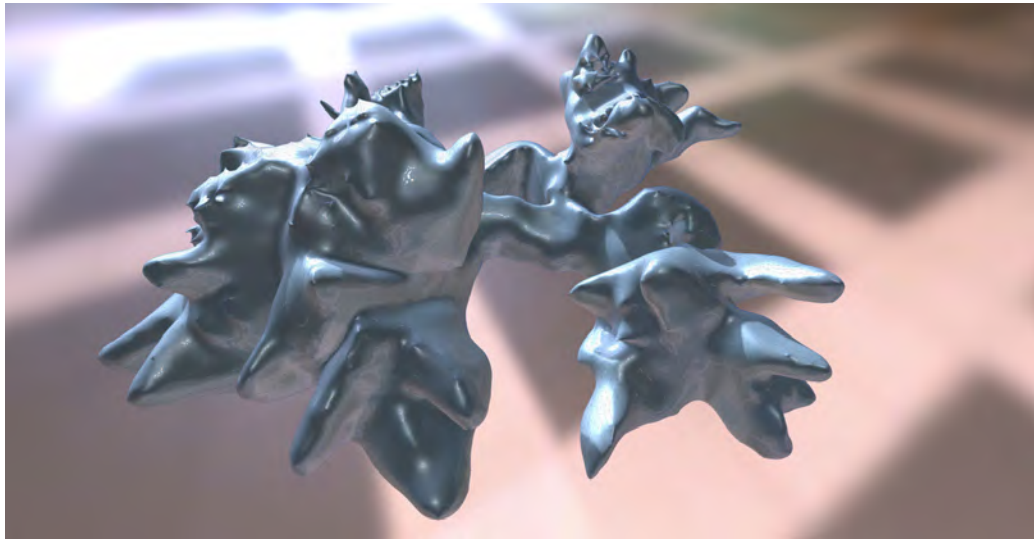
"Gigicus Ficus preys on the nervous systems of all living creatures. It is a mutation of Gigicus Adinus, a genetically modified hallucinogenic plant intended to connect neurons in the brain to enhance overall function. The name Gigicus derives from its ability to make its victims giggle when inhaled. Gigicus Ficus, however, is the deadly extreme of its modified predecessor. Gigicus Ficus floats invisibly through the nervous system and can remain dormant for an indefinite period of time. The activating spore is still unknown. During initial growth, Gigicus Ficus begins attaching itself to the central nervous system of the brain. Victims first experience a sort of heightened euphoria but it very quickly subsides to a dull pain. Gigicus Ficus grows slowly, wrapping around the spinal cord. If left untreated it eventually can cause paralysis. The plant itself does not appear until the body of the host has died."

+ OCTIAID

"This plant has been fully created by the scientists at the Vancouver Lab of Science. This plant is fully robotic and is only found in the forest near Vancouver Canada. This plant can quickly travel from place to place in order to nourish dying plants. Its purpose is to nourish and feed the dying trees in its area, its like the farmer of the forest. This plant also has a protective mechanism to make sure so one is harming the plants in its area and alerts the scientists if someone is cutting them down. It also carries seeds and in its path plants new plants.

This plant travels along the earth floor and feeds many other plants while it travels. The only connectivity to the internet is with its beakons to the scientists."

+   LOTUS FLOWER & LEAVES

"The plant I created is called "lotus flower and leaves", lotus flowers means

Pure and elegant, clean and transcendent in Chinese. The purpose of this

plant is to purify the world since our world is more pollution. The lotus flower

lives in the water that is clear, without any pollution. Our earth is getting more

pollution, if we don't start protecting environment, our human beings will

destroy one day."

