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University of California
Santa Cruz

Classification Cube

An intimate interaction with Machine-Learning Identity Classifiers

Master of Fine-Arts
In
Digital Arts and New Media

By
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June 2019

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Abstract

Classification Cube

An intimate interaction with Machine-Learning Identity Classifiers

By Avital Meshi

Classification Cube is an art installation that invites participants to become more familiar with a machine-learning classification system. Inside an immersive space which is designed to seem private and neutral, participants' bodies become subjected to a classification process which detects their faces and estimates their age, gender, emotion and action. Viewers are invited to compare their own classification with that of a diverse group of animated figures. This comparison raises an awareness regarding the effectiveness of machine interpretation. The rapid update of the outcomes of the process suggests that movement inside the space may alter the classification outcome. Participants are encouraged to become engaged in a performative behavior and try to affect the way the system 'sees' them as objects of information. Utilizing a performative behavior inside the space of the *Classification Cube* presents machine-learning technology as a futuristic platform for a radical identity transformation.

*This work is dedicated to my love Ofer Meshi,
and to my adorable kids who are always very patient with their student mom.*

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“All the world’s a stage, And all the men and women merely players”

William Shakespeare



Figure 1: *Classification Cube* an immersive installation in which viewers can intimately interact with a Machine-Learning classification system

Introduction

Machine learning (ML) algorithms are becoming increasingly prevalent in our environment. They are embedded in products and services we use on a daily basis such as financial platforms, transportation services, commercial marketing, online customer services, personal

assistants, healthcare, social media applications and more¹. These systems rely on our personal information, searching for patterns and regularities in it, and producing corresponding outcomes in return. Most often we are not aware of this process, we do not know when these algorithms 'look' at us and how they 'see' us. Yet the outcomes they produce have the potential to seriously impact our lives. For instance, they may assist in decisions such as granting or denying loans, determining who is hired and who is fired, and even suggesting how long someone should stay in prison^{2,3,4}. At the same time, recent studies show that some ML algorithms reflect social disparities and that human-like biases are encoded in them. Moreover, datasets which are used for the training of these algorithms may often fail to include underrepresented groups and historically marginalized communities^{5,6,7}. Therefore, it is increasingly important that individuals become familiar with these systems and see for themselves how their own bodies are being detected and classified through them.

Classification Cube is an immersive art installation which invites viewers to intimately interact with an ML classification system. Inside a seemingly private space within the context of an art gallery, viewers are confronted with two screens, arranged side-by-side. One screen presents a video of a diverse group of animated figures representing realistic yet unusual combinations of body features and movements. On the other screen, viewers see a video feed of their own

¹ Das, Sumit, et al. "Applications of artificial intelligence in machine learning: review and prospect." *International Journal of Computer Applications* 115.9 (2015).

² Angwin, Julia, et al. "Machine bias." *ProPublica*, May 23 (2016).

³ Citron, Danielle Keats, and Frank Pasquale. "The scored society: Due process for automated predictions." *Wash. L. Rev.* 89 (2014): 1.

⁴ O'neil, Cathy. *Weapons of math destruction: How big data increases inequality and threatens democracy*. Broadway Books, 2016.

⁵ Bolukbasi, Tolga, et al. "Man is to computer programmer as woman is to homemaker? debiasing word embeddings." *Advances in neural information processing systems*. 2016.

⁶ Buolamwini, Joy, and Timnit Gebru. "Gender shades: Intersectional accuracy disparities in commercial gender classification." *Conference on Fairness, Accountability and Transparency*. 2018.

⁷ Caliskan, Aylin, Joanna J. Bryson, and Arvind Narayanan. "Semantics derived automatically from language corpora contain human-like biases." *Science* 356.6334 (2017): 183-186.

bodies given by a live webcam which is situated inside the space. Images on both screens are subjected to the analysis of an ML classification system whose outcomes rapidly update and are displayed on the screen. This analysis includes a face detection process and estimations regarding age, gender, emotion and action of the subjected bodies. The immediate capture and analysis of viewers' bodies, along with the comparison to other bodies inside the space, transforms *Classification Cube* into a platform for exploration. Viewers become aware that the system uses their bodies as its input and produces corresponding classifications as its output. The comparison between one's own body and the bodies of others suggests how effective or ineffective these classifications may be. The rapid shifting from one classification to another invites viewers to display different movements inside the space and to test if by doing so they can modulate the outcome of their classification: Will the system classify me as younger if I stand straight? Will it classify me as happy if I smile? Viewers can also mimic the behaviors of the animated figures and investigate whether the system provides a classification similar to theirs or a different one.

