
THE AUGMENTED BUSHWALK : ADAPTATION IN CROSSMEDIA ECOLOGIES

TROY INNOCENT

Swinburne University of Technology
Melbourne, Australia
tinnocent@swin.edu.au

MATTHEW RILEY

Swinburne University of Technology / RMIT University
Melbourne, Australia
matthew.riley@rmit.edu.au

Keywords: Interaction, Mixed Reality, Traversal,
Generative Aesthetics, Non-Urban, Contemplation,
Pervasive Game

Contemplative interaction appears to be a misnomer; the term 'interaction' implies active engagement rather than quiet reflection. However, we are often engaged on multiple levels simultaneously, particularly inside complex systems. The bushwalk is an active engagement with the environment – a naturally occurring complex system – that occupies the body while the mind is adrift. Similarly, digital systems, such as games – artificially constructed complex systems – can induce a flow state in which actions become autonomic, occupying the mind while the body is at rest. This paper explores possible connections between these experiences, outlining a project that aims to blend the two via a technologically mediated bushwalk experience.



1. INTRODUCTION

The bushwalk is a widely recognised ritual for contemplation in Australia. In indigenous culture this is highly structured; the 'walkabout' is a rite of passage lasting up to six months during which 'songlines' are traced, literally walking in the steps of their ancestors. Outside of Australia, the 'nature walk' is a common way to engage with the natural environment. While this activity may sometimes take place in a wilderness environment, more often than not, national parks are often managed or cultivated to an extent. Centuries of agriculture and the cultivation of gardens has shaped the natural environment in many ways. Although to players who have grown up in the digital forests and mountains of Azeroth as their wilderness, the local park may still be a wilderness worthy of exploration. More recently, land art and digital interventions into natural spaces have staged new relationships with the environment.

Games, both digital and otherwise, provide frameworks for the traversal of space, in conjunction with codes of behaviour for interaction. Games are defined by verbs and actions that define and stage an experience. They also can facilitate interaction via feedback, providing constraints on the experience through time, space or otherwise. Over the last decade, many games have been situated in mixed realities and we feel that this is a suitable space to explore contemplative interaction. A mixed reality game situates digital systems in an embedded context, shifting away from an isolated, hermetic space with discrete components. A mixed reality is an interconnected system of components in an environment made of many different materials: media, objects, people, actions and so on. It is a complex, experiential system that recognises that environments, such as cities, have their own algorithms and patterns with emergent properties and generative potential. Traversal is a key driver in all these contexts – the experience is generated by traversal through an environment, a game world, or a mixed reality. This paper discusses how this traversal can be augmented to stage contemplative interaction in a bushland environment.

In considering the bush as a site for recreation and with the increasing advancements of pervasive computing technologies to augment our physical environment with digital systems, we see new opportunities to cre-

ate novel and playful experiences in this setting. Artist Perdita Phillips, known for her photographic, sound and installation work situated in remote parts of Australia has suggested that recent art practice has rarely engaged with these locations due to a lack of “techniques and possibilities that seem relevant to the contemporary” (2007). However in harnessing these technologies we intend to explore alternative ways of being in the bush and demonstrate how this may invite new perceptions and experiences in this setting.

2. THE BUSHWALK AS CONTEMPLATIVE INTERACTION IN AN IMMERSIVE ENVIRONMENT

This paper discusses traversal within a mixed reality, which places the player in an augmented reality (AR) through the exploration of a bushwalk. Walking has a rich cultural and social significance (Solnit 2001) although it has been suggested that its role within aesthetic practice is much less understood (Stalbaum 2011). With the often-cited psychogeography of Guy Debord (Tuters 2004), Dada and Surrealist art (Careri 2002) and the respective walking art of Bruce Nauman (Morrison-Bell 2012) and Stanley Brouwn (O'Rourke 2012) now being acknowledged as pre-cursors to contemporary practice in this area, an historical framework is developing. Urban interventions such as pervasive games, art installations and locative media projects informed by these precedents have received prominent attention (Borries et al 2007), however a relatively small but developing practice has also seen the traversal of non-urban environments ranging from the hiking tracks of British Columbia (Rueb 1999) to the expanses of Anza Borrego desert of Southern California (Stalbaum 2005) that are mediated through digital systems.