+   RAINFOREST DRIP TIP

"The Purpose of the Rainforest Drip Tip is to help raindrops run off quicky to help them avoid fungus and bacteria in the wet, and warm rainforest and it will also help bring fown water down to the rainforest for other plants. This plant belongs to the moss species. This Plant lives in the Rainforest. This plant affects the earth by helping bring water down to the r0ainforest and ust in general helping it grow and expand. The Rainforest Drip Tip is attached to the ground, it's basically its own garden. The Drip Tip has not yet been modified by technology but it has been mutated humans. Humans have noticed that the drip tip brings alot of help to the bottom of the rainforest with water and keping it green. They have noticed that the Drip Tip is one of the sources that helps keep the rainforest wet. The plant is communicating and conecting with plants and world wide by helping expand the rainforest and keeping it in good condition."

+   BLUE SUNFLOWER

"The Blue sunflower grows automatically after a flower or plant is planted.

Even works on trees and grass. The purpose of the Blue Sunflower is that is

detects and indicates someone if the flower or plant is using alot of water or

if it needs more water. The flower itself is small but the roots are long enough

to wrap around the flower or plant that you've planted. This helps detect the

amount of water the flower or plant is receiving. The blue leaves faces up if

too much water is irrigated. If the leaves faces horizontally than the right

amount of water is being irrigated. The leaves faces down if water is needed

for your plants/flowers or even your lawn. When the leaves face horizontally,

it grows seeds for birds to consume which helps improve their life span. The

whole idea for this Blue Sunflower is so that we don't over irrigate our plants,

trees, and our grass and waste a lot of water. The Blue Sunflower has been

tested to the Plant-Biology Research Cener."

+   MAUVOPHYTA MACROALGAE

"This plant Lives on the surface of the Indian Ocean, and was altered in a lab by botanists and chemists to create a plant that would clean toxins and oils that have spilled into and affect our Oceans. Soon it will spread and re-seed and be carried across the whole world. When toxins are found in the ocean, the Mauvophyta Macroalgae "Purple Seaweed" will absorb the toxic chemicals into its pores, and out it releases saltwater and purple mushy algae substance that falls into the lower parts of the ocean, and when eaten by fish, it tastes delicious and is able to reseed through the fishes poop.The plant does not need sunlight to survive but nearly water and toxic chemicals to absorb. This Purple Seaweed floats and is very long, its roots are attatched to large rocks or coral at the bottom of the sea floor and edge, when the plant detaches or experiences drought, the plant will release seeds to repollinte the area. This plant works well with other ocean plants and creates a clean ecosystem for the Earth's oceans. This plant is also helpful in curing human ailments when taken in small doses."

+   DUPLICILILY
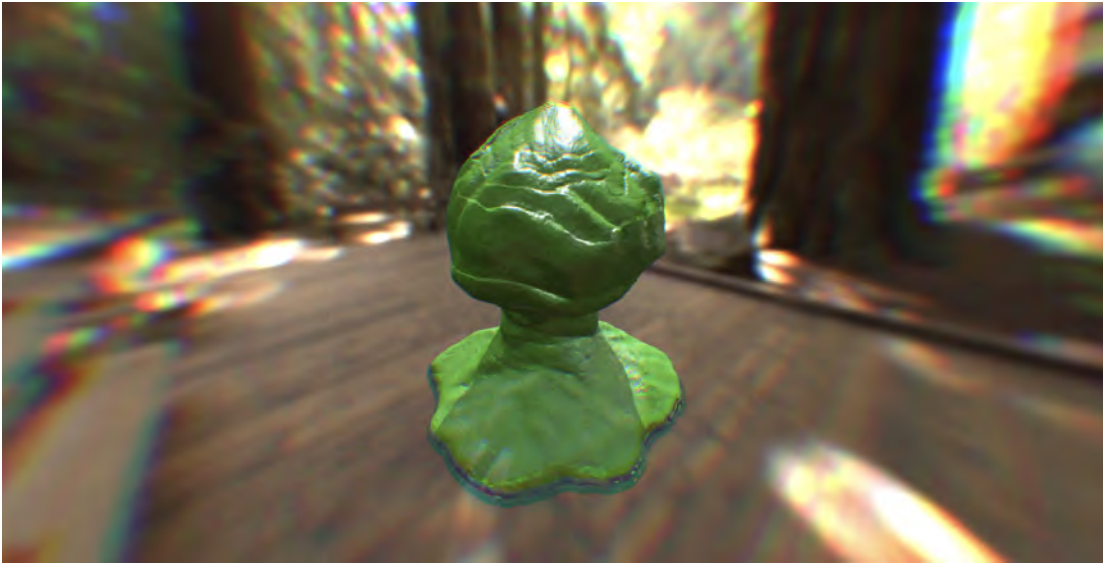
"In an effort to create a new way to increase fruit-bearing plant reproduction,

