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The Sunglasses of Ideology: Augmented Reality as Posthuman Cognitive Prosthesis

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THE SUNGLASSES OF IDEOLOGY: AUGMENTED REALITY AS POSTHUMAN COGNITIVE PROSTHESIS

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ABSTRACT

This project argues a methodological approach for examining augmented reality (AR) that blends new media studies with that of the digital humanities to develop a hybrid methodology that accounts for AR as a digital medium and, in turn, a critical framework for digital humanities (DH) cultural criticism. As Steven Jones argues in *The Emergence of the Digital Humanities,* the digital has always been physical, and the network has become "the water in which we swim" (20). Our networked tech has begun to reflect this by showing closer interaction between physical and digital artifacts, the most notable example being AR, where digital information responds directly to physical space. This project takes a multidisciplinary approach to explore the rhetorical and ideological implications of AR as both a technology and a medium. By exploring AR as it relates to current digital humanities scholarship, comparative new media studies, and critical theory, as well as a hands-on approach that involved the development of an AR smartphone application, this project aims to show that augmented reality is uniquely useful as a vessel for future research into digital materiality, while eventually arguing that this tech literalizes imaginative and cognitive processes, ultimately revealing a posthuman ontology where thinking and technology are indistinguishable from one another.

DEDICATION

For my parents, Justin McKnight, and Ashley Blair, without whom I would have never made it to South Carolina. And for Kate Parker and Sean Morey, for continuing to show me just how meaningful and impactful a life in the humanities can be.

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As digital and networked technologies become increasingly more sophisticated and ubiquitous, the ways in which digital interfaces mediate and remediate our daily lives is becoming integral to how meaning is constructed and exchanged within the politics of contemporary discourse. Jason Farman discusses the ways locative mobile media can be used to reconfigure embodied spaces and human subjectivity[1], while J. David Bolter and Richard A. Grusin examine the ways in which mediums are represented within other mediums, causing a culture of constant erasure and unstable reality.[2] But so far little attention has been paid specifically to the direct augmentation of reality. In this project, then, I will examine the way mixed reality technologies, specifically augmented reality (AR), are on the cusp of becoming a powerful discursive medium, and argue for a critical examination of AR that opens up cogent new avenues for understanding and articulating the ways the posthuman[3] uses, and is used by, digital modalities. Toward this goal, part of my approach borrows from Alan Liu's argument that the digital humanities need more of this political and cultural critique. As he writes in "Where Is Cultural Criticism in the Digital Humanities?":

> Especially by contrast with 'new media studies,' whose provocateur artists, net critics, tactical media theorists, hacktivists, and so on, blend post-1960s media

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1 See *Mobile Interface Theory: Embodied Space and Locative Media*.

2 See *Remediation: Understand New Media*.

3 Although the term posthuman has many contested meanings, I will be using it as it problematizes traditional liberal humanist conceptions of the "essential" human. In the same vein as Cary Wolfe notes in *What is Posthumanism?*, and N. Katherine Hayles in *How We Became Posthuman*, my use of the term does not deal with what comes after or can be added to the human, but rather a sense of human that goes beyond traditional categorization.

> theory, poststructuralist theory, and political critique into 'net critique' and other kinds of digital cultural criticism, the digital humanities are noticeably missing in action on the cultural- critical scene. (Liu 491)

In responding to what Liu sees as a definitive lack of cultural critique amongst the digital humanities, my methodology for examining AR blends new media studies with that of the digital humanities in an attempt to develop a hybrid methodology to account for AR as a digital medium and, in turn, a critical framework for DH cultural criticism. That is, while I offer a new critical vocabulary to discuss how augmented reality reorients our physical experience of the world—a poetics or toolkit that aids us in the same way that the development of literate practices did with alphabetic writing and linear print, and situates AR as a writing technology within a matrix of institution, practice, and identity formation—I also approach AR from a tool-building perspective, and how an account of the former can inform the latter. I begin this project by analyzing how AR emerges within a shift towards more digital, mobile, and networked modalities of constructing meaning, and how the digital-as-physical metaphor has facilitated this shift. Ultimately, I will argue that the emergent technology and medium of AR is of critical significance as a catalyst for looking at networked being with a new set of eyes (figuratively as well as literally), where augmented reality acts as, what I term, a "prosthesis of the imagination."[4]

[4] I realize the term prosthetic may be an uncomfortable term as it often has associations with discussions of the differently abled, but my hope is that this term is not insensitive. Instead I use the term in a similar way as scholars such as Gregory Ulmer have used it in their discussions of prosthetics of thought. Because I see AR as a writing technology, it allows this examination to follow in the terminological lineage of Ulmer and others. The term "extension" could also be used, but I am trying to avoid some of the associations that it has with the technological determinism of Marshall McLuhan. While an extension implies an "add on," a prosthetic implies a very different kind of predetermined purpose.

Augmented reality (or AR) typically refers to a medium in which digital content is seen intermixing with the "analog" world, oftentimes in three dimensional and interactive ways, toward a primary goal of creating a seamless interface between physical and digital domains, or disguising or naturalizing its digital makeup. However, there is always a physical apparatus that serves as a mediator between the individual using the technology, the digital content being delivered, and the physical environment in which that content appears. Most often this technology is a smartphone or tablet, where the live view of the device's camera is remixed with digital information in 3D space, augmenting or entirely replacing the user's vision of the world; such technology also includes everyday GPS devices like a Garmin or TomTom, where auditory content is projected out and intermixed with the world from a physical apparatus that contains a digital readout of a person's physical location. In science fiction novels and films, these technologies often appear as much more advanced and seamless, such as contact lenses, car windshields, or sunglasses that can display digital information.

