

VISUALISING INVISIBLE NETWORKS AS COLLABORATIVE ARTS PRACTICE

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This paper examines approaches to the visualisation of ‘invisible’ communications networks. It situates network visualisation as a critical design exercise, and explores how community artists might use such a practice to develop telematic art projects – works that use communications networks as their medium. The paper’s hypotheses are grounded in the Australian community media arts field, but could be applied to other collaborative contexts.

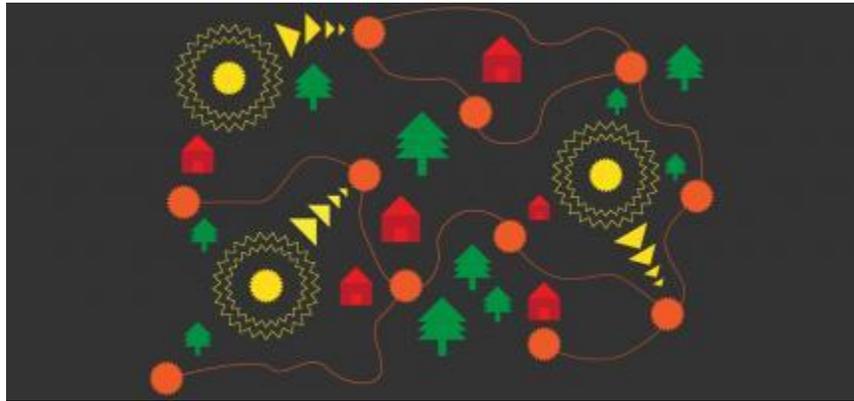


Figure 1: creative visualisation of a mesh WiFi network.

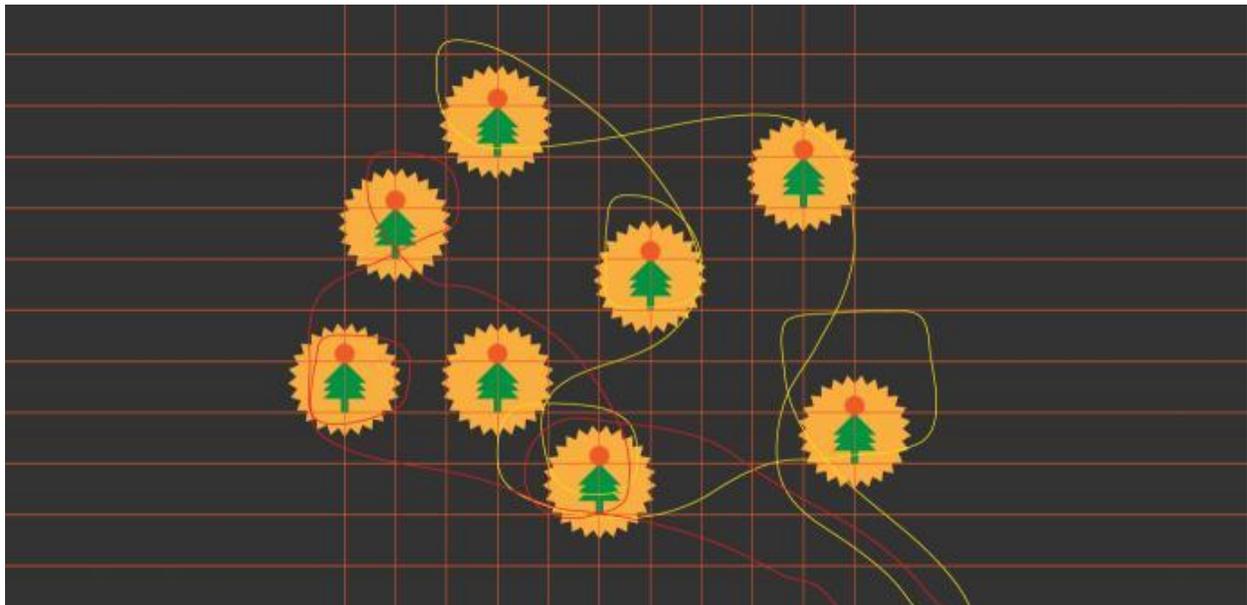


Figure 2: visualisation of anticipated movement through a WiFi installation.

