

TRANSMESH: A LOCATIVE MEDIA SYSTEM

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Abstract

Our research project demonstrates the technosocial possibilities that result from creating localized mediated spaces or 'meshworks' using Bluetooth in order to publish independently produced content. Bluetooth technology is a double-edged sword. It is a meshwork for sharing media freely between mobile device users in public places such as shopping centres and private spaces such as the home and the workplace. It presents opportunities for the design of innovative creative projects, however technical issues, user acceptance and competition for the user's attention provide continuing challenges.

Urbanscapes in the 2000s are often places where people occupy a 'space of flows' [1] in which they can be constantly connected to networks. We are using the term 'mediated space' following Mark [2] to refer to physical places where wireless computing devices such as mobile phones are ubiquitous and access to media is facilitated using Hertzian space telecommunications infrastructure. We focus on the potential for art and entertainment with Bluetooth meshworks as well as practical technical considerations because the logical option is "to work through the inevitable granularity and gaps within these systems, to find the new shadows and opacities that they produce" [3]. We expose some of the technosocial granularities and issues of setting up a WiFi system (Transmesh) using Bluetooth as a way of publishing independently produced content.

Bluetooth is a wireless protocol utilizing short-range communications technology facilitating data transmission over short distances from fixed and/or mobile devices, creating wireless personal area networks (PANs).

The intent behind the development of Bluetooth was the creation of a single digital wireless protocol, capable of connecting multiple devices and overcoming problems arising from synchronization of these devices. Bluetooth uses a radio technology called 'frequency hopping spread spectrum' which chops the data and transmits it as chunks on up to 75 different frequencies. In its basic mode, the modulation is Gaussian frequency shift keying which can achieve a gross data rate of 1 Mb/s. The specifications are developed and licensed by the Bluetooth Special Interest Group (SIG),

which consists of companies in the areas of telecommunication, computing, networking, and consumer electronics.

Bluetooth provides a free way to connect and exchange information between devices such as mobile phones, telephones, laptops, personal computers, printers, GPS receivers, digital cameras, and video game consoles through a secure, globally unlicensed Industrial, Scientific, and Medical 2.4 GHz short-range radio frequency bandwidth. Its range is a radius normally between ten and one hundred metres, depending on both the power of the radio transmitters and receivers as well as the presence or absence of physical obstructions in the vicinity of the transmitters.

In 1999, Mark[2] claimed that a sense of physical place will have increasing importance in the complexity of human and computer interactions in the future. Ten years later, the more complex relationship of networked computers to place that Mark foreshadowed is here. Mediated spaces are enabled by Hertzian space which Varnelis [4] describes 'as real as the physical world'. As various spectrums in Hertzian space are co-opted by technologies to create mediated spaces, they extend the range of social activities that may be undertaken in a physical site. This is a global phenomenon. Mediated spaces are extending their reach providing people with a sense of place in a variety of public places such as coffee shops and transient spaces such as trains [5]. In Ho Chi Minh City, Vietnam one can connect to the Internet wirelessly and without charge in Highlands, the local chain of coffee shops.

Urban places are becoming more complex as they are draped with wireless communication nodes including Bluetooth that create ephemeral networks that promote social interactions and dynamic engagement in new media technologies. Bluetooth is ready to be appropriated for sharing content as well as more typical uses of connecting devices wirelessly and transferring files from one computing device to another. Kostakos [6] argues, "Bluetooth has quietly become one of the most widely used technologies found on the streets today." He points to its duality as both a way to locate other mobile devices and in turn to be found. He argues that a user who owns a Bluetooth-enabled device effectively owns a Bluetooth scanner. This characteristic of Bluetooth technology offers potential for projects appropriating innovative forms of information sharing and communication.

The Transmesh Project

The first phase of our project was aimed at exploring the types of media that may be accessed with mobile computing devices using Bluetooth. Initial tests found that small file sizes up to 500kb using formats such as txt, jpg, mp3 and 3gp were optimum for distribution. Larger file sizes caused issues with connection time-outs and some phones crashed when attempting to download a large file. This is a constraint for producers of media that needs to be addressed through content design.

We created a design brief for the prototype that it would send out media files to mobile phones. The files would be one of three types compatible with most mobile phones: jpg for images, txt for text, 3gp for video. The prototype would also need to recognize a device on subsequent encounters so a different file could be sent each time. Two databases needed to be built: one, which held the media files and one, which stored IDs of devices.