scientists accidententally created the Duplicilily. Right as the flower was

created, it almost destroyed the lab in which it was created. This is because

within the petals of a Duplicilily, there are millions of tiny spores that have the

ability to duplicate the flower from which they came from within 5 minutes,

using only a small amount of water. Through experimentation, scientists have

found out that the spores are capable of latching onto anything that creates

energy, whether it be animals or other plants, or even sources of electricity

like power lines or computers. Due to these extremely dangerous tendencies,

the Duplicilily is currently locked away in a lab to be reproduced, being

carefully monitored so that its population stays in check."

+ FU

"This plant I create is named "Fu" means "Negative" in Chinese. The purpose

of this plant is to absorb the negative energy from People who is feeling

depress and unhappy.This plant is created by the planet "Unhappy", Citizens

in the "Unhappy" planet is trap in a upset feeling in their whole life and some

of them wants to change the moods of themselves. So, the scientists from

"Unhappy" invented a plant that can absorb the negative energy from people

and they places "Fu" on the side of the road, so people that pass by it can

be take away the negative energies and be postive. "Fu" can live in any

climate, because its main purpose is to serve people that has negative

energy. The "Unhappy" Planet saw that Earth has lots of negative energies

around it, so they decided to share this technology with Earth. They hope

that someday Earth can become a planet like them, that is fill with

happiness, not hate and violence."

+   CAELUM LILY

"The Caelum Lily is an extremely large flower resembling a Calla Lily. Like

any other flower, it generates pollen and nectar, but to a more considerable

degree considering its size. The most notable feature of the Caelum Lily is its

extremely high carbon dioxide intake compared to other plants, which allows

it to generate much more oxygen that multiple trees combined. The Caleum

Lily was developed by the XXXXX Biological Research Facility of XXXXXXX as

a way to control and reverse the damage caused by the heavy Carbon

Dioxide emissions left by human society. An unintentional use of the Caelum

Lily is that if can also be used to terraform planets with large hamounts of

Carbon Dioxide if plants are sustainable at that point. The Caelum Lily grows

by planting itself or being planted by a firm source that it can grow off of line

a vine, then as it grows, wraps around the firm source. The sources can

include trees, poles, large rocks, and garden fences, along with many

others."

+   TRAPPY

"The plant I chose is called a Pitcher plant, I named it Trappy. The purpose of this plant is to trap and kill bad things because it's a carnivorous plant. This plant can make the world a better place by eliminating all the bad energy from people and trapping them as a punishment in a jail cell. Inside the plant has a deep cavity where it's filled with digestive liquid so it can dissolve things. Any bad energy that enters the plant, it will distroy it so it will never appear again."

+ PRISMGLOW

"The plant I have created is called a PrismGlow. The plant itself is made to

grow crystals that can illuminate. This plant has been made and genetically

modified by scientists to act as a new power source instead of the sources

we used today. Instead of using lightbulbs and other man made harmful

sources, we use these crystals to act as a new source of light. With these we

can greatly reduce the amount of light polution on our planet. The crystals

from the plant only last for so long, but once used, they can be replanted to

grow more PrismGlows. At first they were only accessable in labs, but now

can be grown in your own homes."