Augmented reality is often discussed in conversations with virtual reality (VR), but there are important distinctions between the two that affect the kinds of critical approaches we take toward each. In a virtual reality paradigm, the participant/user's sensory experience is entirely usurped by that of the digital, typically with a headset that covers the entire field of vision and often the experience of sound as well. The most popular modern examples of this tech exist for videogames as VR headsets such as the

Oculus Rift, Sony VR, and HTC Vive[5], systems that often incorporate cameras and/or controllers that allow for motion tracking of the user's movements. But VR is developing into a much more sophisticated interface with increasingly advanced haptic and kinesthetic systems of sensory communication, while also being paired with devices like omnidirectional treadmills. Older VR systems such as the Mechdyne CAVE VR system continue to improve and are beginning to bear striking resemblance to the "holodeck" VR facility seen throughout *Star Trek: The Next Generation.* Mechdyne's CAVE is described by the company as "a room-sized, advanced visualization solution that combines high-resolution, stereoscopic projection and 3D computer graphics to create a complete sense of presence in a virtual environment," as well as "allow[ing] multiple users to become fully immersed in the same virtual environment at the same time" ("CAVE Virtual Reality"). It is this very "complete sense of presence in a virtual environment" that keeps VR so disparate from AR—while the designers of virtual reality tech seek to simulate fully contained sensory experiences for their users, the goal for augmented reality tech is to work in tandem with the "normal" experience of reality, often serving as tools of convenience or providing users with hidden or alternative layers of their lived sensory experience. While a GPS may be an interactive and remediating AR tool for navigating the world, VR creates an entirely alternative world to navigate. As Jan Rezab argues in a 2016 Forbes article about Mark Zuckerberg's plans to integrate Facebook and VR, "virtual reality's success will depend on the penetration of devices," whereas "augmented Reality is the ultimate solution [as it] allows you to input external content into your own

[5] To a somewhat lesser extent, this also includes the Samsung Gear VR, LG 360 VR, and Google Cardboard, which are devices that rely on the insertion of a smartphone into a headset to act as a screen.

reality rather than entering a separate reality. AR more closely merges into our lives, just as smartphones are now an integral part of our lives" (Chaykowski). Although VR certainly demands its own critical analysis, I contend that an analysis towards the new kinds of practices, identities, and politics that are emerging from the mixed reality interactions of AR are certainly more useful, due largely in part to just how ubiquitous and interactive the tech promises to be, but also in the ways in which it explores digital materiality.

Over the last few years, the use of augmented reality technologies has seen a rapid increase. One of the first major iterations was the heads-up display, or HUD, used on military aircraft since the eighties and nineties. Since then AR has been used in commerce, medicine, education, videogames, tourism, and other industries. Markets and Markets has estimated that AR was a $692 million industry in 2013 and expects that to grow to $56.8 billion by 2020 ("AR Market Worth $56.8 Billion"); Digi-Capital predicts that the AR and VR market could hit $150 billion by the same time, with AR taking up $120 billion of that figure ("A/VR to hit $150 billion"). To put these figures in perspective, the NFL was estimated at roughly $10 billion in 2013 (Isidore) and 2014 (Chemi), and the videogame industry at $15.1 billion in 2015 ("Value of the video game market"). For the average consumer of AR, however, the experience is usually without cost, assuming they already own a smartphone or other networked device. The most popular AR mobile browser apps, such as Layar, Aurasma, and Junaio, can be downloaded for free, and use smartphone cameras to scan objects that others have been "tagged" with digital content, like more sophisticated versions of QR codes, but with an

added interactive element. Most commonly, magazines, newspapers, and comic books feature pages that come to life when viewed through a screen. Companies like Ikea, Home Depot, and Mitsubishi have applications that allow users to hold up a phone or tablet and see what an added piece of furniture or modification to their home would look like in real time, in full 3D. The healthcare industry has begun using programs such as EyeDecide and MedicAR in assisting with everything from training to actual surgery. In 2015, the US military announced their ARC4 headset will display information to the user in a style that looks as though it were pulled directly from a modern videogame.[6] If the use of many of these technologies seems gimmicky, it is most likely because they are still in a larval stage of development. However, as Alan B. Craig argues in *Understanding Augmented Reality*, although AR "hasn't become a part of everyone's daily life, it is on the cusp of doing exactly that. The technological pieces are in place and moving daily." The rise of "wearable" interfaces such as the Microsoft HoloLens and Osterhout Design Group's AR glasses project[7] makes the emergence of a more predominantly mixed reality very probable. A recent issue of Wired perhaps said it best with the headline: "HEADS UP: Why Wearable Tech Will Be as Big as the Smartphone."

With the publication of information no longer limited to a book, computer, or device, everything in the "analog" world becomes a potential location for discourse, even

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[6] This is precisely part of what Jay David Bolter and Richard Grusin mean by "remediation" in *Remediation: Understanding New Media*, where a videogame might resemble a movie resembling AR resembling a videogame, and so on.

[7] Unlike Google's failed Glass project, these devices attempt to create visual content that "coexists" with physical reality, rather than overlaying a screen overtop them that does not interact beyond providing a translucent data screen. In other words, Google Glass failed because it looked too much like VR masquerading as AR, and the additional media the glasses provided never mixed with (augmented) the analog environment.

if that information does require a mediating device. This new potential for public discourse offers new possibilities for critical and political engagement with physical locations. But, with regards to AR, Sean Morey and John Tinnell ask in *Augmented Reality: Innovative Perspectives Across Art, Industry and Humanities,* "at what point does this contestation and dialog become commercialized and reterritorialized by the dominant paradigm? Can an AR of the public sphere by the public provide a space for critique?" (14). Writing and rhetoric have been democratizing disciplines because they allow all literate individuals to participate and communicate in their society, but that literacy is already difficult enough to learn for many. What is emerging, specifically with AR, is a widening gap between those who are able to create content and those who are untrained in or unaware of digitally constructed methods of discourse. Physical spaces might be ripe for public discourse, but only if the public is knowledgeable about how to use the tools of such discourse. Digital humanists debate as to whether or not the ability to code should be a requirement for entry into the sub-discipline[8], but knowledge and skill at computer coding may soon become a requirement for this emerging type of literacy in general. The question AR seems to pose is what does critical, (inter)active agency actually consist of in the politics of 21st Century discourse? In other words, could AR be used by a digital citizenry toward democratic purposes, not just those of military, commerce, or entertainment?