If walking is a specific cultural practice (Solnit 2001), how may it be considered within an Australian bush setting? Harper (2007) traces bush-walking's iconic cultural and personal importance in Australia, situating it in the context of land ownership, access, conservation, cultural identity and recreation. White and Ford (2010) similarly emphasize the long history of recreation in forming ambulant relationships with the expansive Australian landscape, noting the popularity and significance of nature studies and wildflower hunts as forms of play. Ryan describes these activities as a 'mode of participation' which

collapses the “[r]omantic ocular divide between the human appreciator and the picture-esque scene” (2011). Here the environment shifts from ‘appearance to experience’ (Ryan 2011), no longer perceived in representative, pictorial or scenic terms but instead a dynamic, embodied and multi-sensory experience.

Fig. 1 Australian bushwalk



2.1 . RELATED PRACTICE

The augmentation and intervention of wild, remote or natural settings is a long-established phenomenon before the advent of digital systems. The often monumental Land Art and Earthworks of the mid 60s and early 70s, Andy Goldsworthy’s ephemeral and intricate site-specific interventions and Richard Long’s environmental sculptures made from walks, were all created in and from the landscape itself and re-situated the forms, qualities, lines, and colours of nature in subtle and striking new arrangements. These works have been identified as pre-cursors to contemporary art-based practice that has employed visualisation, sensor, data, GPS technologies in non-urban locations, although Hoy notes this field has been approached far less often than urban projects (2011). LEA’s Special Issue: *Wild Nature and the Digital Life* (Grigar 2006) and more recently ISEA’s *Machine Wilderness* (Polli 2012) conference in New Mexico has drawn attention to some projects in this area, however models, languages and frameworks are still emerging.

Artist Teri Rueb explores what she describes as “kinesthetic attunement” (2011) with GPS driven audio walks such as *Trace* (1999), *Core Sample* (2007) and *No Places with Names* (2012). Creating spatial narratives of poems, songs and stories constructed by participants as they re-

flectively move through the landscape with headphones, Rueb has argued that audio is a more appropriate form of engagement for these projects as participants can better engage with the surrounding environment without the distraction of screen-based, visual content (2004). Speculating over a decade ago on how we might adapt to “multi-modal interfaces as they become more pervasive” (Rueb 2004) challenges and possibilities remain in how these may be designed and experienced within non-urban environments.

3. CROSSMEDIA ECOLOGY AS A MODEL FOR CONSTRUCTING THE EXPERIENCE

Given the challenges posed by multi-modal artistic practice in non-urban environments, how can contemplative interaction support multiple modes of engagement in these locations? We propose that digital systems connect with the natural world to form a mixed reality through the concept of a crossmedia ecology. Crossmedia ecologies are complex, emergent systems that blend different media with an awareness of their multiple modalities: phenomenological, semiotic and coded (Fuller 2007). This will be explored as a framework for staging the traversal of an augmented bushwalk. A crossmedia ecology builds on the idea of a media ecology as a materialist exploration of media networks as complex systems. Here, as with other forms of transmedia, the emphasis is on traversal through the system and the ways in which meaning is constructed in that journey. A cohesive event, in this case a bushwalk, bind the various units together in an environment – a crossmedia ecology.

Understanding a media environment as a complex, dynamic system acknowledges the generative aspect of that environment – the ways in which it may be shaped by technology or techniques, how modes of information may impact on its structure, and how codes of communication may shape its experience. From the outset, it is seen as the product arising from the mixing of codes, interaction, perception and play.

Over the past decade, crossmedia ecologies have emerged through gameplay. Play is recognised as a primary force in shaping culture and language, and as a tool for both deconstructing and creating systems (Huizinga 1949). Games have been part of culture for

millennia, and recently digital games have dominated mainstream media culture. With a generation growing up with digital game play as one of their primary modes of engagement with the world, they recognise game play rules and systems in their world view. This allows a new generation of players to intrinsically understand and participate in, many kinds of multi-modal and pervasive games.

