Mobile Augmented Reality Art and the Politics of Re-assembly

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Abstract

Experimental art deployed in the Augmented Reality (AR) medium is contributing to a reconfiguration of traditional perceptions of interface, audience participation, and perceptual experience. Artists, critical engineers, and programmers, have developed AR in an experimental topology that diverges from both industrial and commercial uses of the medium. In a general technical sense, AR is considered as primarily an information overlay, a datafied window that situates virtual information in the physical world. In contradistinction, AR as experimental art practice activates critical inquiry, collective participation, and multimodal perception. As an emergent hybrid form that challenges and extends already established 'fine art' categories, augmented reality art deployed on Portable Media Devices (PMD's) such as tablets & smartphones fundamentally eschews models found in the conventional 'art world.' It should not, however, be considered as inscribing a new 'model:' rather, this paper posits that the unique hybrids advanced by mobile augmented reality art— also known as AR(t)— are closely related to the notion of the 'machinic assemblage' (Deleuze & Guattari 1987), where a deep capacity to re-assemble marks each new art-event. This paper develops a new formulation, the 'software assemblage,' to explore some of the unique mixed reality situations that AR(t) has set in motion.

Keywords

Mobile Augmented Reality; Twenty-First Century Art; Assemblage; Deleuze & Guattari; Tamiko Thiel & Will Pappenheimer; Manifest.AR; Code; Embodiment; Public Art.

Introduction

Politically, the disruptions posed by AR(t) have presented a series of uncompromising critical interventions directed at the canonical Artworld (Thiel 2014:31) and at Global Capitalism (Swarek 2014:3). As an emergent form of interactive social commentary, AR(t) on mobile devices pushes into new territory and destabilises old concretions. Pioneering works by key practitioners have collided portable mobile devices with public art practice, deploying geo-locative technology at relevant sites in North America, Europe, Australia and elsewhere. Historians, theorists, as well as the artists themselves have tackled the conceptual and pragmatic implications of mobile augmented reality in public space, focussing attention on the practice of geo-location (Aceti 2011, 2013; Rinehart 2013; Ulmer &

Freeman 2014; Lodi 2014; Rhodes 2008; Geroimenko 2012, 2014; Gwilt 2010, 2014; Lichty 2010-; Rhodes 2008; Thiel 2010-; Swarek 2010-; Pappenheimer 2010-, Freeman 2010-); McGarrigle 2012 -). The intention of this paper is to offer an additional chapter on the unfolding story of AR(t), through exploring the largely untapped relation between mobile AR and assemblage theory, and bringing that to bear on issues of embodiment, ubiquity, surveillance, and materiality.

Deleuze and Guattari attacked the problem of how to provide an adequate account of the forces, flows and intensities operating on the contiguous parts of a dynamic system. Their account situated the compositional drive in a material flow as an assemblage: a self-organising system of material elements drawn from a common technological lineage, where organisation is achieved by way of procedural operations vested in movement, intensity, scale, and flux. Dynamic and provisional, an assemblage always has a side facing 'vertical content' (control, authority, stratification) as well as a side that can make connections with other machines of expression, movement and so forth. The assemblage can therefore instantiate new becomings, while remaining connected to its technological lineage: existing materials are meshed together in all together different ways, allowing highly unique connections to emerge from any given matter-flow. Deleuze and Guattari announce: 'We will call an *assemblage* every constellation of singularities and traits deducted from the flow— selected, organized, stratified—in such a way as to converge (consistency) artificially and naturally; an assemblage, in this sense, is a veritable invention (1987: 406). An understanding of assemblage facilitates an examination of the material elements and relational forces that coalesce in some of the new types of hybrid mixed reality situational artwork emerging from the AR medium. The assemblage allows us to understand such works as both inseparable from the utilitarian thrust of industrial and military AR, the trivialities of entertainment and gaming paradigms, and the possibilities of new and novel aesthetic experiments.