+   EAGIANNA
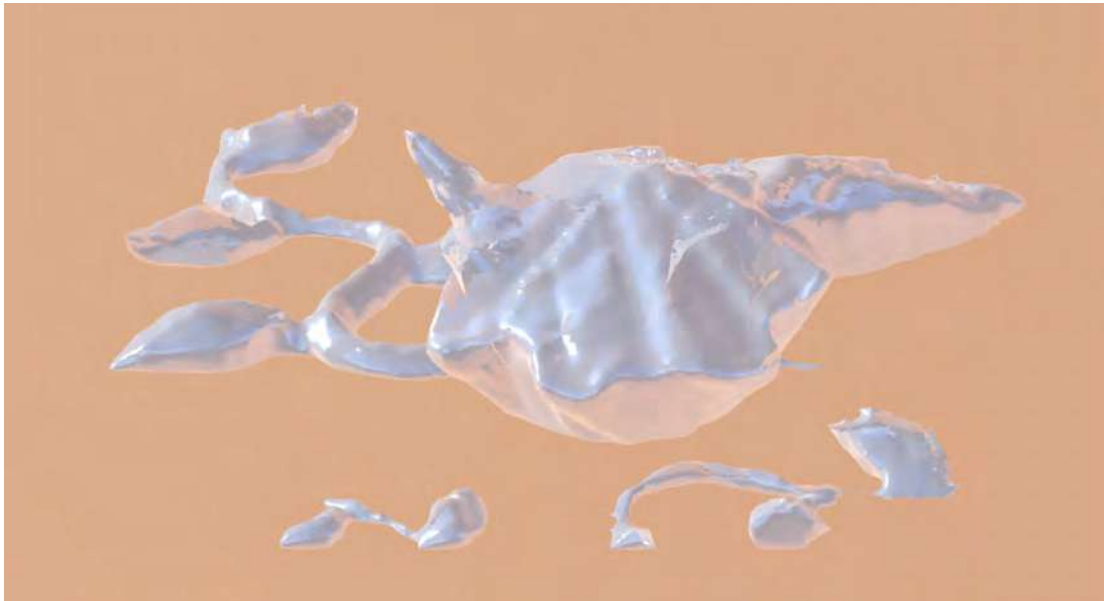
"This plant is called Eagianna, which is a mutated pitcher plant that was

made in ABC Science Lab of XYZ University. It is a new type of pitcher plant

that has prey-trapping mechanism featuring a deep cavity filled with

digestive liquid. Eagianna's food are mostly small bugs such as flies or bees.

Most carnivorous plants exist in places that lack of nutrients, however, this

plant often grows on fertile lands. Therefore, by feeding itself with the

nutritions from both the land and the victims, Eagiannas usually produce

many vines with big leaves and a giant pretty flower called Gianna. Its white

flower blooms with a very nice scent to attract the bugs, but the wall inside

the flower is very slippery, enough for the bug to fall into the bottom of the

flower - where the digestive liquid is. The acid inside the liquid will slowly

absorb the victim, and turn it into nutrients for the plant. Overall, the acid in

the plant is not dangerous enough to affect human, but it has a very

nice-looking flower with a pleasant scent, so scientists are looking for a way

to use it as a natural solution for preventing diseases such as malaria and

dengue that exist in countries with many deadly mosquitos."

2.   SOFTWAR[E] MANIFESTO

State hegemony over accessing information has mutated people enduring geographical predetermination as an object of surveillance. Officials are trying to assert more control across all media and actively purify content through communication bans. In these totalitarian societies, using censorship circumvention tools such as VPNs and proxies allow gaining access to everyday information; however, these processes are not enough to bypass the underdeveloped internet and it's trickling speeds. Suppression is meticulously implemented in more ways than just engaging with the throttled internet, and stranding people in the perimeters of media isolation. There are only about half a dozen state-run TV channels—all in the direction of downstream propagation. Despite crackdown, the so-called 'depraving' satellite TV tends to be the predominant media. Orbital/terrestrial jamming and confiscation of satellite dishes has become a common practice for autocracies wishing to limit unfavorable coverage. Content restrictions toward cyber sovereignty are tightening to a degree such that connection to the outside world is deteriorating.