Classification Cube reveals information which is usually kept obscure. We become aware of our own entanglement with the system and the coupling between the information and our bodies. This understanding opens a broader discussion regarding the way we are seen through the lens of this technology, outside the context of this art installation. Assuming these algorithms will continue to develop and eventually dominate the entire public domain, our behaviors will be constantly detected, classified, and stored, and our records will be determined accordingly⁸. Therefore, it is important to become more familiar with these systems and figure out how they see us. As we understand that our body and behavior serve as their input, we can potentially learn that we have the power to modulate them. Becoming engaged in a performative behavior which changes the outcomes of our classifications

⁸ Ibid., 4.

suggests an opportunity to control these systems and manifest our identities as we wish to present them. This understanding identifies ML technologies with other technologies for identity transformation such as biotechnology or virtual-reality. In these platforms people are able to see themselves as they wish to be seen and not necessarily correspond with the way identity is assigned to them by culture and society. In this sense *Classification Cube* can be regarded as a futuristic practice space in which we can shape and accomplish a performance that may lead to a radical identity transformation outside the cube and in the public domain.

Implementation Details

Classification Cube is a cubical construction (10'x10'x10'), wrapped with an opaque, white spandex fabric and lit with LED light strips. Its entrance is designated by a draped fabric with a narrow opening, designed to encourage viewers to step in but to also suggest the intimate and private nature of this environment (**Figure 1**). A black and white grid floor is designed to simulate a digital 3D modeling environment upon which virtual bodies are graphically designed. Inside the space there are two side-by-side, vertically mounted 75" monitors which show the outcomes of an ML classification system. One monitor is connected to a small media player and shows a looping video of animated figures, and the other monitor is connected to a small webcam and an Apple Mac Mini computer which analyzes a live video feed of the interior of the cube.

The algorithms used in the *Classification Cube* installation are 'off-the-shelf', pre-trained models derived from computer vision algorithms developed by the open source community and made freely available on GitHub code repositories. Although they are developed and maintained by industry and/or academic research labs, they are widely used in a variety of surveillance and classification systems. These include a face detector which was pre-trained

by the Wider Face dataset, which creates a green rectangle, or 'bounding box', around any automatically detected faces⁹. An age and gender estimation model which was trained by the IMDB-WIKI dataset is also included in the installation, and it is able to estimate an age from 0 to 100 years old and classify a user using 'Female' or 'Male' gender labels, along with the confidence of its classification^{10, 11}. They also include an emotion recognition model which was trained by FEREC-2013 dataset, and which was used successfully in Kaggle's Facial Expression Recognition competition. This model is able to estimate one of seven emotions according to recognized facial expressions, which include: Angry, Sad, Disgust, Scared, Happy, Surprised and Neutral¹². Lastly, an action recognition model is included that was pre-trained by the Kinetic Human Action Video Dataset. This model recognizes bodily actions and classifies them according to a list of 400 distinct human action classes^{13, 14}. Estimation of age, gender, emotion and action are all clearly displayed using four lines of red text, showing the estimated labels and the confidence level for this estimation. All of the models in this system were assembled into a single codebase which provides both the analysis outcomes while processing the webcam's live feed of user motion in real time, and also produces analyzed video files for previously captured videos, as in the case of the video of the animated figures (**Figure 2**).

The animated figures which are represented on one of the screens inside the cube were created using Adobe Fuze CC and Mixamo online service (**Figure 3**). In order to create a diverse group of avatars, all body elements, clothes, textures, animations and other elements

⁹ <https://github.com/yeephycho/tensorflow-face-detection>

¹⁰ Rothe, Rasmus, Radu Timofte, and Luc Van Gool. "Deep expectation of real and apparent age from a single image without facial landmarks." *International Journal of Computer Vision* 126.2-4 (2018): 144-157.

¹¹ <https://github.com/omar178/Emotion-recognition>

¹² <https://github.com/omar178/Emotion-recognition>

¹³ Carreira, Joao, and Andrew Zisserman. "Quo vadis, action recognition? a new model and the kinetics dataset." *proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*. 2017.

¹⁴ <https://github.com/deepmind/kinetics-i3d>

offered by the platforms were numbered in advance. Using a random number generator, numbers were selected and figures were assembled according to them. Color choices for skins and outfits were chosen in a similar fashion by randomizing RGB values with the same random number generator. The goal behind this randomization was to challenge the ML classification system with diverse and unusual looking bodies. This diversity is also presented to viewers so that they can compare the classification of their own bodies to that of many different other bodies (**Figure 4**). Unfortunately, this diversity cannot be claimed to be comprehensive, as it produces a limited selection of elements that are offered by the character creation platform, which excludes certain body types, such as those with functional diversity or non-binary gender types. Additionally, it should be noted that the classification system itself offers a limited set of labels, which ignores gender complexities, emotional diversity, and a wide range of possible human behaviors and actions.