Experimental AR artworks that can be understood as software assemblages include Blast Theory's *Uncle Roy All Around You* (2003), Janet Cardiff and George Bures Miller's *the City of Forking Paths* (2014), Julian Oliver's *Level Head* (2008), and Tamiko Thiel and Will

Pappenheimer's *Biomer Skelters* (2013-), and many of the unique works produced in the last five years by members of the Manifest.AR collective. All are iterative, that is, they produce multiple versions of themselves, with the result that the work never unfolds the same way twice. Iteration, or put another way, re-assembly, is a significant quality of the machinic assemblage, one that occludes the formation of models or repetitive design patterns. *Uncle Roy All Around You* (Benford et.al 2004) and *Biomer Skelters* both mobilise user participation and agency to shift the work as it unfolds; in the former, the participant must trace the elusive Uncle Roy and attempt to converge their path with his; in the latter, the shifting pace of the participant's heart beat effects the growth of a virtual organic biome. *The City of Forking Paths* uses the virtual qualities of AR to situate the participant in a confusing perceptual relation to a parallel world, where participants use their mobile phones to follow the artists' shamanic narrative as it meanders through The Rocks, Sydney, while Oliver leaves the source code and instructions for producing a version of *Level Head* on his website to enable the user to turn programmer/critical engineer. While the mixed reality artworks cited here are certainly not an exhaustive list of the field, these examples serve to convey the differences between the industrial and artistic threads of AR, as well as pragmatically delineate the scope of this paper.

I will be suggesting that using the concept of assemblage in relation to AR as a particular permutation of software as interface introduces a materialist media analysis into the discussion of AR that has been lacking to date. From a technical perspective, AR is any technological system which combines real and virtual, is interactive in real time, and is registered in three dimensions (Azuma 1997: 355). Caudell and Mizell (1992: 659) coined the term 'augmented reality' to describe the visual and textual layer inflected to the heads-up display (HUD) they adapted to display virtual information over structures manufactured at Boeing. Over the next ten years, potential applications in engineering allowed AR to emerge from under the motherly skirt of virtual reality (VR), to achieve its own standing as a distinct medium. However, the problematic transposition of the technology and concepts from an engineering paradigm to more culturally aligned fields is illustrated by the persistence of the information overlay approach. Two examples from the commercial world illustrate AR as information overlay. Wikitude is an interactive map registered in real space via a screen display or PMD to assist in precisely locating a geographical point of interest. Cartographic and geo-locational information is held on a web server and transposed to the local space of the user. From the mobile game industry, the massive multiplayer game Ingress, invites players join one of two pseudo-militarised factions and cooperate to build virtual portals whose instantiation asserts dominance over real space. Many of the design patterns currently deployed in the mobile AR industry proceed from the assumption that the digital screen is somewhat of a transparent analogue to a window: Wikitude is literally an overlaid map, while for Ingress the smartphone screen becomes a 'portal' for the player to look through. This has led to a situation where the weight of industry-directed AR research, is focussed on what happens within the frame of the screen, or the HUD/HMD.

AR as experimental art inhabits a different topology to that of AR as information layer, coalescing around notions of political intervention, critical inquiry, collective participation, and a deep capacity for re-assembly. When deployed in experimental and provisional formulations like the software assemblage, AR by artists presents a creative opportunity to eschew the restrictive commercial products of the AR medium and re-position its associated technologies like Portable Media Devices (PMD's) or the Head-Mounted Display (HMD). Imbued with a micro politics that explicitly values and enhances qualities of experimentation, participation, and critical inquiry, software assemblages challenge the accepted industry driven perceptions of AR as information overlay, and perhaps can operate to undo some of the trivial paradigms that have beset AR in fields such as mainstream gaming and entertainment. Entangled with the conceptual trajectory of the software assemblage is the capacity to self-organise, a key quality that separates the AR as software assemblage from AR as information overlay. For example, the mobile AR artwork *Biomer Skelters* (Thiel and Pappenheimer 2013-15) uses the participant's physiological data— derived from a smartphone fitted with a heart rate monitor— to grow a virtual biome in physical space. As the participant walks, their heart rate increases, and this increase triggers virtual plants that appear to populate the adjacent area. As the participant moves the camera/sensor, they perceive a biome appearing around them in real time, generated by the nuances of their heart rate. Using the sensors in a PMD to measure the physiological data that subsequently articulates real time actions in the biome, creates a self-organising system conjoining real and virtual to participant, mobile wireless network, and device. This is a virtual 'dynamic system' that the participant symbiotically enters to 'co-compose' the work. Participants compete with one another to proliferate the healthiest biome: in Dubai, themes of greening the desert created a kind of 'anthroposcenic' moment. Poetically, in the face of global climate change, humans are able to re-assemble nature by cultivating a virtual biome. Thiel and Pappenheimer pose conceptual answers to ethical problems by using the augmented reality medium to expose the 'rough edge' of perception itself. For a user experiencing an AR work such as *Biomer Skelters*, everyday behaviour in public space (using the PMD camera to view and GPS to navigate) is transposed to a micro-political site of affective experience. A critical engagement is unleashed, where the participant is called on