Pervasive games play outside of digital spaces, with or without supporting digital systems and may provide a suitable habitat for crossmedia ecologies to thrive. Although largely staged in an urban context, many examples of this type of gaming will be explored that demonstrate the idea of the crossmedia ecology and the role that traversal plays in generating these experiences.

3.1 . RELATED PRACTICE

Many contemporary works are engaging in ideas of a crossmedia ecology, manifesting in many different configurations of mixed reality. While the overwhelming majority of these are staged in an urban context, they inform this project through their exploration of modes of interaction, rules of engagement, and the construction of meaningful connections in the traversal of transmedia.

One of the earliest combinations of the outdoors and technology is geocaching (Peters 2007), the practice of using GPS devices to locate hidden caches all over the world. Each location has tradable objects and digital traces left as comments on *geocaching.com*; making the solitary bushwalk and interconnected social experience. Caches are rated via difficulty and players often evolve further rules and systems around the sites, playing off mobile technologies and the atmosphere of the sites in varying combinations.

Blast Theory, an artist group using interactive media, have produced a number of pervasive games in cities. *Can You See Me Now?*, one of the first location-based games, is built on a system that blends two different modes of interaction and ways of seeing the city. Street players are literally on the street with access to a GPS view of online players and can contact other street players via walkie talkie. The online players see a diagrammatic, game-like view of the same city and must navigate their avatar to avoid the GPS-synced locations of the street players.

If players are ‘tagged’, they are out. Thus, street players and online players traverse the same space in different modalities, the experience manifests in the transmedia ecology that emerges through play.

Artist Troy Innocent’s *Colony* is described as an ‘urban art environment’ and stages a more ambient mode of play. A public art commission situated in the Melbourne Docklands, *Colony* is an interactive sculpture garden situated in a residential area. The sculptures ‘talk’ to one another using a coded language, autonomously generating patterns of light and sound with speakers and lights embedded in their structure. Players, one or more, may also talk to the sculptures via an iPhone app that allows them to be played as synaesthetic musical instruments this also allows for spontaneous play in the space. Paths run through the garden allowing players to traverse the space on foot while using a mobile device – the visual and sonic events made possible by the generative system embedded in the installation of totems allow players to learn its language and the range of expressions afforded by that system. Social rules may also emerge as multiple players – who may be complete strangers – compose together, perhaps developing call and response interactions or simply seeing who can make the most noise.

Both projects illustrate a framework for contemplative interaction utilising traversal through an urban space. The game play in each sets in place rules and systems to connect existing parts of the environment with players, as well as digital systems that construct a crossmedia ecology. It is in the traversal of this newly manifested space that the meaning and experience of the work is constructed. Utilizing this framework, we now turn to contemplative interaction in non-urban spaces.

3.2 X = bushwalk + crossmedia ecology

Central to the different types of experience described in this paper thus far is the traversal of space, whether that be the actual space of a bushwalk or the constructed space of a crossmedia ecology. In each instance the engagement with the experience is dependent on the process of linking and connecting spaces constructed about and around the player or players. Understanding this mode of engagement informs the design, aesthetics and technical resolution of a project that aims to augment the

bushwalk via a game-like information layer. How can these disparate elements be combined into a cohesive experience? And does the resulting experience manifest a form of contemplative interaction?

Whilst some may argue that a walk in the Australian bush is an effective way to get away from technology, the augmented bushwalk may also be seen as a 'portal back into nature' for those who primarily see their world through the small screen of a mobile device. On another level, the context of this experience – like many locative media projects – is critical. The simulation of aspects of the natural world within the complexity of actual nature draws attention to limits of that abstraction and the assumptions underpinning its construction.

The central aim of the new project described in this paper is to construct a mixed reality, blending different modes of traversal to engage the player in contemplative interaction. However the project also aims to critique more broadly the understanding of nature as represented in the abstractions many of us are familiar with in a digital environment. For example, simulation games and Real Time Strategy (RTS) games focus on the management and effective use of resources to achieve short and long term goals. This may result in a degree of procedural literacy in understanding how complex environments emerge and evolve over time. Drawing upon this understanding, the game is designed to highlight aspects of the natural environment via their simulation – for example, a 'seed' to plant the next algorithm may be physically carried from one site to the next in the bushwalk to engage the player with the actual processes that occur in a natural environment. Thus, the proposed mixed reality project is a map, a language and journey inviting contemplation on an understanding of the natural environment from the mind of the player.