Figure 2: An ML classification of a diverse group of animated figures are presented inside the cube and allows viewers to compare their own classification with that of other bodies.

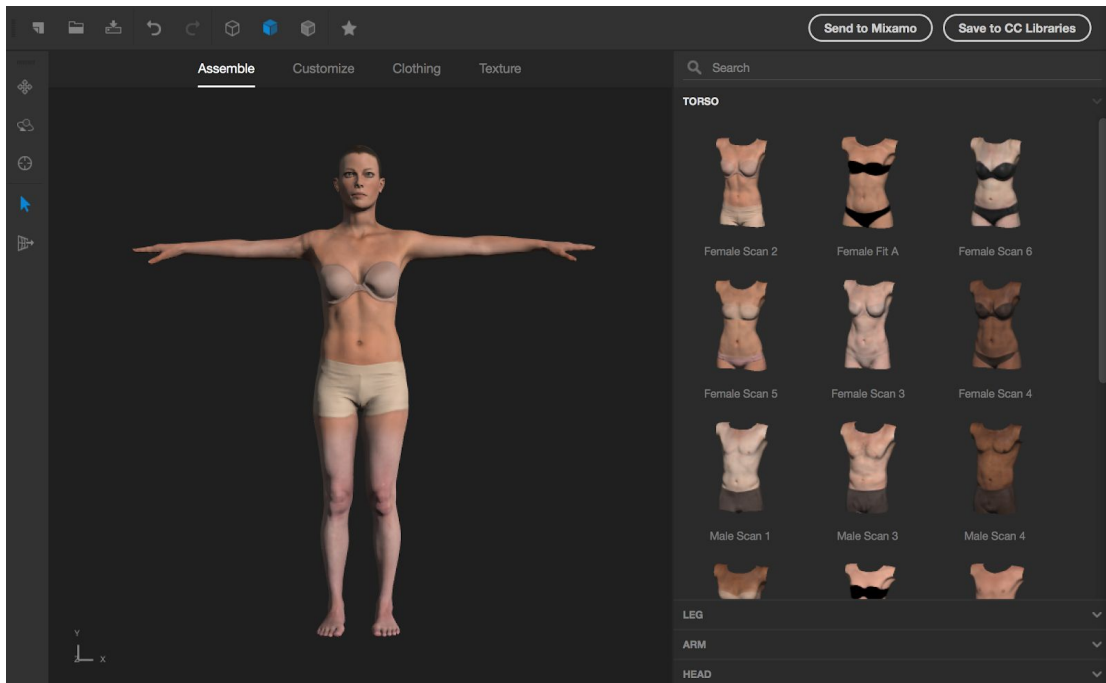


Figure 3: Body elements offered by Adobe FUZE CC are randomly selected for the creation of a diverse group of animated figures.



Figure 4: Viewers inside the cube are able to compare their own classification with those of the animated figures. Becoming engaged in performative behavior allows viewers to influence the outcome of their classification.

Audience Reception

Classification Cube was shown at the DANM MFA exhibition in Spring 2019 which was open for a two-and-a-half week period. Throughout this time the exhibition hosted critique meetings and tours for students enrolled in university courses on art, art history, media studies, computational media, and computer science. Since a primary goal of the project was to ensure a safe space in which users felt free to interact with the classification system without being surveilled, documented, or analyzed, there was no formal evaluation of user behavior within the installation. Nevertheless, the piece generated much discussion about socio-technical systems and data ethics, and many participants were eager to share their thoughts about their experience with *Classification Cube* after exiting the installation, expressing a range of different reactions. For example, one viewer noted that her gender classification was always 'wrong', and said: "I tried to manifest some typical feminine gestures but it did not help, maybe I should have applied makeup to convince it that I'm a female". Similar responses were common among female viewers who claimed that the system classified them many times as males. On the other hand, gender classification among male viewers seemed to be working as expected, especially for those with facial hair. For example, a group of three male viewers laughed about the confidence level of the male classification, noting that for two of them, who had no facial hair, the confidence level of the male classification was about 60-70 percent but for their friend, who did have facial hair, it was above 90 percent. One of them joked about it and said: "he is more manly than we are". One viewer, who identified as non-binary, commented on the fact that the system only offers a reductionist view on gender complexities, and observed that ML systems must not have the capacity to classify them accurately. In regards to age classification, viewers reported that the system classified their age as either younger than they are (mostly said with a smile) or older than they are (mostly said with a frown). A viewer who was eating a slice of pizza inside the

space said that the system classified her as 'playing the harmonica'. Lastly, another viewer, and a rather happy one, reported that the emotion classifier labeled her as 'angry'. She said in response: "it made me angry to see that I was classified as 'angry' so maybe this system is about predictive classifications".

