Icebreaker NUIs: Encouraging Social Conversations Around Interactive Urban Spaces

Abstract
Interaction with digitally augmented urban spaces has increasingly relied upon Natural User Interfaces (NUIs) to achieve low-entry levels for the interaction and promote social encounters. In this paper, we discuss two interactive interventions we developed using NUIs for activating two very distinct urban spaces. Despite their highly different contexts and content strategies – one informational, the other playful – we observed that both prompted similar collaborative behaviour among participants, who engaged in conversations with other participants via their digital representation on the screens. To better understand the observed interactions we present a comparative analysis of the two interactive scenarios.

Author Keywords
Natural user interfaces, public display, playful behaviour, full-body interaction.

ACM Classification Keywords
D H.5.2 [User Interfaces]: Interaction Styles; I.3.6 [Methodology and Techniques]: Interaction Techniques.

General Terms
Design, Human Factors.
Background
In this paper, we present two interactive media façade applications we recently developed: the Media Ribbon and Solstice LAMP. Both urban interventions were made available during a public lights and ideas festival and designed with the aim of activating "in-between" spaces otherwise poorly utilised, turning them from mere pedestrian thoroughfares into destination zones.

The Media Ribbon
This is a gesture-based interface developed as a public display located at the University of Sydney. The display consists of two high-performance projectors positioned inside the glass wall of the School of IT building. They are aligned to produce a 1.2 by 4.2 meter large display area. The resulting image is back projected on a film on the glass façade of the building, facing the courtyard of an adjacent theatre (Figure 1, top). Tracking of participants is carried out with a single Microsoft Kinect camera. Conceived as an iteration of an ongoing design process on gesture interfaces [4][7], the original goal of the Media Ribbon was to serve as an information platform for passers-by, who could then learn about events at the theatre and activities in the university. We developed a system to support people exploring the ribbon content using four simple hand gestures [1]: left-swipe, right-swipe, arm-up, and arm-down. To assist them in learning these gestures, the system shows four static pictograms at the bottom section of the display (Figure 2). Each is highlighted once their corresponding gesture is executed. Figure 2 also shows the user’s representation as a "stick figure" skeleton, an extra feedback mechanism [7] indicating the interactive nature of the display [2]. This representation was favoured over silhouettes or live video feed so as to avoid obstructing the main content displayed.

Solstice LAMP
Solstice LAMP [3] was a large-scale responsive environment installation consisting of two main sections: (1) an interactive zone at the floor level; and (2) laser animations projected on the façade of a 125-metre tall building. The interactive zone consisted of an overhead structure where two large-venue projectors and two depth-view cameras (Microsoft Kinects) hung, tracking passers-by who approached the building.
forecourt. People within the interactive zone were surrounded by their respective digital silhouettes projected onto the floor around them (Figure 3). Every 60 seconds, the silhouettes were ‘detached’ from their owners and started moving towards the building and then climbing the façade until they disappeared at its top (an effect created with laser animations projected onto the building). After that, the interaction resumed.

Results
Analysis of the interaction logs for the Media Ribbon revealed that, although some of the gestures were successfully learned, there were also long periods of people facing the screen without necessarily triggering any of the gestures. A preliminary analysis of the corresponding depth video recordings indicated a surprising level of intrinsically motivated engagement with the display without any direct goal [5]. Although this playful behaviour may be attributed to a number of factors, we observed that it seems to have been amplified by the somewhat whimsical mirror representation of people in the form of a skeleton. In fact, despite the interaction itself being driven by gestures of a single user, skeletons were displayed for up to 6 participants tracked in front of the display. Depth footage reveals numerous occasions where groups of people started to interact playfully with each other through their skeleton representations, seemingly paying little attention to the informational content.

Data gathering for Solstice LAMP relied chiefly on field observation, revealing some patterns of participant behaviour. In particular, we observed that people would (1) start playing with their projected silhouettes almost immediately upon entering the space; (2) engage in creative collaboration with their acquaintances; and (3) limit social interaction with others they were not acquainted with to ordinary social etiquette (e.g. apologising for invading their ‘personal spaces’).

Discussion
Both works considered in this paper were designed with the aim of activating public spaces previously poorly utilised. To achieve that goal, both implemented NUIs for interaction with media architecture [9], based on depth-view cameras (Microsoft Kinects) and making use of full-body interaction to lower the entry threshold for the interaction. Playful and social behaviour was observed in both works. In particular, such behaviour seems to have been encouraged by small groups of passers-by being prompted by visually intriguing feedback from the displays. This feedback seemed to have allowed them to express themselves creatively and socially in the public space while exploring the interface, effectively turning the interaction into a performance [8]. While that had been the core goal of Solstice LAMP all along, it was not the primary purpose of the Media Ribbon. Importantly, neither of the activated public spaces were zones where people would previously congregate or socialise in the playful ways observed with our displays.

We attribute the increased sociability of the space to the perceived playfulness of the interfaces. This is supported by the immediate engagement observed in both scenarios by participants entering the interactive zones with the corresponding whimsical visual representations of their physical bodies in the digitally augmented environment. Crucial to sociability, however, was the fact that both interfaces were large enough to accommodate multiple participants simultaneously, and they were then able to engage in
social conversation via triangulation [6], i.e. mediated by the digital interface. This seems to have been relevant particularly for the Media Ribbon, where playfulness was an unintended consequence of the design, enabled by an otherwise ancillary visual cue.

Conclusion
In this paper we presented two interactive digital works deployed in distinct public urban spaces during a large festival. Although one had been designed as utilitarian information display and the other for playful purposes, both seemed to have promoted a similar behavioural response from participants: engaging playfully with the work and socially among one another through triangulation with the work. Considering specific aspects of the interaction design of each work, we propose that this is largely due to the whimsical graphical representation of each individual, direct mapping to their real-time movements and capacity of the interface to accommodate multiple participants simultaneously. Although findings are still incipient, we expect that they can point towards design factors for sociability to be further explored in upcoming studies.

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References