4. OUTLINE OF THE PROJECT

The project expands upon a previous project that created a series of site-specific mixed reality artworks situated in urban environments. The first iteration of this project, entitled *noemaflux*, was created around nine sites in Ogaki, Japan, which were claimed as 'readymade game spaces'. A series of overt AR marker was placed into each site claiming it as part of the work (see Fig. 2)

This approach marked the territory of the work and signified its presence before the experience of the digital component – each marker functioned as a portal into an artificial world.

Fig. 2 *noemaflux* Ogaki, Japan. Troy Innocent & Indae Hwang 2010



This artificial world comprised of a set of digital entities, one located at each site. Expressed as both a computer graphic and sound, their appearance changed depending on data introduced from the previous site visited by the player. Effectively, the player carried a seed from one site to the next to initiate the process of generating the graphic and sound content. Using the metaphor of pollination, the players were playing the role of honeybees by shifting the data around within a mobile device.

In 2011, a second iteration of *noemaflux* was staged in Istanbul, Turkey as part of ISEA2011. In this iteration, the digital content was represented as a form of digital graffiti inscribed onto the streets of the city, again with the data from each site seeding the next. Players used AR markers and generative writing systems to create an experience of abstract virtual art in urban environments.

The most recent iteration was developed during a residency at the Magic Vision Lab connected to ISMAR 2013 in Adelaide, Australia. Deployed on an iPad and developed using the vuforia library in Unity, this version introduced complex fiducial markers integrated into the urban environment (see Fig. 3) Again a set of nine markers transformed sites into locations for the game, which one or more players could play simultaneously.



In *noemaflux:ia* the game is musical. The device displays and plays a sequence that is collected by finding and activating the markers. Players create a piece of music by traversing the space of the work, slowly increasing their presence in the urban environment by making more sound. As each layer of the work is decoded, another code is revealed drawing the player deeper.

The next iteration of the work is situated along a Sherbrooke Forest walking track located within the Dandenong Ranges National Park, Victoria. Having long been a place of interest for artists such as renowned Australian landscape painters Arthur Streeton and Tom Roberts, Sherbrooke Forest has also been a site of study and conservation for its distinctive native flora and fauna. An apt location to explore a crossmedia ecology via a digital system, *Epiphyte* will both draw attention to aspects of its environment as well shifting our experience and perception of it.

The key intention of the work is to encourage contemplative forms of interaction that meaningfully relates players to both the environment and digital system. While mobile devices are not usually associated with these more subtle and slower modes of engagement, the project intends to invoke this reflective process through the traversal of an augmented bushwalk. In a similar manner to Bartle's 'explorer' (1996) play style in interacting with the world and Flynn's description of a virtual

Fig. 3 *noemaflux:ia* Adelaide, Australia.
Troy Innocent 2013

flanerie navigating game spaces (2003), the work considers walking, movement and navigation in support of a spatialised, contemplative experience.

This manifests as generative imagery on the screen of the device triggered by the discovery of AR markers on the bushwalk. These on-screen digital entities are based on the adaptive behaviour of actual orchids found throughout the Dandenong Ranges. Similar to how orchids adapt to animals in their environment for pollination, the entities of *Epiphyte* will adapt to one another, the material environment and players interaction with them in the attempt to establish a type of balance within the simulation. This mechanic builds on Melissa Harper's (Harper 2007) description of a bushwalk as a mode of discovery, a recreational activity and a heightened engagement with 'nature' from within the landscape itself as traversal through the environment determines how the adaptations evolve.