Crossing between parallel realities, communication systems are being augmented, and a global village is born. As a consequence of the age of Digital Imperialism, a westernized culture has been imposed; reinforcing capitalism as a universal quality. Ubiquitous algorithms and mathematical

models curate and aid decision-making. The ability to collect and analyze massive amounts of structured and unstructured data affects large swaths of people through micro-targeting operations. The information overflow in social networking platforms provides new forms of civic engagement interweaving big data with manipulation strategies. Bias seeps into data that machine learning uses to train on, influencing the predictions it makes. Lack of transparency around these abstract formulas raises issues of dehumanization and emotional excision.

+ INTERSECTION +

Reflecting on the rise and fall of physical barriers dividing contradictory ideologies, these barriers have now metamorphosed into virtual ones to prevent the information perceived. Raw data is buried beneath massive layers of content obstruction. Achieving net neutrality and original, creator-specific digital communications requires liquefying these layers through revolutionary software movements (Softwar[e]). This phenomenon traces the evolution of the internet from a novel playground for social experimentation to something that now more closely resembles a battlefield. Throughout major clashes with cyberspace gatekeepers, people have broken holes in the existing, inhibiting systems—indiscernible from portals for access to pure, unfiltered content.

Softwar[e] looks poetically at the authoritarian control of information for people enduring geographical predetermination or exploitation by the opaque, algorithm-driven society. Built as a device of ubiquity, restricted access to information of the internet perpetuates inequality; an institutional perpetuation of hegemonic cultural misunderstanding. Through processes of purification and filtering, systems of control are imposed on the information that is made accessible. These interventions into the natural and localized organic growth of networks facilitating communication, define the confrontational edge between imperialization and dictatorship. Softwar[e[addresses the ways we engage and access information. It is a call to action for the development of alternative methods to circumvent the immense global influence and power.

Call-to-Action

1. We believe raising awareness reduces and constrains the misbehavior of despots, and as a result democracy flourishes.

2. We strive for bringing positive social change to the strange and contradictory digital infrastructure.

3. We encourage unity among individuals and resistance against institutional, decision-making algorithms.

4. We insist on the return of a chronological, no-ad stream of posts and an end to smart software governing our existing social feed timeline.

5. We call for vigilance against polarization entrepreneurs causing suspicion and discord among people.

6. We seek to abolish the sophisticated censorship apparatus that enables officials to hedge their monopoly on information.

7. We demand countering Softwar[e] as the main venture to unobstruct concealed and false information.

8. We want individuals confronting Softwar[e] to recognize their loopholes for gaining access to information.

9. We yearn to establish a virtual paramilitary unit to combat social isolation and alienation.

10. We wage cyber warfare against online and offline fragmentation.

3.   I.R.L. LOVE LETTER

My Dearest,

It's been a while since your passing and I still miss you ever so much. A new update is being released soon and I'm not sure if I'll make it. My heart is heavy without you and I blame cellular network technology for your obsolescence; I fear that my time will soon meet a similar end.

I remember well how we started sharing GIFs in 1987. Some of them have now gone viral, others simply lost to time. It seems we're all destined for the discard pile when the next shiny development comes around; though, I'll remember fondly our time in the spotlight.

The dependence on physical media is decreasing with each passing day. Walkmans were replaced by Spotify, while VHS cassettes gave way to Netflix. Back then, you weren't appreciated by many due to your limited capacity and now your outmoded data is disembodied into "clouds". This human society is evolving at a pace never before seen in this physical world; soon they'll transition from reality to a virtual existence, and live inside a machine. They have abandoned and replaced most of our peripherals with wireless gadgets, and all-in-one devices. What was not adaptable and lacked the versatility to weather this ever-changing landscape is now dead.

But you, my love, will always have a retro kind of beauty. An everlasting

"real" quality that the world will be remiss in abandoning for the "new". I will

hold onto the memories of your sweet cacophony of beeps, buzzes, whirrs,

and scratches attempting for a dial-up connection and it will forever play on

repeat in my Windows Media Player. If this is my last message to you, know

that I treasured what we had, and we'll always have Paris.

Sending you all of my digital love,

Current Tech

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