Feedback from artists, art historians, and game studies faculty, was given through an iterative design process that was informed by critical discussions about the role of art in the information age. Scholarly critique of the project noted that an innovation of the project is manifested through the invitation to form a direct playful interaction between the viewer and the machine. The simple and immediate nature of this interaction turns the installation into an accessible, open ended platform for exploration. The white, well lit structure of the cube corresponds with the traditional 'white cube' layout of the art gallery, mimicking and challenging its ideology; It removes participants from traditional contexts and places them inside a 'non-space', an artificial, clean, simulacrum where they can devote their attention to the study and examination of an aesthetic. Other comments compared the space to that of virtual caves, photo-booths and theater stages. The side-by-side comparison between the viewer's own body and that of the animated figures was noted as one of the most powerful elements of the installation, by explicitly showing viewers how their bodies are prone to be classified (and misclassified) similarly to many other bodies. This notion emphasizes the awareness that our entanglement with such systems is not just a personal one, rather it is relevant to the diverse range of our society as a whole. Lastly, ideas of identity transformation were discussed in relation to other technologies of identity transformations such as biotechnology and virtual reality. This concept was examined in relation to 'real-life' implications of ML-based identity classification, and the applicability of performative behaviors that might alter some of these implications was seen as a powerful concept and

demonstrates that interactive data artworks can play an important role in contemporary society. This idea broadens the discussion to focus on future developments of such systems and the way they shape our behavior and our culture.

Related Work

Classification Cube invites viewers to interact with ML-based systems and examine the coupling between the physical body and the information produced by the system. A similar invitation is demonstrated in *Zoom Pavilion* made by artists Rafael Lozano-Hemmer and Krzysztof Wodiczko (2015). The interactive installation utilizes 12 computerized surveillance cameras which use face recognition algorithms to detect the presence of participants and record their spatial relationship within the exhibition space. The outcome of this system is projected on the walls of the space, showing zooming sequences which amplify the images of some participants and disorient the entire image to focus on one person or another. In the context of this artwork, viewers become subjected to surveillance systems, which are usually used for detection and control. The installation emphasizes the temporal construction of connection between the space and the people inside it¹⁵. Another demonstration in which viewers are able to better understand the coupling between the body and the information is presented in the artwork *Sight Machine* made by artist Trevor Paglen in collaboration with the Kronos Quartet (2018). In this large scale multimedia installation, musicians playing music on the stage are subjected to the analysis of an algorithmic system. The outcome of this analysis, projected on a screen above the players, reveals information about them to the audience who is watching the show. This information includes detection of their faces, movements of their bodies and details regarding their gender, age and emotion. Occasionally

¹⁵ Lozano-Hemmer, Rafael and Wodiczko, Krzysztof. *Zoom Pavilion* (2015).

an image showing face detection of the audience itself reminds viewers that they are subjected to the same analysis as well¹⁶.

A more private exploration of ML classification systems is demonstrated in another work by Trevor Paglen titled *Machine Readable Hito* (2017). In this photographic collage, Paglen shows hundreds of portraits of artist Hito Steyerl, in each one she is seen making a different facial expression along with a caption of an ML classification stating her age, gender and emotion. In this artwork, Steyerl carries out an intentional performative behavior which changes the outcome of her classifications¹⁷. In the piece *Faking A Smile is Easier Than Explaining Why I'm Sad* made by artist Ruth Patir (2019) viewers themselves are invited to carry out a similar performance. In this project, the artist invites participants to observe a 3D avatar of her naked body. While doing so, a real time ML classification system detects the participant's emotions and in accordance to specific emotions the system changes the avatar's dance style: A happy viewer will make the avatar belly dance, a surprised viewer will make it dance ballet and an angry viewer will make the avatar perform spanking movements. Patir's work, while revealing subject relations between the body and the machine, also examines our ability to control these systems and change their outcomes by performing different behaviors¹⁸.

While artists understand the problematic nature of these systems and their potential to produce oppressive visibility, a few artworks suggest ways of becoming invisible. Artist Hito Steyerl, in *How Not To Be Seen. A Fucking Didactic Educational .mov File* (2013) presents five 'lessons' in invisibility. Some of her suggested solutions are to live in a gated community,

¹⁶ Paglen, Trevor. *Sight Machine* (2018).

¹⁷ Paglen, Trevor. *Machine readable Hito* (2017).