In *The Poetics of Augmented Space*, Lev Manovich calls for "reconceptualiz[ing] augmentation as an idea and cultural and aesthetic practice rather than as a technology"

[8] A great starting place is Matthew Gold's edited collection *Debates in the Digital Humanities*.

(220). He makes comparisons between augmented space and architectural practices, arguing that "the design of electronically augmented space can be approached as an architectural problem" and that now "invisible space" needs "a structure, a politics, and a poetics" (237). The question however remains: what does that structure look like? As it stands right now, the effectiveness of public AR texts and installations rely on the specific applications or devices being used. Users are able to choose what mixed reality they subscribe to, like flipping channels on a television, which has the potential to be either a tool of empowerment, or a further system of isolation and schizophrenic experience among the populations of the first world.

This idea of subscription is crucial, it seems, to the workings and understandings of augmented reality going forward, as it makes visible the various "media ecologies" in play at any given time. While AR is most easily conceptualized as a technology, perhaps it is more prudent to configure as a practice, as Manovich states, or, as Vladimir Geroimenko argues, "a novel creative medium [that] is bound to become an organic part of the emerging hybrid world" (313). The significance of this medium, then, is that it has the ability to not only comment on reality, but the ability to visibly and audibly alter it. Of course, all commentary in some way alters the perception of reality for the viewer, but augmented reality's effectiveness lies in its ability to display new realities that are immediately available, and that bypass the need to imagine the interaction between world and commentary, or as Morey and Tinnell call it, "a transparent relationship between word and thing that becomes layered and conflated in real time" (25). Augmented reality's effectiveness, then, is a result of its ability to actualize the imagination on behalf

of the user, making it unnecessary for him or her to do so themselves.

As a contemporary example, L'Oreal's *Makeup Genius* application for smart phones enacts such a performativity of imagination for the viewer. To use the app, users hold their phone up in front of their face, as they would a small mirror, and select from a wide variety of lipsticks, eyeshadows, and other makeups in order to see what they would look like wearing them in real time. If users are at the physical store, they are even able to scan products on the shelves and receive an immediate overlay that shows them what they would look like without ever trying on or even touching a product. This use of augmented reality as a marketing strategy gives consumers a fun, hands-on experience, but also subtly takes away a step in the decision-making process. Instead of imagining owning a product and then imagining the subsequent use of it, the consumer instead has their imagination literalized for them and their agency in some ways invaded, even if that agency was an illusion to begin with. Or as one could argue from Marshall McLuhan's work in *Understanding Media: The Extensions of Man*, when the ability to actualize makeup on oneself in this way is achieved, there is a tradeoff where the imagination is made numb. Media scholars such as Guy Debord and Neil Postman critique an image culture for its potential negative effects on a participant democracy, which begins to show how uses of AR that actualize imagination and create interactive imaging might also, in this way, numb the cognitive interactivity of democratic citizenry, exacerbating the problems already present in an image-based culture.[9]

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[9] See *Society of the Spectacle* and *Amusing Ourselves to Death: Public Discourse in the Age of Show Business*, respectively.

Even though *Makeup Genius* may seem like a trivial example, it shows what is at stake when it comes to the ways in which AR mediates imagination and choice. Like most digital tools, AR is marketed as invisible and immediate, even though it is neither, but rather serves as what I describe above as an "imagination prosthesis" that works outside of the mind or *actualizes* the imagination. In many instances, the use of these kinds of technologies numbs the imagination, where, in the example of *Makeup Genius*, the user is still limited to the various constraints put in place by the designers of the application. The makeup is limited in how it is applied and does not, for example, allow the user to draw on their eyes with lipstick, or to smear mascara onto the wall behind them. However, while the application does not grant the same kind of visceral and immediately lived experience for the user as a traditional set of makeup would, it does serve as a prosthetic of the imagination, one that limits decisions while simultaneously expanding choice. For example, dozens of makeup combinations can be sorted through in seconds, a process that would involve hours of "manual" application and reapplication of makeup, so in that sense the "digital" application of the makeup (via the smartphone application[10]) is in some sense actually *faster* than immediate, even with a tradeoff of dampened freedom and creativity. But this is exactly where AR serves as prosthesis—the *Makeup Genius* app fills an otherwise invisible cognitive role for the user. When applying makeup, as when selecting from any consumer product, oftentimes the actual application of said colors comes after a sort of mental selection process, where one pictures various colors on themselves before beginning the process of putting them on.

[10] The distinction between application as a verb (to apply) and application as a noun (as in a computer program or smartphone "app") is, I think, an interesting one in and of itself.

Once the makeup is fully realized it may of course be changed after seeing what it *actually* looks like, but the imagination is a crucial cognitive step that precedes the physical process. In tandem, the physical process often feeds back into the imaginative process. In terms of this application, the essential role that the "eye" of the smartphone camera plays consists primarily in its ability to serve as a literalization of the "mind's eye." It can "see" better than a human's imagination can. Neither imaginative nor physical application is needed.