to mediate the emergence of 'machinic life' in a biome they can either make flourish or wither.
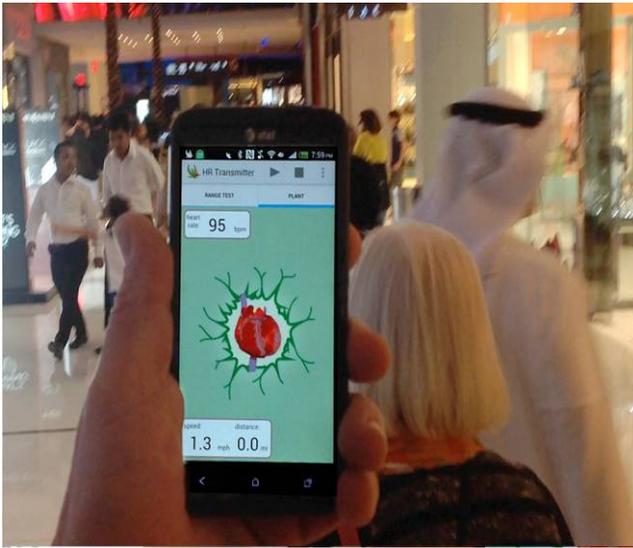
Fig 1. Still from *Biomer Skelters* (Dubai 2014). Heart rate transmitter generates data to grow plants. Courtesy of the artists.

Theorists like Mathew Fuller and John Johnston have explored the notion of assemblage as a compositional force that allows diverse material elements to coalesce according to particular affordances, intensities, flows and attractions. Matthew Fuller (2005) referenced Deleuze and Guattari's assemblage as a force for the self-organisation of matter-flows concerning people, materials, devices, cultures, all interconnected and entangled as a mediatic ecology, such as that present in London's pirate radio scene of the 1990s (2005: 13-53). Fuller's ecology traced the dynamism of such transitional and provisional assemblages, and in particular showed how the consumers were now often also producers (radio disc jockeys, artistes) of music. For Fuller, assemblages are the procedural driving force of a re-invented 'media ecology:' they are imbued with a persistent capacity to re-assemble, and do not concretise since they are in constant motion.

John Johnston (2008) has developed the concept of 'computational assemblage' to 'designate a particular conjunction of a computational system and a correlated discourse' (8). That computational system is cybernetics, artificial life, robotics, and autonomous software agents, while the theoretical discourse is assemblage theory as a processual mode of tracing the emergent and connected behaviours that lie behind organic and non-organic life. Johnston extends these ideas in relation to self-organising machines, from a framework he has termed 'machinic philosophy.' Johnston's use of the term 'computational assemblage' is specifically in regard to his work on self-organizing, semi-automonous machines and their associated software agents. However, it is of significance to my term software assemblage because Johnston's

project re-situated AI and robotic agents as assemblages engaged in radical forms of becoming. This marked a critical turn away from an object-based notion of semi-autonomous machines, since becoming (as a machinic articulation of complexity) pays respect to change, transformation, and singularity, allowing Johnston to more accurately trace the trajectories machinic life is taking as machines increase in complexity toward states of self-organisation (105-161).