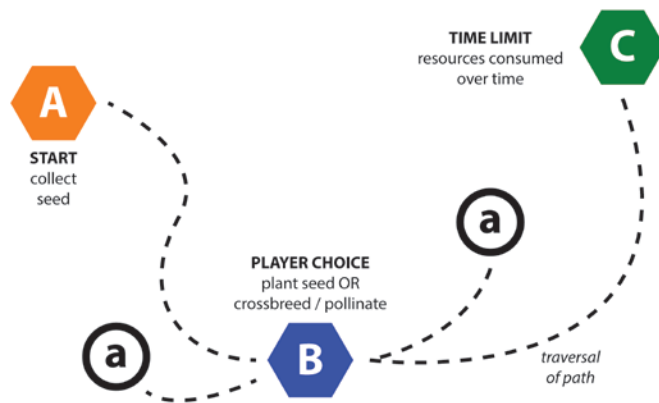
The objective of the game is to balance the diversity of this crossmedia ecology while keeping it alive. This begins when a player finds the first site in the bushland and activates it, collecting a seed to activate the next site. The seed has a time limit – it can die – encouraging the player to find fertile ground for it or risk starting over. These simple game objectives and constraints engage the player in meaningful processes and actions that reflect the games objective.

The bushwalk is remapped via thirty-six AR markers temporarily situated near features of the walk – trees, ferns, grasslands, streams and rocks. Held in place using natural cotton rope, knots and pegs (Fig. 4.) these AR markers are both familiar and unfamiliar in the bushland context. They are familiar as environmental signage but have their own unique code that draws on existing practices and signs in non-urban environments such as geoglyphs, orienteering guides and topographic symbols.

The AR Markers serve a number of purposes; redefining the space with signs to establish a crossmedia ecology; distinguishing the species within this ecology, acting as navigation landmarks to guide participants as they traverse the space and finally, as readable signs, they will also trigger changes in the on-screen content of the mobile devices carried by participants.

Fig. 4 Concept art for a bush AR marker in *Epiphyte* attached via rope





Two types of AR markers appear on the bushwalk. The first set of twenty-seven AR markers represents three distinct species that form the ecology of *Epiphyte* – each species is linked to nine markers. These are clearly distinguished by their colour (orange, green, blue) and their design (physical shape, position in-situ and graphic glyph). A second set of nine markers act as ‘resource’ points for the player to nurture ‘seeds’, extend the life cycle of the entities and trigger further behavioral and aesthetic changes. The player must make strategic decisions as to move directly to the next site or take a detour to acquire resources (Fig. 5).

Visually, the AR markers act as a framework to anchor the generative drawing processes. These sprite-like forms reconfigure themselves differently each time a player scans a marker with their device. A simple generative system triggers audio and visual changes that form the digital entities. The relationship between the AR markers and the on-screen content is both aesthetically and conceptually linked, the players connected to both the physical and virtual worlds of the game.

In this game that frames the mixed reality the overall objective is to balance the crossmedia ecology and create a sustainable artificial ecosystem. A player may focus on developing one species, traversing the site specifically in search of the group of markers associated with those entities. In seeking out more striking aesthetic transformations (sound, animation, colour, shape etc) a player may also attempt to crossbreed the three species. However in doing so there is a greater risk of the entities fading and retreating if new conditions created by the breeding are not met. The player decisions are strategic: plant too many singular seeds and the system collapses due to lack

Fig. 5 Player choices when navigating sites in *Epiphyte*

of diversity or rely too much on cross-breeding and the system dies due to lack of cohesion as it does not adapt to its environment.

In situating this work in an alternative context we intend to contribute new models and frameworks for designing, experiencing and evaluating these cross media ecologies – specifically in illustrating how contemplative interaction may be supported in harmony with a bushwalk.

6. CONCLUSION

This paper has outlined our project to augment a bushwalk with a game that encourages contemplative interaction via a mixed reality. While urban environments have been well-documented and understood as sites for location-based mobile and pervasive games and artworks, *Epiphyte* will explore the characteristics and features of the Australian bush as a space for interaction. The proposed work considers the rich history of recreation, play, traversal, contemplation and art within non-urban-environments to develop new forms of creative expression that ultimately shift our experience of place. While this paper positions the project, further research will focus on the implementation and study of the behaviour and experience of players within the mixed reality later this year. This will explore and investigate the ideas proposed in this preliminary research.

The themes of adaptation and traversal are explored in a number of new spaces that we hope will inspire contemplation of our complex relationship to these environments via engagement through interaction – in this case a simple game that combines physical and digital interaction in a mixed reality. There is a technological adaptation of AR into a bushland setting, an adaptation of the player into the game of bushwalk, and an abstraction of nature into a digital system that mimics the biological processes of adaptation in Australian orchids. The experience relies on traversal – both of the bushland and the digital system – that combines physical and mental engagement and meaningful switching of modalities in interacting with its content. These are hallmarks of a healthy and diverse mixed reality.