It is this particular quality of AR that makes it so important as an area of critical study. As digital technologies become nearly ubiquitous components of our lived reality, it is becoming increasingly critical to examine the ways that our physical experience and perception of reality are reoriented and articulated in nonverbal ways.[11] This is certainly an aspect of the technology that is easy to harness and abuse by those in power, but the use of AR tech as a discursive medium also offers great potential as an agent of both democratic and poetic change. As Morey and Tinnell state, "the paradigm shift that augmented reality beckons is as much about everyday ethics as it is technological utopias," or as Craig argues, "the biggest limitation right now is our imagination for the possibilities, combined with a lack of widely available, easy-to-use development tools" (265). While so far I have examined existing applications and tech, I will now examine a few of the ways AR as a writing technology has been imagined in popular culture, and the contemporary implications of its role as discursive medium. Through this analysis, I contend that AR can be useful as a metaphor for how ideology is constructed and

[11] Of course this only applies to the privileged, industrialized world's experience of tech.

remediated in contemporary culture, and the implications that has for a conception of posthuman cognition.

IDEOLOGY SUNGLASSES, POSTHUMAN EYES

One helpful way of examining augmented reality is by framing the AR apparatus as a "sunglasses of ideology," where sunglasses can be read as a metaphor for both the physical AR apparatus and its affective properties. In fiction, these glasses often provide a mode of AR that exposes hidden truths or enlightens users to invisible and insidious ideologies, whereas a much more likely permutation of AR seems to be one that remediates our physiological *reaction* to (or experience of) the physical world. This does not mean, however, that these fictional analogies are not worth exploring, just that they must be explored with caution. For example, in *The Wonderful Wizard of Oz*, the inhabitants of the Emerald City are indoctrinated into a collective reality through the wearing of emerald-tinted glasses that force them to see the physical city in a way that is "untrue." Alternatively, perhaps the perfect chiasmus to *Oz* is John Carpenter's 1988 cult classic film *They Live*, where protagonist John Nada discovers a pair of sunglasses that gives him the power to see subliminal messages displayed throughout the cityscape. When wearing the sunglasses, a billboard featuring a swimsuit model instead bears the message "MARRY AND REPRODUCE" and the money in Nada's hand simply says "THIS IS YOUR GOD." Eventually he discovers what Slavoj Žižek, in the introduction to *The Pervert's Guide to Ideology*, refers to as a "classic Hollywood topic of the invasion of the body-snatchers," where aliens have hidden among society and are controlling it by enforcing consumer culture. Unlike in the Emerald City, where the city is changed at the mediating point of the physical apparatus of the sunglasses, the city of Los Angeles in *They Live* is unchanged—what the glasses display *is* reality, or at least

reality as it existed prior to the aliens' arrival. The body-snatchers and their brainwashing scheme are real, but completely invisible unless one is subscribed to the correct channel. By using his "de-actualizing" glasses, Nada is able to find the source of the aliens' signal and destroy it, making the aliens' fictional reality disappear for everyone without the glasses. As Žižek explains:

> There is a further feature which makes this scene with "ideologico-critical spectacles" contemporary: in it, the ideological injunction is hidden, so that it can only be directly seen through the glasses. Such a relationship between visible and invisible is predominant in contemporary "consumerist" societies, in which we, subjects, are no longer interpellated [sic] on behalf of some big ideological identity, but directly as subjects of pleasures, so that the implied ideological identity is invisible (Denial: The Liberal Utopia).

These "ideology sunglasses" can be a useful framework for thinking about the rise of digitally altered spaces, particularly through the use of augmented reality interfaces and technologies, and it's easy to see the parallels here—virtual, or otherwise invisible, information being overlaid atop physical locations. Unfortunately, in many cases of augmented reality, the "sunglasses" of our digital devices work in almost exactly the opposite way. For starters, the use of the device is not hidden by the marketing company, but is rather encouraged. In this way, more often than not, augmented reality applications are used to reinforce the typical ideologies of consumer culture. The body snatchers hide in plain sight, and they freely give their sunglasses—their AR apps—to anyone willing to play along, whether conscious of it or not, in the spectacle of their mixed reality ad

campaign. The bigger the company backing the project, the flashier and more attractive the reality they are able to offer, and thus the more effectively they are able to attract the attention of the consumer. Through his analysis of Prada's conscious efforts to produce such an AR campaign, Manovich explains that we are reaching a point where "[all physical spaces] now have to compete" (235).

This competition of public space is already beginning to manifest itself through augmented mediums, with some noncommercial applications being developed to compete with corporate uses. One of the more recent examples is the augmented reality goggles called Brand Killer, developed by a group of students at the University of Pennsylvania's PennApps hackathon. Brand Killer, described as "AdBlock for Real Life," is a headset that allows for brand name logos to be blurred out or pixilated from the viewer's perspective in real time, allowing an "opt out" option for everyday life (Vanhemert). A similar, albeit somewhat more aggressive, example is artist Mark Skwarek's logo-hacking application called "The Leak in Your Hometown." This application augments the oil and gas company BP's logo to depict a broken gas pipe leaking unending gasoline upward in reference to the 2010 BP Deepwater Horizon oil spill. Similar to the glasses in *They Live*, this application literalizes an invisible truth and turns it into something that must be confronted. While these examples are by no means the most exciting or impressive, they are still emblematic of a deep desire to take back public space as a place of democracy and discourse.

This method of taking back public space through the integration of digital data, as well as the collapse of the imagination into our devices, is made possible from the

collapse of the traditional polarity of digital and physical domains. As Steven Jones states throughout *The Emergence of the Digital Humanities*, the digital is, and always has been, physical. Digital capable devices make it possible for us to access the network, but that network exists in physical locations as data that can be rewritten and manipulated within servers and other hardware. Jones says that now "the network is no longer normally imagined as a place you jack into in order to upload your disembodied consciousness, a place you 'visit' as if it were another planet. It's right here all around us, the water in which we swim" (20). For Jones, digital information "everts;" it integrates itself in the physical environment outside of the bounds of traditional computational interfaces such as the desktop. He argues that the common metaphor surrounding the "digital realm" comes to us from speculative fiction, particularly William Gibson's *Neuromancer*, which features virtual environments that participants enter *into*, traditionally identified as "cyberspace," termed by Gibson in his short story "Burning Chrome." Eversion, on the other hand, appears in Gibson's more recent novel *Spook Country* and represents the current scenario where the digital is stepping out into the everyday physical environment. Instead, digital information is making itself more apparent as a physical entity, or as Jones says, "the augmented has displaced the virtual" (14).