Mobile AR(t) from an interventionist thread, has respect neither for the gallery, nor the art world: accordingly, it is one of the most conceptually challenging and ephemeral hybrids to emerge in recent years. Simona Lodi (2014) contends that appropriations of public space by a loosely connected system of 'attacks' using emergent technology, are changing audience perceptions of curation by offering an uncompromising critique which is uninvited by the art establishment. Context and content interconnect in these uncompromising messages, such as Molleindustria's virtual 'one finger salute' attached to the Chinese Pavilion at the 54th Venice Biennale (2011) in defiance of Ai Weiwei's arrest in April 2011. The intervention aimed to challenge the 'spatial, temporal, discursive and institutional framework' (286) of the artworld and most certainly would have been removed immediately had it not been virtual. Emerging with and through AR(t) is an activist politics engaging wireless networks to achieve a critical 'detournement.' In this context, AR has been deployed as a radical political agent, mapped at specific sites where participants do not simply view 'the work' (as one does in a conventional art gallery) but activate the sensation of 'being within' a critically resonant event. Such artivist gestures have allowed AR(t) to forge a specific cultural relation with public space that was, prior to mobile technology, largely occluded. Ulmer & Freeman (2014:61) have recently pointed to the link between AR and an emergent politics of well-being in public space, drawing a parallel with the Nineteenth century town square as a paradigm for vocal disruption as a vector to a radical collective politicisation. Here, a counter-cultural version of the possibilities posed by ubiquity emerges to challenge mainstream AR.

Ulrik Ekman (2013) has argued that 'ubicomp' has not yet been 'concretised' and needs to be explored through its processual operations of emergence. Emergence, traced through Gilbert Simondon's notion of 'transduction,' is a key processual, social and material activity of ubiquitous computing. Ekman contends that ubiquity cannot be approached as a 'controlled coding' but only as an 'event to come,' a matter of an ontogenetic dynamics and its relationality playing themselves out in practice ' (2013:283). The situation of mobility brought about by ubiquitous computing, engages a relational and material capacity for re-assembly, as well as activating a micro-politics that challenges existing stratifications, such as in the Occupy AR works and others (http://manifestarblog.wordpress.com). Here, the gestures of artist and participant emerge together in a provisional

and transitional mixed reality situation. While still resisting the formation of a 'model,' some points of consistency can be noted. Firstly, a participant becomes activator, user, and audience: performing all the operations and gestures that allow an event to unfold in public. The artist, now off to the side, has gifted their agency to code. At the same time, a participant, guided by computational as well as human logic, is interpellated into a performative machine. Secondly, when engaged in such AR(t), 'thinking' is no longer the primary mode of apprehension: sensation, both haptic, aural and related to the feelings generated by a responsive site, play a greater role. Thirdly, in this post-gallery milieu, embodiment is a powerful force, via the gestures a participant needs to activate the work and also through the practice of walking about the site. Referring back to Occupy AR, we find a sympathetic affective tendency at work: the docented art tour staged by members of Manifest.AR in front of the New York Stock Exchange, a location where protestors were forbidden, reveals a strategic use of the virtual, to disrupt authority and stake out a vocal space for critical thinking. In the contexts of the Venice 2011 interventions and as well as Occupy, the virtual becomes an powerful force that cannot be moved along or arrested. Building on Brian Massumi's thought, we could say that mobile AR(t) activates the body of the participant through multimodal sensations that produce a space for disruption as a form of difference, an unfolding event where affect is highly micropolitical. AR(t) does not occur prior to the arrival of the participant: it is co-emergent and relational, affording new modes of being that, if carefully nourished, can shift and perhaps even transform the everyday.