¹⁸ Patir, Ruth. *Faking A Smile is Easier Than Explaining Why I'm Sad* (2019).

to wear an invisibility cloak or to simply be a female over 50¹⁹. Artist Leo Selvaggio's *URME, Personal Surveillance Identity Prosthetic* (2013) offers viewers a way to free themselves from any threat of surveillance by wearing a 3D printed mask of his own face²⁰. Similarly, artist Zach Blas in his project *Face Weaponizing Suite* (2011-14), protests against face detection based surveillance by offering masks which cannot be detected as human faces²¹. Artist Adam Harvey, develops a similar idea in his *CV Dazzle* project (2010-2017) by coming up with fashionable looks which can camouflage people from face detection²². While it is unclear whether or not these offered solutions can lead to actual invisibility, it is important to note that in some places wearing masks in the public domain is considered illegal and also the attempt to become invisible can be considered as suspicious behavior in and of itself; recent news reports share incidents of people arrested while covering their faces in order to avoid face detection systems. Additionally, detection of disguised faces has already become a technological challenge, studied by several research groups who are trying to overcome any kind of disguising elements which might interfere with face detection^{23, 24}.

Artists presenting work which calls us to avoid oppressive visibility manifest their critique against the use of ML based systems for surveillance and control. Scholar Shoshana Amielle-Magnet expands on this understanding by saying that when biometric systems fail they reveal a violent, racist, homophobic, classist and sexist structure that we cannot run

¹⁹ Steyerl, Hito. *How Not To Be Seen. A Fucking Didactic Educational .mov File* (2013).

²⁰ Selvaggio, Leo. *URME, Personal Surveillance Identity Prosthetic* (2013).

²¹ Blas, Zach. *Face Weaponizing Suite* (2011-14).

²² Harvey, Adam. *CV Dazzle* (2010-2017).

²³ Kushwaha, Vineet, et al. "Disguised faces in the wild." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*. 2018.

²⁴ Singh, Amarjot, et al. "Disguised face identification (DFI) with facial keypoints using spatial fusion convolutional network." *Proceedings of the IEEE International Conference on Computer Vision*. 2017.

away from. According to her, these systems place us inside a 'cage of information'²⁵. This specific idea is further demonstrated in the project *Face Cages* made by Zach Blas (2013-16) in which he fabricated 3D metal masks according to biometric diagrams of human faces generated by facial recognition systems. These masks, which are extremely painful to wear, are presented in an endurance performances of four queer artists, to emphasize the violent imposing of these diagrams on human faces, to evoke a resonance with torture devices and to communicate the repeated failure to recognize people, and especially those of people from minority groups and historically disadvantageous communities²⁶.

Conceptual Overview

1. Liberating ourselves from the cage

While considering that ML systems do, in a sense, lock us inside a cage of information, it is also important to ask how do we liberate ourselves from this cage? In the manifesto for cyborgs, Donna Haraway tells us that "liberation rests on the construction of consciousness, the imaginative apprehension of oppression, and so of possibility"; She explains that new technologies turn organisms into objects of knowledge, they recraft our bodies, they 'techno-digest' them, embody and enforce new social relations and new meanings²⁷. One of the major goals of *Classification Cube* is to allow people to become more familiar with ML systems and invite them to better understand both the oppression and the possibility in them. In this setting viewers may try to reveal some new meanings that come with this technology. Rather than focusing on how the outputs of these systems look like, *Classification Cube* offers viewers a space in which they can try to better understand how these outputs came to

²⁵ Magnet, Shoshana. *When biometrics fail: Gender, race, and the technology of identity*. Duke University Press, 2011.

²⁶ Blas, Zach. *Face Cages* (2013-2016).

²⁷ Haraway, Donna. "A manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s." *Australian Feminist Studies* 2.4 (1987): 1-42.

be. This shift in perspective follows a conceptual framework developed by James Bridle's research project of the New Aesthetic in which he proposes that humans can communicate with machines--- We can wave at them and see how they wave back at us. In interrogating machine behavior, we reveal ways in which these systems can be platforms for radical transformations²⁸. Bridle's ideas are further explored in Curt Cloninger's Manifesto for a theory of the New Aesthetic, in which he rightly claims that trying to go backwards from the images we see on the screen toward the process itself is too complicated²⁹. Systems like the one we see in *Classification Cube* are defined as 'Black Boxes' their inputs are connected to one another in so many non-linear connections so that when one input slightly changes, it can critically modify the values of other inputs and outputs. Even the designers of these systems themselves do not know exactly how they work³⁰. With that said, Cloninger advises, in his words, "to stop sitting around and letting these systems dazzle our minds by showing us a real-time documentary of ourselves", Instead, he writes, provocatively: "we should spend some time figuring out how these systems flow and function so we can more effectively modulate them (or sabotage them)"³¹.

2. Performative Behavior inside *Classification Cube*

Inspired by these ideas, *Classification Cube* offers a space in which we can become more familiar with the system, we can 'talk' to it and 'explain' to it who we are. Spending more time inside this space, making changes to our appearance and our behavior allows us to learn how the system 'sees' us and gives us insight into how we might influence this vision, giving

²⁸ Bridle, James. "Waving at the Machines." *Video recording and transcript of keynote given at Web Directions South conference*. <http://www.webdirections.org/resources/james-bridle-waving-at-the-machines>. 2011.