In addition to data, the systems that support data storage and exchange have also become more integrated with, and impactful upon, external environments. In a talk at the University of Miami in 2015, George Yúdice examined the way the Internet as "Cloud" is always advertised as an ethereal, ever-present and non-physical system, but in reality cloud storage facilities can be the size of small cities. In a time where California is

struggling through historically severe droughts, cloud facilities in Silicon Valley use enough water in their cooling systems to provide for several small towns ("All the World's a Cloud"). This "grounding" of the cloud is a shift away from what Nathan Jurgenson calls "digital dualism," a belief "that the digital world is 'virtual' and the physical world 'real.'" Jurgenson goes on to say that he thinks "digital dualism is a fallacy," a statement that spawned a string of contentious dialogue between him and technology writer Nicholas Carr ("Digital Dualism vs. Augmented Reality").[12]

The argument against digital dualism is perhaps best fleshed out as what N. Katherine Hayles and many "thing theory" practitioners might refer to as the coevolutionary spiral of humans and technology, or an object-oriented ontology. In her book *How We Think: Digital Media and Contemporary Technogenesis*, Hayles gives a useful example of this spiral through her analysis of *Toc: A New Media Novel*: "humans construct time through measuring devices, but these measuring devices also construct humans through their regulation of temporal processes," which of course easily extends to AR and any other tech or tool (115). Hayles further argues for thinking as a process undergone by human and non-human actors, where humans are more like units in an evolutionary progression than they are fully autonomous agents demonstrating mastery over nature. When nature is so often lazily defaulted to as an Other in this way, it's easy to see why the concept of digital dualism seems to be such a dominant ideology. Consider how Carr handles his initial rebuttal against Jurgenson:

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[12] This back-and-forth between Jurgenson and Carr does a surprisingly good job of summing up what seems to be the two primary camps of thought when it comes to discussions of the "digital native."

> We should celebrate the fact that nature and wilderness have continued to exist, in our minds and in actuality, even as they have been overrun by technology and society. There's no reason to believe that grappling with the online and the offline, and their effects on lived experience and the formation of the self, won't also produce important thinking and art. ("Digital Dualism Denialism")

When he brings up the "self" throughout this discussion, Carr is aligning himself with an outdated Cartesian model of the human, one that Walter Ong and Eric Havelock have shown has its roots in alphabetic and print literacy.[13] This quote shows rather succinctly how directly this constructs a view of nature that is at once exotic and remote, as if human involvement would irrevocably taint it, or that it should not be "tainted" in the first place. Nature of course relates to natural, but the implication Carr is making is that there is nothing natural about the human or technology, and certainly not about the digital. And so the beaver dam counts as natural, but the iPhone does not, despite both being tools that were created by (and that in turn help create) agents in evolutionary discourse. Hayles and others suggest something more fluid, where thinking is more like a multitude of agents getting better at reacting to one another, and less like some divine, exclusive gift reserved for humans.

The construction of tools—just like the construction of a dam, iPhone, or anything that augments "nature" or environment by its presence and application—needs to be considered a part of how we approach augmented reality. From a tool-building digital humanities perspective, it seems that it is no longer enough to ask questions of culture

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[13] See *Orality and Literacy: The Technologizing of the Word* and *Preface to Plato*, respectively.

through preconfigured tools designed for industry or military use, but rather a time for building tools that address the needs of humanistic inquiry. At the same time, such tools must also be put through cultural critique, as Liu has argued. Or in other words, perhaps it is now the duty of those in the humanities to become practitioners of a reactionary discourse. As Hayles argues (though Hutchins) in *How We Became Posthuman: Virtual Bodies in Cyberspace*, "modern humans are capable of more sophisticated cognition than cavemen not because moderns are smarter…but because they have constructed smarter environments in which to work" (289). In Hayles' *How We Think* coevolutionary spiral, it is this very act of mediating sensory experience through augmentation that is the most important tool at our disposal in creating these "smarter environments in which to work." The true power then of AR, both the literal tech and medium as well as what it represents in the digital-as-physical conversation, is not only in its potential as a literalized form of cognizance of this coevolutionary spiral, but also as a process of destabilization. What it demands is a reconfiguration in the way we think about AR as both physical and cognitive apparatus—if imagination ever really did take place within the mind, now these processes of creativity are beginning to be done for us; they have become everted and externalized. To think about these questions means not only interrogating the technology, but also using the technology as an interrogative device.

SUNGLASSES: THOSE WHO DESIGN VS. THOSE WHO WEAR

If AR is to become the emergent discursive medium that Manovich and Craig discuss, there is no question that the gap will widen between everyday AR practitioners and the actual medium builders, the app and tech developers that design, and therefore designate the boundaries of, the sunglasses themselves. In order to better understand augmented reality as more than just a user, I (along with Charlotte Powell) have been developing an AR smartphone application called *tARot*.

The application was constructed in the 3D game engine Unity, using the Vuforia Software Development Kit (SDK) along with transparent overlays created in Adobe Illustrator, and is compatible with both Android and iOS.[14] The app allows users to hold their phone over any card in the Rider-Waite Tarot deck for an instant overlay of digital information that explains the symbolic significance of key visual elements on the given card, serving as a lightweight imagination prosthetic.