To an extent, the participant in a mixed reality situation has been acculturated to interpret the requisite visual, haptic and sonic processes of AR(t) through a prior familiarity with the tools of pervasive computing. Katherine Hayles (1999) has outlined the difference between 'incorporating' and 'inscribing' practices, and how they operate together to produce an embodied response (1999:198). An incorporated practice (in our case, the gesture of holding a smartphone or tablet to reveal or capture a camera view), cannot be separated from its 'embodied medium' (the portable media device). The complex interrelation between inscription and incorporation (imaged poetically by Hayles as a modulating sine wave) has the effect that: '... culture not only flows from the environment into the body but also emanates from the body into the environment. The body produces culture at the same time as culture produces the body (1999: 200).' Building on Hayles perceptive account, where cultural practices are meshed to the environment through embodiment, affords a perspective into the recent failure of a much heralded AR product, Google's *Glass*. Patrick Lichty (2013) has correctly cited *Glass* as simply an 'informatic overlay'. Extending that citation in it's year of doom, we could add that, as an informatic overlay *Glass* maintained a tight relation with a prior industrial sense of AR (see Claudell and Mizell), and neglected to perceive

the shift of AR into culture as a meshwork of social intensities. The failure of *Glass* is not so much technological but conceptual: in a post-Snowden era, participants in real-time mediatic assemblages are actively resistant to the idea of surveilling others, and are at least partially aware of the industrial goals of big data. In some of the social situations that emerged with *Glass*, user's were ridiculed as 'Glassholes', a low brow quip that somewhat points toward the co-emergent relation between materiality and embodiment: or, culture that is produced by the body, as the body produces culture.

Looking at software as an assemblage, theorists like David Berry and Adrian Mackenzie have developed an understanding of code as more than simply a series of repeatable, executable commands, an approach where software, along with its technical elements of data, code and algorithms, forms the procedural ground of digital mediatic assemblages. David Berry (2011) has a useful conception of code as 'computational logic located within material devices' (63), where code produces a series of materialities conjoining the activities of the end user, the creative writing of the programmer, and the devices that run executable commands, together as a relational system which can be deployed in any given cultural milieu, with quite specific affects. Following Berry, code, when embedded within technical devices, takes the role of organising agent, articulating the nuances of the medium and linking those nuances to software agents, applications, and user behaviours. AR— produced by such conjunctions of algorithms, code and software— is a particular instance of computational logic deployed on technical devices, and as such needs to be explored for its relational and material connections to a social and technical assemblage. In *Cutting Code: Software and Sociality* (2006), Mackenzie explores code as the neglected material 'background' to software. He notes: 'Code is so ubiquitous that it should be an important material for cultural practices and representation, but it is relatively invisible, backgrounded, and forming part of what Thrift terms a "technological unconscious"... .' (2006:25). Mackenzie's analysis proposes a material approach to computational logic as culturally produced by processes than conjoin code with sociality, and facilitates an understanding of the temporal and spatial relations present in events such as those emerging with AR. If, following industrial AR, we primarily perceive AR as an information overlay, we miss its capacity to provoke the multimodal perceptions that turn a passive viewer into an active participant in a radical media assemblage. For example, Cardiff and Miller's *the City of Forking Paths* (2014) places the participant in a situation where they must follow the audio-visual logic of the AR embedded video, along the exact cartography set out by the narrative, and are completely unassisted by the normal technical aids used in AR such as global positioning systems (GPS). Participants trace the multiple narrative flows presented by the work at the same time as maintaining an awareness of their geographical context: if they deviate from the 'forking paths,' they loose their place and are caste adrift

from Cardiff and Miller's parallel perceptual universe. In this way, the work operates alongside each person's unique sensory apprehensions, foregrounding the role of the body in producing a mixed reality experience, not the role of the technology.

Closing remarks

Software assemblage, as I have discussed it, operates as an emergent critical practice that repurposes existing devices, is moved by code (agential and social) as well as situated by signal, feedback, and transmission. It attempts to shift the virile stratifications of Global Capitalism through a series of affective turns, mobilising embodiment, physiology, and conceptually radical thought. It is post-gallery and occurs at a critically interventionist site where public space is utilized and politicized: perhaps a park, a street, a town square, a desert. Wherever and whenever, the future iterations of these singularities are always available for re-assembly.

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