²⁹ Cloninger, Curt. "Manifesto for a theory of the 'New Aesthetic'." *Mute* (2012): 3.

³⁰ Card, Dallas. "The 'Black box' metaphor in machine learning". Medium: Towards Data Science (2017).

³¹ Ibid., 29.

participants the opportunity to produce several possible visions until they come to those that they actually find exciting and empowering. With these notions in mind I go back inside the *Classification Cube* and try to understand my own 'cage of information'; I try to figure out the connection between the text that appears on the screen and its coupling with my own body and the way this coupling might represent my identity.

Brian Massumi claims that the body comes to be defined by its corresponding to a site on a grid of constructed significations such as male vs. female, black vs. white, gay vs. straight and so on. Massumi asks whether or not a particular positioning on the grid is more than just a local embodiment of an ideology, trying to understand if there is a potential to change, to perform our way from one position on the grid to another or even change the grid itself. Inside *Classification Cube* classifications change on the screen every second and I can see that I can control them with my movement. Massumi might address this movement as a state of in-betweenness with only its beginnings and end-points as the ones defining the body³². If my movement changes my classifications inside the cube, what kind of movements should I do? Should I try to manifest myself? But what is my 'self'? I identify as a female, my age is forty one years old, I would like to think that I am rather happy than sad or angry, but do all of these define my 'self'? And if so, how do I portray them with movement? Is there a typical movement to female bodies? Is there a typical movement to forty one years old bodies? For a moment my classification is a 32 years old, sad, female but even when a 'correct' female label do appear on the screen it seems more of a practical construct than as anything natural that I can authentically embrace; it's confidence levels vary, for one moment I'm a female by 85.07% and a moment later, a female by 84.06%. What happened in this moment that made me seem less feminine? And what about the other 15.94% of confidence? In this window of

³² Massumi, Brian. "Concrete is as Concrete Doesn't." *i "Parables for the Virtual* (2002).

uncertainty, am I a male? Or maybe something else, maybe an animal? As I continue to move, my classification changes to a scared, 44 years old male who is belly dancing (**Figure 5**).



Figure 5: Exploring my own classifications inside *Classification Cube* by utilizing performative behavior.

3. From Appearance to Apparition

The classifications I see on the screen are peculiar, surprising, disturbing and unexpected. While considering Harraway's idea of finding 'New Meanings', I never thought of myself as a 44 years old male and never in my life have I belly danced. I am suddenly confronted by this image which ironically expands my awareness. This classification, surprising as it may be, is a new meaning and it becomes possible by my movement inside the space. The system and its process, which I am trying to become familiar with, claims my appearance and implies a new identity. Roy Ascott, in his visionary proposal for global telematic exchange, addresses this new identity as an apparition; a ghost like image of a person, a remarkable or unexpected appearance of someone or something³³. Ascott claims that appearance itself is the face of reality, it shows us no further than what an outward form allows at a specific moment, Appearance shows us things as they are, whereas apparition reveals a constructed reality and shows us things as they could be. However, Ascott claims: "our insights into the ways in which reality is constructed in our consciousness leaves us no doubt that the processes of apparition are authentic and that appearance is a fraud"³⁴. If what Ascott says is true, then the apparition of me as a 44 years old, scared, belly dancing man might be seem as true and can be attached to me as a new identity, a new positioning on the grid.

4. Technologies of Identity Transformation

When we think of identity manifestation, Judith Butler tells us that our personal identity as we know it, is already a constructed one. According to her, identity is a performative accomplishment which the mundane social audience and the actors themselves come to believe and to perform in the mode of belief. Identity performance is at the core of my artistic

³³ "Apparition". The Oxford English Dictionary Online.

³⁴ Ascott, Roy. "From appearance to apparition: communication and culture in the cybersphere." *Telematic Embrace: Visionary Theories of Art, Technology, and Consciousness*, ed. Edward A Shanken (2003): 276-283.

practice as I explore it in role-play communities in social virtual-reality. Following a daily practice which spans almost five years, I embody a group of twenty-five different avatars in the virtual world Second-Life. Each of my avatars is uniquely designed and belongs to a different role-play community. For instance, I have a nine years old, catholic boy avatar who attends a religious boarding school, another one is 16 years old, female, geisha apprentice avatar in virtual Japan, I also have a sexy young lady avatar who spends her time in an adult BDSM community and another avatar who is a dead female figure floating, face down, in a virtual pool (this last one does not belong to any community and she never speaks to anyone because she is dead. Nevertheless, others keeps reaching out to her with some most interesting comments) (**Figure 6**). Avatar embodiment in virtual reality is known to allow users the opportunity to explore aspects of identity in a space in which it is considered safe to do so. For some users it is a platform to express a selfhood which they are reluctant to show in the real world and for others it is an opportunity to examine identities other than their own by embodying different roles³⁵.