The purpose behind this project is twofold. Powell and I had a strong desire to use emerging augmented reality technologies to solve a practical problem, but also to pursue an academic and hands-on approach to examining AR as a new discursive medium. We chose to augment the tarot deck as it seemed to fit both of these criteria perfectly, and the Rider-Waite deck was chosen simply because it is widely considered the most common deck currently used in the English-speaking world.[15] In this sense, the prospective audience for this project is split between those with digital humanities interests in tool

[14] We may not publish it for iOS due to Apple charging $99/year for a "developer account" to host it.
[15] The deck was illustrated by English American artist Pamela Colman Smith based on the directions of British poet and mystic A. E. Waite in 1910.

building and those looking to use *tARot* strictly for its pragmatic application as a smartphone app.

The process of creating *tARot* has opened up a whole new avenue of exploring AR beyond its existence as either tech or discursive medium. That is, it helps provide critique of AR itself: AR as metaphor, AR as an emerging poetics, and AR development as writing process. At the most basic level, overlays were created in Adobe Illustrator by digitally painting onto a transparent layer that was overlaid onto digital scans of each of the 78 individual cards, after which the card was deleted and replaced with a transparent layer in a tedious process of combination followed by erasure. These overlays were then imported into Unity and put into a grid on a virtual plane, where they were again matched with their respective cards. The cards had to be manually "shuffled" between programs and then once again matched with their companion cards, which is precisely the clumsy and time-consuming practice that the app is designed to eradicate. Rather than drawing a card and then looking up the various symbols in a companion book or online guide, the app is designed to streamline the process by serving as a cognitive aid. This is in some ways similar to the "book wheel" used by medieval scholars, which was in itself a cognitive prosthetic for quickly and efficiently working with multiple texts at once.

When we finally finished and zoomed back out on the virtual plane we were working on in Unity, we saw a field of meaningless markings—circles and arrows and scattered chunks of text. We had essentially created an empty deck of cards, a ghost deck. Without the actual cards, the "overlay deck" was completely divorced from any interpretable meaning. What we were left with was an empty symbol set, a floating

database that was waiting to evert. But in creating the tARot app we were able to create a new form of textual interaction that relies on the ability of the app to immediately identify a card, superimpose the correct overlay, and in doing so provide a new juxtaposition that allows for the symbolism of the overlays to convey meaning.

It is Manovich's exploration of a spatial (architectural) poetics of AR that lends itself to an augmented tarot deck application that must be used in three-dimensional environments. Because of the dynamic interaction of digital text and architectural design in such spaces that account for AR and everting data streams, new associations emerge that can be designed, but not totally accounted for, leading to poetic encounters. The tarot itself works as a rich and "invisible" associative logic system, and as such, "reading" the cards resembles something closer to an online wiki than that of a linear print-based book. Because of this, what tends to slow down newer practitioners of the tarot is the need to look up individual symbols in a guidebook. What this application aims to do is skip this step by adding an element of immediacy as a means of actualizing information that the querent can use in order to complete a reading. Unlike applications such as "The Leak in Your Hometown" or "Brandkiller," this application is not a system of protest or a means of literalizing hidden truths, but rather serves as a potential framework for the digital annotation of non-traditional texts. Like the book wheel before it, this app becomes an example of Hayles' discussion of the modern posthuman's construction of "smarter environments" in which to think and work. In this way the pragmatic application of this project and the theoretical structure under which it was built are synergistically intertwined. That being said, the content of the overlays could also be changed to create a

critique of the Rider-Waite Tarot as well, rather than simply providing an aid for interpreting the deck.

Although the information that *tARot* provides is informative, it still participates in subverting imagination as it provides definitions and explanations of the symbols in the Rider-Waite tarot deck, and therefore in some ways fixes their use and interpretation, short-circuiting more imaginative readings. This is similar to how *Makeup Genius* fills invisible cognitive roles for its user while also coopting the imagination, where interpretations of the cards' symbolism are, in Roland Barthes' terminology, anchored.[16] However, tarot reading[17] is always an imaginative process where so-called original or intended meaning is perpetually circumvented and rearranged as the cards create meaning through associative interpretation. Our goal was not to coopt any processes of imagination or interpretation, but to replace the tarot guidebooks that are so often accompanied with early tarot learning, and to help demystify and contextualize much of the hidden or archaic semiotics within the Rider-Waite Tarot deck. So as a prolepsis, the degree to which this application participates in the prosthetic is of a different degree if not kind than that of *Makeup Genius*.

Although it may not yet be considered practical, it would be ideal for users of AR to take up the roles of both active developer and practitioner, like the protagonist of "Havana Augmented," Paul, from Tim Maughan's short story collection *Paintwork*.[18]

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16 See "Rhetoric of the Image."

17 "Reading" here referring to purposes of divination or exploration, as opposed to the tarot's original function as playing cards.

18 It may not yet be considered practical because coding, hacking (and what Ulmer calls "electracy"), etc. are not yet widely adopted as critical skillsets or widely taught as fundamental disciplines in schools.

The story centers on a group of hacker, counterculture teens that create an augmented reality game featuring enormous digital robots that battle one another within, and according to the constraints of, physical space. The robotic combatants do not exist in any tangible way and can only be seen by players or spectators wearing the proper ocular tech and subscribed to the right channel; the physical streets and rooftops of Havana become a living, ever-changing battleground that dictates the parameters and overall limitations of the game. In the story, Paul is not only a player of the game, but an active developer in updating and intensifying the game; he is able to master his control over his robo-gladiator avatar, but what is more important is that he is able to operationally transform the mixed reality world that this avatar inhabits.