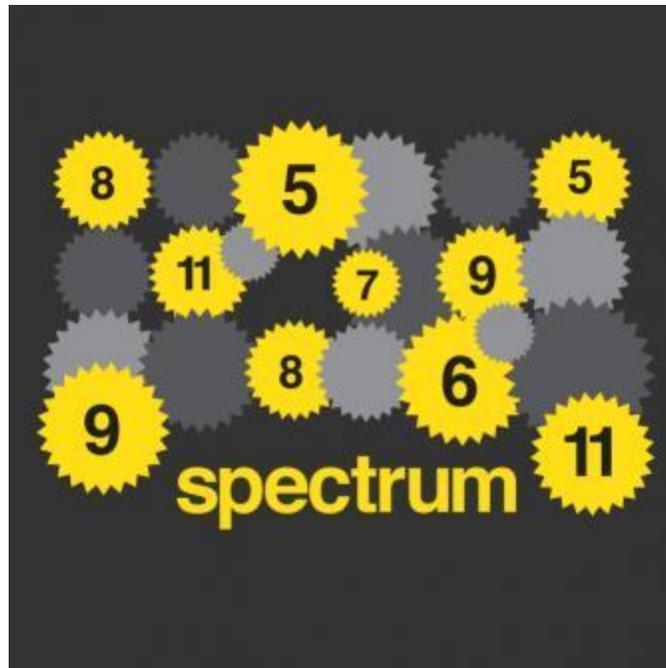


Figure 3: visual response to the wireless spectrum.

The Community Media Arts Context

Community arts and development has traditionally been considered a collaborative creative pursuit. In Australia, the field has occupied various positions on the activist, cultural and welfare spectrums since the 1960s. It has been considered an avenue for political activism, cultural democracy, self-determination, civic engagement, capacity building, community collaboration, empowering the marginalised and skill building.

The founding community arts practitioners rejected the notion that creative practice was for the pursuit of high art and the exclusive domain of the professional artist. The field's mandate was to reframe art as a practice available to anyone, and to reconfigure arts policy to support such activities (Hawkins 1992). Practitioners communicated this idea through the term 'cultural democracy', emphasising the decentralisation of the means of cultural production. Although the notion of 'cultural democracy' has traditionally framed community arts and cultural development practice, I would argue the term 'building agency' better describes the community media arts field's current agenda.

My notion of building agency, in a community media arts context, involves using creative practices to nurture people's capacity to act in the world. One approach to this scenario involves helping participants gain a better sense of their personal ethics, by engaging them in creative practices that raise their awareness of the dynamics of everyday situations. This heightened sense of one's own boundaries creates opportunities for self-reflexivity, and could move the individual beyond merely having agency, towards more considered, conscious action.

The everyday situation this paper is concerned with is participation in digital communication networks, an activity that is defining the current cultural moment – the networked moment. This networked moment presents both a new source of power and knowledge and a new site of privilege and inequality – a spectrum of effects that manifest as a result of network actors. The premise of the paper builds on this dynamic, and proposes that visualisation may be used to uncover and reveal these actors and hence the power relations among them.

Critical Network Participation

This paper's consideration that CMA practices should nurture people's critical literacy around everyday situations, moves beyond the dominant mode of addressing new media participants – from those who use networks, to those who understand networks. In doing so, it challenges 'storytelling' as the dominant mode of CMA practice – a dominance that emerged due to low-cost video production tools becoming widely available in the mid-nineties, which led to a contingent of film-makers becoming involved in community arts projects – a contestation of the status quo similar to Hecks' (1985) questioning of the acceptance of community arts folk aesthetics in the 1980s. So as CMA in Australia realigns its logics to the networked moment, nurturing capacities to critically navigate communications networks, should become part of the remit of practitioners.