³⁵ Boellstorff, Tom. *Coming of age in Second Life: An anthropologist explores the virtually human*. Princeton University Press, 2015.



Figure 6 - Embodying different avatars and role-playing different identities in the virtual-world Second Life.

As part of my own artistic exploration I examine how some of my virtual-reality experiences can be transferred into the physical reality, I invite participants to join mixed-reality performances in which I introduce them to my avatars or to my virtual friends. In one of my performances I threw a birthday party to my avatar, in another performance, I invited participants to eat lunch with virtual friends. I also served tea in a cybernetic tea house and invited participants to consider joining a geisha school in virtual reality (**Figure 7**). These participatory performances opened up some interesting discussions regarding identity in the real and the virtual worlds. However, some of them were also harshly critiqued; some people claimed that the identities I presented were not authentic or real or serious. Some referred to these whole events as a game or a fetish practice. The communities which were introduced

were referred to as cults and some people even warned me that I should be careful while interacting with 'such' people. There were also worries regarding cultural appropriation and sensitive symbolism which might perpetuate bias. This was especially relevant to the manifestation of an asian female, a figure which has already been extensively critiqued in relation to identity tourism in cyberspace³⁶. My attempt to embody a Japanese geisha had no intention to appropriate or perpetuate bias, however, I addressed my lack of opportunity to ever embody this identity in the real world, one that was suddenly given to me in the virtual reality. That said, one of the most interesting comments that I received while embodying this avatar was: "Why can't you just perform as an Israeli mother?"; knowing that in the real world I am an Israeli mother and suggesting that I should stay in my position on the grid and not attempt to move out of it. My response to this critique was to actually perform as a mother, yet unlike the expected behavior of a real world mother, I guess the mother that I embody in my performance would have served the cultural phantasm better if it wasn't for the VR headset covering her eyes and completely removing her from the physical environment of the baby she holds in her arms (**Figure 8**).

³⁶ Nakamura, Lisa. "Race in/for cyberspace: Identity tourism and racial passing on the Internet." *Works and Days* 13.1-2 (1995): 181-193.

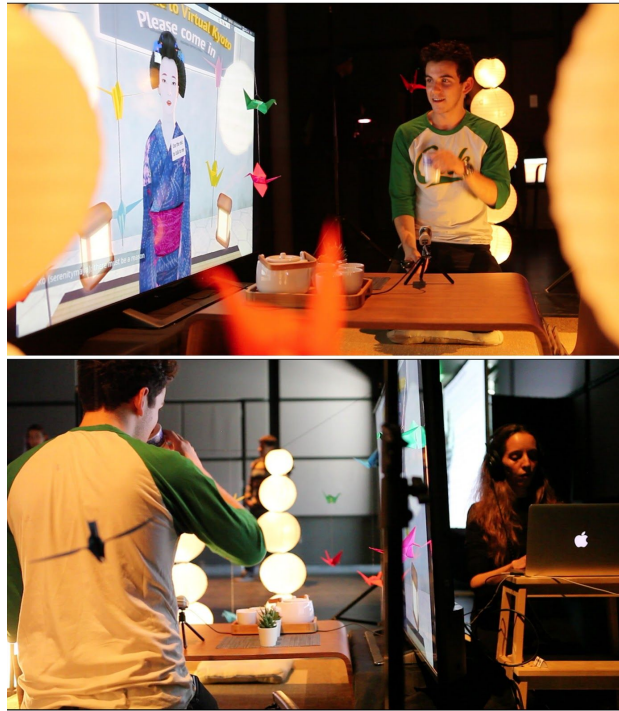


Figure 7: *Cybernetic Tea* (2018). A mixed reality performative installation.



Figure 8: *Live Feed* (2018) - performing as a mother who is fully immersed in virtual reality