REFERENCES

- Blast Theory.** "Can You Seen Me Now?." 2003.
- Bartle, Richard.** "Players Who Suit MUD's." <http://mud.co.uk/richard/hclds.htm>.
- Borries, Friedrich von, Walz, Steffen P., Böttger, Matthias, Davidson, Drew, Kelley, Heather, Kücklich, Julian.** *Space Time Play: Computer Games, Architecture and Urbanism: The Next Level.* Switzerland: Birkhäuser Architecture, 2007.
- Careri, Francesco.** *Walkscapes: Walking as an Aesthetic Practice.* Land&Scape Series. Barcelona: Editorial Gustava Gili, GG, 2002.
- Flynn, Bernadette.** "Languages of Navigation Within Computer Games." <http://hypertext.rmit.edu.au/dac/papers/Flynn.pdf>
- Fuller, Matthew.** *Media Ecologies: Materialist Energies in Art and Technoculture.* USA: The MIT Press, 2007.
- Grigar, Dene and Sue Thomas.** "Wild Nature and the Digital Life." *Leonardo Electronic Almanac* 14, n°.07 08 (2006).
- Harper, Melissa.** *The Ways of the Bushwalker: On Foot in Australia.* Sydney, NSW: University of New South Wales Press Ltd, 2007.
- Hoy, Meredith.** "Eco-Locative." <http://socialmedia.hpc.unm.edu/isea2012/?q=apply/artist-talks>.
- Huizinga, Johan.** *Homo Ludens: A Study of the Play-Element in Culture.* London: Routledge & Kegan Paul, 1949.
- Innocent, Troy.** "Colony: An Urban Art Environment." *Second Nature* (2009): pp. 98-133.
- Morrison-Bell, Cynthia.** *Walk On: From Richard Long to Janet Cardiff - 40 Years of Art Walking.* United Kingdom: University of Sunderland, 2013.
- O'Rourke, Karen.** *Walking and Mapping.* Cambridge, Massachusetts: The MIT Press, 2013.
- Peters, Jack W.** 'Geocaching: The Combination of Technology and the Outdoors' in Borries et al. *Space Time Play: Computer Games, Architecture and Urbanism: The Next Level.* Switzerland: Birkhäuser Architecture, 2007.
- Phillips, Perdita.** "Fieldwork/Fieldwalking: Art, Sauntering and Science in the Walking Country." Edith Cowan University, 2007.
- Polli, Andrea.** ISEA2012 Machine Wilderness. <http://socialmedia.hpc.unm.edu/isea2012/>.
- Rueb, Teri.** "Trace." 1999.
- . "Focus discussion on Locative Media: Proprioception." <http://34n118w.net/UCHRI/extract.htm>
- . "Core Sample." 2007.
- . "Kinesthetic Attunement: Walking, Talking, Listening, Knowing." <http://isea2011.sabanciuniv.edu/panel/site-specifics-mobile-media-art-and-contexts-place>.
- . "No Places with Names." 2012.
- Ryan, John Charles.** "Not a Bush Flâneur? The Convergent Topographies of Recreational Bushwalking, Floristic Appreciation and Human Embodiment in the Southwest of Western Australia." *Colloquy: Monash University Postgraduate Journal*, n°.20 (2010): pp. 5-32.
- Solnit, Rebecca.** *Wanderlust: A History of Walking.* New York: Viking, 2001.
- Stalbaum, Brett.** "Experiments with Virtual Hikers." 2005.
- . "Walking Art and a Short Introduction – Brett Stalbaum for C5." <http://www.intercreate.org/2010/10/walking-art-and-a-short-introduction/>.
- Tuters, Marc.** "The Locative Commons: Situating Location-Based Media in Urban Public Space." *Electronic Proceedings of the 2004 Futuresonic Conference* (2004).
- White, Richard, and Caroline Ford.** *Playing in the Bush.* NSW: Sydney University Press, 2012.