After a series of viral videos depicting gameplay, the game becomes an international sensation and the ill-motived Sakura corporation begins handing out free augmented reality glasses that allow participants to see not only the game being played in their city, but also "virtual billboards [hanging] in the air down the street, covering the fascias of some of the buildings, or hanging across the street like banners. They were advertising games like *Rolling Iron* and *A Wind of Blades*, soft drinks and fast food, Nike shoes and other clothes. Stuff you couldn't even buy in Cuba. At least, not yet" (81). While the sunglasses worn by the original players of the game were free from these advertisements, these new glasses seduce their wearers into complicity in something similar to what William Gibson has called a "consensual hallucination." In this sense the glasses mimic actions recently taken by Facebook and Google in supplying free Internet access to impoverished countries, which has received a large amount of criticism due to

limited, cherry-picked content available through the service. Facebook's "Free Basics" service, for example, has stirred up significant controversy in India on the grounds that the service "lack[s] transparency in how information is selected for the site and [favors] Facebook's own services over those of competitors" (Sharma). This could set an unfortunate precedent of corporately controlled network access that "Havana Augmented" warns against, in direct opposition to what Liu refers to as the "Zeitgeist marked by its own kind of cultural criticism: cyberlibertarianism in conjunction with social-justice activism" of the early network (491).

Early on in "Havana Augmented," Paul has a virtual reality meeting with a Sakura representative, who tells him "my hope is that if this all goes well your government will be persuaded to open up net access to all" (68). Despite his highly tech driven existence, Paul is still confined by the intersection of corporate and political derision over how the infrastructure of the network is distributed. While the neighborhoods and alleyways of Havana are the physical boundaries of his digital combat, the towers and satellites (and more importantly, the people that control them), are the physical boundaries of Havana's digital existence. By being exceptionally tech savvy and adept in digitally constructed methods of discourse, Paul holds a means of (inter)active agency. He is able to use AR to mold his environment to his liking, and VR to bypass the restrictions his government has placed on the country's Internet architecture.

This differs from most other fictionalized portrayals of AR, most of which daydream of digitally oversaturated worlds as a neutral techno-human inevitability, rather than as a speculative ethical dilemma revolving around participation and remediation.

Even the speculative fictions with heavy AR depictions that do challenge us with techno-ethical dilemmas tend to use AR merely as a flavoring or example of mixed reality futures. The gestural interfaces of *Minority Report* and the locative artwork of *Spook Country* are backdrops for the exploration of other issues surrounding tech ubiquity, not necessarily AR itself. Perhaps one of the best conjectures that does put AR at the forefront is the episode of the anthology television series *Black Mirror* entitled "White Christmas," which portrays a world where nearly all people are fitted with augmented reality ocular implants known as the "Z-Eye." The Z-Eye, a literal AR prosthetic, mostly allows for Internet access, image capture, and live video streaming, but the prosthetic's more sinister implications come to light when they show a character becoming "blocked." At the end of the episode, Matt Trent (played by Jon Hamm), is registered as a sex offender and is blocked by the police. Every person in his presence is visually blurred out and audibly muffled, and he appears the same way to them (however, while other people appear as gray shades to him, he appears as a red silhouette, warning others about his conviction as a sex offender). Where regular eyes could be used to view other human beings as they truly are, the Z-Eye prosthetic forces Trent's visual experience of others to resemble an analog television set tuned to a dead channel.

In this case, unlike "Havana Augmented," all AR interfaces can be easily controlled by a central government. Although Trent is shown to be rhetorically savvy as a skilled salesman and impromptu interrogator, he isn't shown to understand technology at the level of its code, and so there is a sense that technology in this world has in some way become sealed from easy manipulation. While "White Christmas" and "Havana

Augmented" have different degrees of authoritarian oversight, each show us worlds where having both analytical and practitioner skills would be profoundly beneficial in ways that are both practical and political.

ARTIFICIAL EPHEMERA: AR SNAPCHAT GHOSTS

A critical methodology for approaching mixed reality mediums might seem more poignant now that the first truly mainstream use of augmented reality is being realized within the smartphone application Snapchat. As Mark Racette writes in his article "Snapchat's Future Lies in Augmented Reality," the company is essentially "the first to successfully commercialize consumer AR." The app's AR "lenses" became a cultural phenomenon seemingly overnight after the company covertly acquired the facial recognition "selfie" app Looksery for $150 million in September 2015. Snapchat is perhaps the builder of AR most relevant for critique due to the technological and political implications of the company's enormous mainstream success and global reach, as well as for how it allows us to recognize how AR serves as an ideological construct.

Independent of Snapchat's new AR experience, it's important to note that the app is in many ways an outlier when it comes to social media. While similar tech juggernauts like Instagram and Facebook serve as endless digital archives for seemingly infinite amounts of permanent photo storage, Snapchat promises services that do the exact opposite. Instead of posting photos to a page or "roll," users set a timer for their photo or video, select their recipient(s), and send it away. Once a recipient views the sent photo or video for the predetermined amount of time, it instantly deletes itself and cannot be viewed again.[19] Similar to the ways in which Instagram manufactures nostalgia with filters that mimic the aged discolorations of Polaroid and instant film, and the vignette-causing light leaks of the cheap consumer Holga camera, Snapchat offers its users

[19] Although users do get one free "replay" per day, and are able to purchase more for a fee.

artificial ephemera by rebuking the powerful tools of networked archivization that their peers in the tech industry so often rely on. Just as a digital augment disappears when the viewer looks away from an AR installation, so too does an image on Snapchat.

On September 16, 2015, Snapchat began offering visceral mediated experiences to its users with the introduction of augmented reality features in what they call "Lenses." These lenses work in a similar vein as *Makeup Genius*, where a smartphone's forward-facing camera allows the screen to mimic a small mirror, which in turn allows the user to cycle through various augmentations that are mapped onto the face in real time. Users can distort their faces with a never-ending deluge of new lenses (which update everyday), and add bodily effects, like making their foreheads comically large, morphing their face into a monster, making themselves cry with cartoon tears, and even vomiting rainbows. "Premium lenses" can be purchased for $0.99, and, much like the corporatization of augmented space that occurs in "Havana Augmented," businesses are even encouraged to sponsor lenses, for between $400,000 and $750,000 a day (Kosoff). Among the first sponsors were Fox Studios, advertising *The Peanuts Movie* with interactive dancing Snoopy and Woodstock 3D characters, and McDonalds, which is also one of the actual sponsors in "Havana Augmented."