Network users are faced with an evolving set of signs, protocols and pragmatics that affect navigation and participation. Often these functions "operate at a level that is anonymous" or invisible, which "makes them difficult to grasp" (Galloway and Thacker 2007, 5). Anonymous network actors represent forms of control that include interfaces, processes, software, and hardware – selecting, adding, withholding, displaying, channeling, shaping, disregarding and deleting (Barzilai-Nahon 2008). These protocols are inescapably related to power, meaning questions relating to participant agency naturally become a concern of the community media artist.

Building network agency is inextricably linked to developing an awareness of network structures and dynamics; and this exploration begins with the consideration that technological development is not an autonomous occurrence, but rather a social, nonlinear process. The interplay between technology and culture is situated in relationships – both human and technological – whose complexities can be understood by considering their "articulations and assemblages" (Slack and Wise 2005, 109). Articulation and assemblage looks to the web of connections contributing to the technology and its impact on society. The cause and effect binary is replaced with an appreciation of the matrix of actors, non-actors and liminal spaces that impact societal change.

Visualising 'Invisible' Networks

Visualisation techniques range from abstract representations to more analytical cartographic approaches. They are an increasingly popular method of framing information and are used to encourage the practice of connection-making. The approach I am suggesting for the community arts context falls towards the abstract end of the network visualisation spectrum – a fair distance from data-driven network visualisation, which is based on network theory and mathematics.

By rendering the matrix of actors in networks 'visible' through visualisation, we can begin to map connections, flows and blockages. We begin to form a picture of the social and technical forces at play. The objective of visualising 'invisible' networks is to interpret the articulations and assemblages of networks, exposing participants to the idea that "the very notion of a network is in conflict with the desire to gain an overview" (Mackenzie 2010, 9). It is also to expose the binary nature of networks – that they operate on the logic of inclusion/exclusion and that they are both self-configurable and programmed (Castells 2009). These objectives respond to Ascott's essay *Gesamtdatenwerk* (1989), where he describes the process of "making the invisible visible" as "the great challenge of late twentieth century art" (Ascott 2003, 222).

Visualising communications networks may also help decipher emergent nodes of connection or significance. This process of projection may help anticipate the potentiality of a network. Take the case of wireless networks. MacKenzie proposes that "wirelessness, affects how people arrive, depart, and inhabit places" (2010, 5). Becoming more conscious of these invisible dynamics could increase people's sense of how "their wireless devices are expanding and multiplying relations, overflowing existing infrastructures and environments and realigning senses of personhood at many junctures and on different scales" (2010, 12).

Working with visualisation techniques to highlight the power dynamics with networks may also help community media arts participants develop critical visual skills. These might include tools for the production and analysis of visuals, such as information design or the registering of embedded ideologies within visual material.

Network Visualisation as Telematic Art Process

This paper supports telematic art as an approach for community media artists, and offers network visualisation as a preliminary (critical) design task for the creation of telematic art. Network visualisation activities may provide a critical entry point for the design of telematic art projects, as participants begin the artistic process by engaging with the structures and dynamics of networks. This approach is designed to provoke, inspire and question fundamental assumptions about the role technology plays in everyday life.

The term 'telematic art' was introduced in 1978 by Roy Ascott, whose creative work and writing had a significant influence on early artistic explorations of networks, including experiments with video and satellites in live performances; and, collaborative story-making using computer networks. The term is still used to describe artworks that use communications networks as 'material', but such projects are also referred to as 'networked art'. I have chosen the term telematic art as I feel it situates communications networks as a medium of the work.

Speculative Design Proposal: *WiBuy*

Critical Design, popularised by Anthony Dunne and Fiona Raby, takes a critical theory approach to design, and uses speculative design proposals to challenge assumptions we have regarding the products

we use. This paper draws on notions of Critical Design, to offer a speculative design scenario through which to explore its themes. It also looks to critical design to provide a framework for combining the aesthetics and ethics of network visualisation, allowing community artists and participants to explore what Anne Galloway, drawing on Latour, describes as “matters of concern rather than matters of fact.” Critical Design pulls focus on how the design process arranges relations between things, ideas, people and places, and in turn, triggers a critique of communications networks, building awareness of anonymous network actors.