We tested the server in a busy street in Melbourne, Australia. We hoped that the physical appearance of the server would intrigue people in the street. Many passersby looked at the object with curiosity but kept walking. Some stopped because they were particularly interested in the solar panels. Once they found out what the object was they kept walking. A few took the time to stop and discuss mediated space with the researchers.

From our field tests we identified user acceptance and people's intimate relationships with mobile phones as key design considerations for Bluetooth meshworks. Many owners regard mobile devices as an extension of the self [7]. People use mobile phones as a technology for the presentation of the self [8] so they have strong emotional connections with their mobile phones. Goffman's [9] analysis of the presentation of the self according to the revealed, public self and the concealed, private self applies to mobile phone use as well as to the mobile phone as an object. The private information hidden from the public gaze can include address books, calendars, diaries, photographs and banking details such as pin numbers.

Naturally owners are very protective of their phones. As a result, many leave their Bluetooth off or invisible when in public places because an attack on their phones may constitute a material attack on their phones may constitute a material attack on their private information as well as compromise or limit their ability

to remain connected to others via a network. Hence people need to be enticed to turn their phones Bluetooth to visible when in the vicinity of a Bluetooth publishing system.

We posted an online survey linked through social software (Facebook) to find out about popularly held perceptions about Bluetooth and mobile phones. Our survey results suggest that more people would be prepared to accept media from Bluetooth meshworks if there was more content on offer that captures the imagination. Pervasive computing and mediated spaces offer opportunities for filmmakers and new media artists to distribute their work in an interesting and creative manner and for users to engage with mediated spaces in surprising ways. It would appear that the challenges associated with Bluetooth meshworks are far outweighed by the potential of Bluetooth technology to provide alternative publishing models and innovative modes of social engagement.

The survey demonstrated that Bluetooth as a file sharing technology is already becoming pervasive. People frequently create temporary meshworks to exchange photographs and ringtones. The ability to create temporary meshworks within the flows of Hertzian space without having to have an account with a telecommunications provider has huge technosocial ramifications.

At present meshworks are locally based, limited by the range of a Bluetooth enabled device. However, through a bricolage of server side software and use of WiFi, the reach of the Transmesh meshwork may be extended in the future

beyond the scan zone of a specific Bluetooth device. This also opens up possibilities for relaying files from one Wi-Fi and/or Bluetooth device to another – similar to the way in which Bluetooth is used to relay sms messages via a series of handsets from the sender to the intended addressee in Africa [10].

The research team has explored the technical granularities of building a Bluetooth server and found that gaps in coverage and transmission are inevitable. Bluetooth covers spaces loosely whereby physical obstructions can cause breaks to transmissions. The Bluetooth scanning process itself presents opportunities for locative media projects. Its ability to locate other mobile devices means that a user who owns a Bluetooth-enabled device is also in possession of a Bluetooth scanner allowing them to scan for devices within their proximity. Pervasive computing in the form of Bluetooth offers innovative forms of information sharing alongside concerns about privacy, takeovers and surveillance. Indeed, privacy, takeovers and surveillance may in themselves present new ways of producing and sharing compelling content. Bluetooth can also create new modes of social engagement through the building of ad-hoc ephemeral meshworks in urban spaces. Users who accept ambient media via Bluetooth may choose to keep that media in motion via the construction of these meshworks. Those who use Bluetooth on their own portable media devices to push out media content to others within range, generate the potential for the creation of multiple meshworks.

The first public use of *Transmesh* was to broadcast poetry for the Melbourne Writers Festival at strategic sites within Melbourne's central business district – the Capitol Theatre and Federation Square. Melbourne is already well respected as a city for the arts, as a UNESCO City of Literature. This project enhances that reputation through the introduction of emergent technology appropriated in a novel way to emplace poetry and other creative content in the Melbourne urban landscape. In the spirit of bricolage, that is appropriating technology for innovative uses we also published the poetry using Twitter, popular social software. Our next design and development challenge will be to expand the Transmesh system into a series of Bluetooth nodes that may be managed remotely and to extend its interactivity through meshing it with other networked technologies such as GPS.

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Fig. 1. Ad hoc ephemeral meshworks using Bluetooth servers Artist © Dean Keep, 2008