Racette also argues that it was once popular for users to wield the application's crude color palate with a finger and paint onto their environment and even themselves, adding drawings to their "selfies" or cartoony additions to their surroundings. But with the introduction of Lenses, these interactive, creative processes are now prostheticized through the predesigned Snapchat AR overlays. And in a move similar to that of the

Sakura corporation in "Havana Augmented," the company has also implemented "geofilters" and "snapcodes," what Racette refers to as "contextually-aware filters, " features that allow specific AR content to be unlocked only within specific physical locations, such as overlays that show that a user is in San Francisco, or sitting inside of a McDonalds. Snapchat's intermixing of digital content with physical space mirrors what Jones refers to several times throughout *Emergence of the Digital Humanities* as a "willingness to engage," where AR technology uncovers a deep desire to engage with digital content in physical ways. So what makes Snapchat's playful entry into this game of desire for a digital-physical interaction so important? Even though it is the first major or mainstream contender into a game of this kind of interaction, it is crucial to remember that what Snapchat offers is also a corporatization of this AR remediation process. While other AR smartphone apps such as Layar and Aurasma offer users the ability to augment physical space with layers[20] of their own design, what Snapchat offers is prepackaged AR that can only be consumed, never remediated. And, much like a McDonald's hamburger, what users do create with this tool is cheap and quick content that can only be sent and consumed once, so that new content must be constantly prepared and served anew.

In terms of analyzing Snapchat's potential, Racette echoes Jones, Hayles, and Manovich in predicting a move towards a mixed reality, AR future: "My take is this: While Microsoft, Google, Facebook, Alibaba, and Asus hastily prepare for AR/VR to take off in 2016, there's a sly little ghost meandering about, walking through walls, slinking past giants with their heads down, and playfully guiding the next generation

[20] Or as Aurasma calls them, "auras."

along the path to a more *augmented* reality." And to take it one step further, perhaps the ghost symbolizes even more than that, since nothing is actually deleted. While the service is marketed as though the images and videos are deleted immediately after being viewed, in truth these photos remain, haunting Snapchat's servers long after their short life on recipients' phones. The Snapchat ghost holds significance when considering what AR really is—a medium of creating and controlling apparitions that only certain people are able to see.

Finally, we might consider the ways in which Snapchat so perfectly mirrors the ideology sunglasses of *They Live*. In 2014 Snapchat purchased Vergence Labs for $15M, a company working on a pair of networked sunglasses, similar in many ways to Google Glass (Wong). While little is known about what Snapchat is up to at the moment, it does look like they are making a jump from software to hardware, and the fact that they are hiring so many glasses designers and AR developers hints at a move towards a more streamlined digital-physical apparatus. In "SnapGlass? HoloChat? Snapchat is Secretly Hiring Wearable Technology Experts," Sean Hollister speculates about a different kind of cognitive augmentation, saying, "as much as Google Glass was demonized, one of its most useful features was a camera that was always ready for action and captured exactly what the wearer saw. A pair of Snapchat glasses could do away with the extra steps involved in snapping a shot, and that could encourage people to use the service even more than they do now." So is Snapchat working on a more prostheticized version of its popular service? It's not uncommon to stare at something important for an extended period of time to create a more vivid memory of it, and it's becoming increasingly

common for people to take a photo instead. But what Hollister suggests is that Snapchat could be working to merge the two, to create a memory or communicative prosthetic, hardware that augments human cognition. In Hayles' caveman example, these glasses become part of a "smarter environment" that helps advance the development of more object-oriented, posthuman modes of memory and discourse.

If augmented and other mixed reality mediums were once all about large headsets and cumbersome hardware, now they are being covertly slipped into our phones. While current uses of AR lean heavily towards industry, military, pragmatic, or commercialized uses, close examination at the medium can be much more useful as a practical metaphor for looking at the ways in which our tech experience is streamlined and concealed, as its performativity so often relies on the functionality of a visible/invisible dichotomy. What makes the medium/tech so ripe for techno-critique and critical examination is the fact that it operates so uniquely close to human cognition. AR operates as a "natural" and invisible tech; by its very nature, it could be considered in some ways to be the most human digital tech as it is so often concerned with practical solutions to problems and interactive, digital play. But as the medium relates to ways of extracting processes of imagination and critical tool building, it's the responsibility of the humanities to divert a techno-future away from the "sealed," authoritarian use of the tech in "White Christmas" and towards the hacktivist, open source use of AR as seen through the character Paul in "Havana Augmented." I have been using the term "prosthetic," but through a more posthuman lens it is not difficult to see how this type of digital tech, this AR poetics—the entire spectrum

of AR—can be harnessed into a more naturalized understanding of techno-human materiality.

In *All The World's a Link: The Global Theater of Mobile World Browsers*, John Tinnell offers a useful critique of the very term "augmented reality," by applying examinations of the ways vision relates to "reality" in psychology. He contends,

> We never *experience* a reality that is somehow prior to or purged of images. In this sense, our experiences of "reality" have always already been "augmented" by imaging. One could say that imaging, like writing (if we even distinguish between them), is an *originary supplement* to perception. Thus conceived, the term "augmented reality" becomes a senseless, empty signifier. That world browsers and smartphones bring this capacity into the mass-market, leading to the creation of massive global networks, is precisely what denaturalizes the philosophical stance implied by labeling such technology as augmented reality (Tinnell).

The true power of the sunglasses then becomes not the ability to make the invisible visible, or to uncover masked ideologies, but to see tools of meaning making, tooled discursive practices, as part of the fluidity of posthuman being. That is, as Tinnell observes, AR is just another writing technology through which we augment the world around us, albeit a new one that allows for cogent new avenues of discourse. When AR becomes a prosthetic for a cognitive process we never thought we had, it reveals an ontology where cognition and reality have always been one and the same.

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