
Infostructures – Embedding Media Facades in Public Transport

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Abstract

In this paper we present an investigation into how new screen technologies, such as media facades, can contribute to improving the quality of existing public transport environments. We propose the notion of 'info'structures, which describes the integration of smart, or responsive, digital information into the existing physical fabric via media facades in a coherent architectural and spatial context. The paper presents two design explorations to investigate possible uses of media facades in public transport environments. Based on these two examples we discuss how digital technologies and networked communications can transform and augment public transport infrastructure, allowing new forms of intelligent, adaptive, interactive and self-aware architecture to be developed.

Keywords

Urban informatics, media facades, responsive technologies, public transport, smart environments

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Human Factors

Introduction

Our vision is to improve existing transport environments by integrating smart, or responsive, digital information into their physical fabric with the purpose of improving the overall user experience. Such an approach has the potential to reduce pressure on transport infrastructure at a period when public transport service provision is increasingly challenged by the continuing growth of the population in cities.

Given the significant challenges associated with transport infrastructure expansion including cost, disruption, energy use, and implementation periods the augmentation of existing transport environments offers alternate measures to manage demand and improve the user experience. Intelligent and responsive digital technologies, along with media facades and personal devices such as phones and smartcards, offer opportunities for creating user-centric timetables, public information, way-finding and ticketing. To investigate the capability to stream, screen and embed information in an existing public transport infrastructure we developed 18 design explorations in collaboration with students from a graduate studio. Some exemplary results of the studio are presented in the paper; the complete findings of the studio and the resulting publication will be presented and discussed at the workshop.

Background

Relevant research in the field of enquiry includes: the architectural potential of digital technologies in the urban public realm and the study of urban experiences that use real-time and ubiquitous technology [1]; real-time information technologies to understand the relationships underlying urban spatial structure [2];

public media screens as large scale interface for communicating information [3]; and customer experience in the context of multiple media delivery platforms [4]. For example, research has shown that obtaining accurate real-time timetabling and route information, such as estimated arrival times is essential for a positive user experience [5]. Some cities around the globe are benefiting from radio frequency identification (RFID) ticketing as a common form of payment [6]. Research has also been undertaken with regard to commuter stimuli barriers and sensory-overload [7]; relations between real-time information; timetabling and willingness of non-transit users to use public transport [8]; evaluations of the beneficial effects of at-stop real-time information displays [9]; the benefit to people with cognitive disabilities in their use of public transport, enabling community integration, socialization, and independence [10].

Research Explorations

The research hypothesis was tested through an architecture graduate studio coordinated by the researchers. Students were tasked to investigate the capability to stream, screen and embed information within an existing public transport environment using standardized or custom-made media facades. The busy, aging Central Station in Sydney, being a multimodal public transport hub, was our location for research experimentation. In the following section two exemplary projects are introduced and evaluated.

Intelligent Tunnel

Public transport patronage is predicted to experience significant growth over the decades to come. 'Intelligent tunnel' took this assumption and the associated issue of passenger flows as inspiration for

change. Based on the Fruin standard levels of service, an existing pedestrian tunnel was analyzed using the Fruin calculation method and a processing script examining pedestrian movements. Based on these investigations the design intervention suggests two possible alterations: (1) a travelator to control the travel direction of the users while increasing their travelling speed and (2) fold out functions to utilize space during off peak times. The concept of a travelator is widely used in airport environments and can find similar application opportunities within public transport environments.



Figure 1. The existing tunnel transformed into an interactive, responsive environment © Vinh Nguyen

The design intervention combined the proposed travelators with digital screens located parallel to the travelling direction, where software enables the content to travel at the same speed as the travelator and therefore identical speed for a stationary passenger. Through this intervention the length of journey through the tunnel could be, psychologically, further reduced by giving the traveler intermediate stops.

Dare to be aware

As with many public places today, train stations are under constant surveillance enabled with CCTV technology. While the main purpose of CCTV cameras is in preventing crime and antisocial behavior, they still function as a reactive and not preventive system creating a 'big brother' effect with an anonymous person watching. 'Dare to be aware' investigates the utilization of the existing CCTV network at Central Station and aims to remove the mono-directional 'big brother' idea of surveillance and instead create a proactive system, one where the camera can be used to preempt and protect, rather than simply record and react. In achieving these aims sections of the existing underground tunnel system were chosen as installation sites for interactive screens. Each site is designed to simultaneously display real-time CCTV footage and record activity to be viewed by fellow commuters in other areas of the station. These screens seek to establish a 'socio-public' space within Central station where individuals can pass by and interact with one another. By creating an interactive interface, commuters are encouraged to actively participate in this passive surveillance. In consultation with Central station stakeholders, the project developed nine scenarios to demonstrate how the system would operate. These included: playing interactive games, 'a conversation' and 'looking out for each other' to name but a few. The design intervention broadened the function of the existing pedestrian tunnels into a virtual environment, offering space for public video art installations as well as increasing the perception of safety and security through passive surveillance.

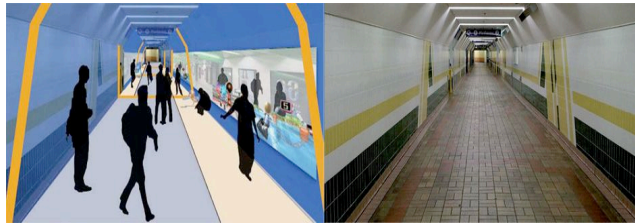


Figure 2. One of the interior spaces transformed by applying media façade technology © Anna Ganko

Conclusion

The design explorations presented in this paper demonstrate an application area for media façade technology beyond playful interactions. The proposed scenarios enable people to engage more than once with same content typology (such as timetable information, etc.) when at the same time the user experience could be improved by providing alternate information access interfaces that have the capacity to communicate real-time timetabling, way-finding and ticketing information amongst others via media facades. The vision of this research is to offer opportunities for improving existing public infrastructure environments by transforming them into responsive environments ready for the challenges of the 21st century.

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