The speculative community media arts project I am proposing, titled *WiBuy*, will be a ten-week workshop series followed by a public outcome that will form part of a day-long community festival. The work will use a temporary mesh WiFi network, WiFi enabled mobile phones and mapping software to devise an outdoor, locative media installation.

The project draws on the practice of geocaching – an orienteering activity that involves hiding and seeking out ‘caches’ in publicly accessible places. People use mobile devices and other navigation techniques to find the ‘caches’, which are often small containers that contain a logbook or historical information about the corresponding site. *WiBuy*’s caches will be a digital download of a tutorial on how to make something. The nature of these do-it-yourself (DIY) activities, decided by project participants, range from making cakes solely from raw ingredients, to building your own bicycle from bamboo. Each digital ‘cache’ is assigned to a particular WiFi router, which means that people have to move around the festival site to gather them all.

An important aspect of this locative media project is the mesh wireless local area network (WLAN). Mesh networks enable WLANs that cover large distances. Their topology is distributed, meaning the architecture is decentralized and connections form in an ad hoc way through ‘repeaters’ that spread the wireless signal. Mesh networks also make it easy to share excess bandwidth with the network – this can be thought of as similar to putting electrical energy ‘back in to the grid’. At the initial project workshop, the CMA practitioner might begin by guiding the participants through visual explorations of the dynamics of mesh networks, and their associated signals and dynamics. Figure 1 is an example of a mesh network visualisation – the yellow dots show the main nodes that have a direct connection to the Internet, and the orange dots represent the mesh repeaters that share bandwidth. The CMA practitioner would be careful to remind participants at various stages of the project that the network visualisations they create are only conceptual explorations of network dynamics, and are not fully representative.

There are a myriad of ways for the CMA practitioner to get participants thinking about and visualising networks. Figure 2 is an example of how visualisation techniques could be used to anticipate the movement of people through *WiBuy*; and figure 3 is a visual response to thinking about the wireless spectrum, where the yellow starbursts represent active channels. The type of mobile device and software people would be using to access the digital download could be used as subject matter for a network visualisation. CMA practitioners might also draw on Dunne and Raby’s metaphor of the spectrum as a “nervous system” (2001, 18). This would provide an entry point for understanding ‘hertzian space’ as a real landscape (Dunne and Raby 2001).

Conclusion

By using network visualisation techniques in telematic community art projects, participants have the opportunity to unveil the actors within networks. This process is applied with the aim of increasing critical participation in communications networks. Critical network participation builds from a heightened consciousness around the articulations and assemblages of networks, and has the potential to improve connection-making abilities. This encouragement of visualisation practices around communication networks may also develop critical design skills around the production and analysis of visual material.

References and Notes:

- A. Dunne and F. Raby, *Design Noir: the secret life of electronic objects* (Basel, Birkhauser, 2001).
- A. R. Galloway and E. Thacker, *The Exploit: a theory of networks* (Minneapolis, University of Minnesota Press, 2007).
- A. Mackenzie, *Wirelessness: radial empiricism in network cultures* (Cambridge, MIT Press, 2010).
- B. Latour, *Reassembling The Social* (Oxford, Oxford University Press, 2005).
- B. Latour, "Networks, Societies, Spheres: reflections of an Actor-network theorist" (paper presented at Annenburg Networks Network, Annenburg, CA, 2010).
- G. Hawkins, *From Nimbin to Mardi Gras: constructing community arts* (Sydney, Allen & Unwin Pty Ltd, 1992).
- J. D. Slack and J. M. Wise, *Culture and Technology* (New York, Peter Lang Publishing Inc, 2005).
- K. Barzilai-Nahon, "Toward a Theory of Network Gatekeeping," in *Journal of the American Society for Information Science and Technology* 59, no.9 (2008): 1493-1512.
- M. Castells, *Communication Power* (New York, Oxford University Press, 2009).
- R. Ascott, *Telematic Embrace* (Berkeley: University of California Press, 2003).
- R. Hecks, "Rethinking Community Arts," in *Meanjin* no.4 (1985): 553-555.
- W. E. Bijker, *Of Bicycles, Bakelites, and Bulbs* (Massachusetts, MIT Press, 1997).