5. Becoming Transreal

The hardship of identity transformation is well known to those who attempt to go through it. Many of my friends from the virtual world Second-Life keep their virtual identities as a secret, knowing the harsh critique against this sort of exploration they might face in the real world. Interestingly, artist LaTurbo Avedon uses the same powerful tool of keeping a secret identity while presenting her digital persona in the real world. While those who embody Avedon remain completely anonymous, she manages to present herself as an artist and a curator and as such, is able to participate in numerous gallery exhibitions in the physical reality³⁷. The difficulty of openly going through the process of identity transformation in the real world is well manifested in micha cárdenas's performance *Becoming Dragon* (2008). In this mixed-reality performance, cárdenas performs an identity transformation from a human into a dragon in a virtual world while questioning real-life requirements for biotechnology based gender transformation in the real world³⁸. While examining both biotechnology and virtual-reality as two distinct technologies for identity transformation, cárdenas refers to the virtual world as a prototyping space in which one's conception of the self is affirmed and defied by others. In her performance *Becoming Transreal: Bio-Digital Performance* (2010) cárdenas continues this exploration in collaboration with artist Elle Mehrmand where they examine a 'transreal' identity; a combination of the 'real' body that one is born with along with a constructed identity built across multiple strata of communication technologies³⁹. cárdenas describes the

³⁷ Wall, Saoirse. "The Multitudinous Self: Expanded Identity in Mouchette and LaTurbo Avedon."

³⁸ cárdenas, micha. *The transreal: political aesthetics of crossing realities*. Atropos press, 2012.

³⁹ *Ibid.*, 38.

embracing of these two identities together as often perceived as rapidly shifting or shimmering between multiple conflicting readings, as in the case of a mirage⁴⁰.

6. Classification Cube as a practice space

The idea that virtual worlds might serve as a practice place where users can prototype changes in their identity and test the manner by which these changes are addressed by others is an interesting one, mainly if some of these changes can be manifested in the real world. Don Ihde disagrees with this idea by arguing that our desire to incorporate the technologized body into ourselves so that it becomes a living body is unachievable; for him “VR bodies are thin and never attain the thickness of flesh”. Ihde compares the virtual world to Plato’s cave yet argues that when we emerge from the shadows of the virtual world back into the sunlight of the street all we end up finding is the mundane world of reality⁴¹. For Cárdenas, this return to the real is impossible; she aligns her thoughts with thinkers such as Gilles Deleuze and Jacques Derrida and claims that in differential planes of reality, the transreal and its permanently partial identity, is both real and unreal at the same time. While agreeing with Cárdenas’s ideas I claim that in this day and age, when we go outside into the sunlight of the street we might think we walk on a plane of a mundane world however we actually walk inside a cave; one which envelopes us with a thick network of intelligent algorithms. Through the lens of this technology, virtual bodies attain the thickness of the flesh so strongly so that they are the only ones seen. These virtual bodies are constructed by the ‘game of knowledge’ which, according to Donna Haraway, reconstruct, embody and situate them by a specific perspective of an enculturated knowledge given by their surrounding world

⁴⁰ Cárdenas, Micha. "Becoming Dragon: A Transversal Technology Study." *CTheory* (2010): 4-29.

⁴¹ Ihde, Don. *Bodies in technology*. Vol. 5. U of Minnesota Press, 2002.

⁴². Going back to James Bridle's and Curt Cloninger's ideas of the New Aesthetic I attest that it is time for us to join this game of knowledge.

Through the lens of ML systems all of us become transreal. Just as the mirage experience described by micha cárdenas, inside the space of *Classification Cube* we are confronted with a rapid shifting between conflicting readings; we witness the body we were born with as it becomes entangled with a technological body. We also understand that as our bodies serve as the input of this system, it is in our capacity to change it and influence the output that this system ends up producing. In a sense, just as in the case of virtual reality, *Classification Cube* can be seen as a practice space, a futuristic mirror, which shows us how ML systems see us. Inside this practice space we can then prototype our appearance and our behavior so that when we step outside the cube, into a world of constant algorithmic visibility, we know how we are being seen and we make sure that this visibility is the one we chose to perform and present to the world.

Conclusion

Machine learning products and systems are becoming more apparent in our environment. While our visibility through the lens of this technology can be an oppressive one by subjecting us to biases and discrimination, it is important to figure out if it can also provide an opportunity for an empowering visibility. In this sense, *Classification Cube* is proposed as a space in which we can become familiar with the system, inside the cube we can play and interact with it, we can understand how it 'sees' us and others, and we can try to control it by performing different behaviors in front of it. *Classification Cube*, unlike similar classification systems in the public domain, does not collect any information and does not provide any real-life implications in relation to its outcomes. Its design as a private, neutral space presents

⁴² Haraway, Donna. "Situated knowledges: The science question in feminism and the privilege of partial perspective." *Feminist studies* 14.3 (1988): 575-599.

a safe environment in which one can practice and shape their performance in response to the algorithms. Assuming a future of constant surveillance and ubiquitous interpretation by machine learning systems, *Classification Cube* can serve as a kind of futuristic mirror, reflecting how we are detected and classified in an increasingly digitized public domain. In a world which is entirely dominated by intelligent algorithms, performing to these algorithms opens up an opportunity for a radical identity transformation in which all of us can become transreal by embracing our biological body with our digital, technologized one.