Designing for performativity: conceptual developments and future directions

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Abstract
Designing for performativity in public settings has become ever more relevant for HCI with the increasing role of technology in recreation and leisure activities. We summarise various threads of our own work in this area both as part of current and past projects.

Keywords
Trajectories, magic performance, spectatorship, framings, bystanders, orchestration, crowds.

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

General Terms
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Introduction
As interactive technologies push out into ever more diverse public spaces, whether it is through increasingly commonplace use of mobile and embedded devices in the urban environment, or growing use of interactive

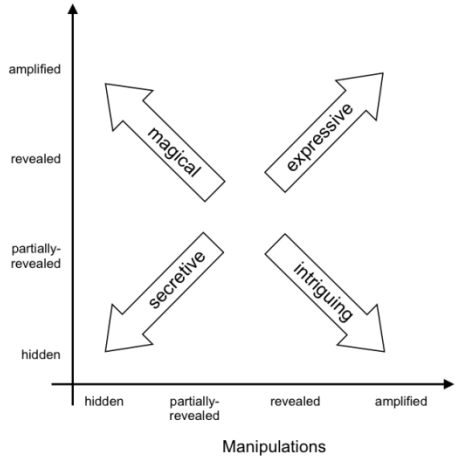

Figure 1. A comparison of the extent to which manipulations and effects are hidden, revealed or amplified reveals key strategies for designing spectator interface.

technologies in exploratoria, museums and galleries, or through the deployment of novel forms of interfaces supporting artistic performances, there is a pressing need to understand the relevance of spectators and audiences to HCI. Drawing on our own investigations of technology deployed in various public settings, we present a series of interrelated concepts aimed at understanding and designing for the performative nature of HCI for discussion at the workshop.

Spectator interfaces

An early contribution focused on how a nearby spectator might experience a performer's interactions with an interface [9]. This involved rethinking how input and output are designed – in particular observing that interface *manipulations* may encompass 'non-input' such as performative gestures around an interface that form part of an input sequence. Equally, the *effects* of interface manipulations may go beyond existing concepts of 'output' to include the visible effect of the interface in its user. Reconsidering the spectator experience of input and output led us to think about how a user's interface *manipulations* and *effects* might be hidden, revealed, or even augmented for the spectator. By reflecting on various combinations of hiding or revealing manipulations and effects we uncovered four key strategies for designing spectator interfaces (Figure 1): *secretive* (hidden manipulations and effects, e.g., a photo booth), *expressive* (revealed or augmented manipulations and effects, e.g., performers using gestural interfaces to generate visuals or sound), *intriguing* (hidden effects but revealed manipulations, e.g., head-mounted displays), and finally *magical* (hidden manipulations but revealed effects, we will explore an example of this below).

Magical interfaces and deception

More recent work further explored the nature of magical interfaces, by creating and studying a series stage magic performances in which a magician used a computer vision system to fool a series of 'punters' as they played the classic three-cups magic trick. From this, we uncovered a more nuanced understanding of manipulations and effects, as a stage magician "often reveals only some aspects of manipulations while hiding others, simultaneously occupying several areas of [the manipulations and effects space]" [6]. We also extend our account of spectatorship to consider strategies such as deliberately misdirecting spectator attention and setting up false expectations for the spectator (creating indirection in causal mappings between manipulations and effects), relating these to Alan Dix's concepts of feedback and feedthrough in collaborative interfaces [4].

Performance frames and bystanders

Looking beyond the immediate or deliberate spectator to the use of an interface, we have also considered how such use may impact upon bystanders who happen to be in the same environment. This led us to consider the way in which interactions in public are bracketed, or *framed*, and how the design of performance frames affects technology-mediated interactions. Goffman's notion of framing broadly indicates the context within which a performance takes place, with certain "principals of organization" [5] helping to make such a performance intelligible to those engaged in and observing it. By exploring the boundaries of the performance frames, our work has uncovered how such aspects factor into design, and how technologically-mediated interactions may take advantage of framing. Designing for the role of the bystander, for instance, as

Figure 2. Fitting riders with personal telemetry systems in order to enhance the experience of spectating an amusement ride.

a spectator unaware of the framing of a public performance, becomes important. An important feature is thus the 'payoff' moment for bystanders as they engage in making sense of others' use of the interface, and being inducted into the frame. Furthermore, our study of the performance work Uncle Roy All Around You show how experience designers can deliberately exploit ambiguity over frame boundaries (such as whether some objects or even people are part of the frame of the interactive public experience or not). Here, we identified two main strategies for ambiguous framing: either extending the apparent boundaries of the frame to implicate unassociated bystanders and objects in the world (such as buildings, cars, etc.); or contracting the apparent boundaries of the frame so that seemingly unassociated bystanders are in fact, say, actors, and seemingly unassociated objects are in fact 'props' [1, 8].

Crowded interactions

Further extending our work on spectatorship, we have also begun to consider how larger formations of audiences – particularly crowds – may come to be engaged in shared experiences [7]. Instead of breaking down spectators and audiences into roles, we can consider the crowd itself is considered a distinct interactional unit, highlighting the various opportunities offered in supporting crowds being crowds – for example, synchrony, timing and the physical and verbal ways in which crowd members make 'offers of participation' ensuring that their actions are observable and openly collaborative for 'strangers' in the crowd (e.g., chants, songs, Mexican waves). 'Crowd-ness' may be expressed via the use of shared objects to offer distant members of the crowd to engage in shared, collaborative action (e.g., horns, flags, etc.); this engagement also persists between events (e.g., repeated use of flags, an established repertoire of songs, etc.).

Orchestration

A series of ethnographic studies of interactive performances have repeatedly highlighted the importance and nature of orchestration work, that is the work that it takes – often from behind the scenes – to manage and steer the performance as it unfolds. Orchestrators may often be professionals who balance the tasks of monitoring participants' interactions and intervening where necessary, with occasionally taking on 'front of house' roles as actors, or even fluidly stepping between the two as required. A recent study of augmenting amusement rides through personal telemetry systems revealed how this perturbed the existing triangle of relationships between riders (performers), spectators and the ride operators (orchestrators) [10].

Trajectories

As well as designing for the different roles – performer, spectator, bystander, crowd, orchestrator and so forth – that might be involved the public performance of interaction as outlined above, it is also important to consider how people may move between them during the course of a performance. For example, bystanders may progress to being spectators and eventually to performers, or professional participants may step back and forwards between being visible performers and hidden orchestrators. We have recently argued that people may follow a trajectory through such roles as part of a broader trajectory through the various real spaces, timescales and interfaces that define the general ecology of the performance. Indeed, we have

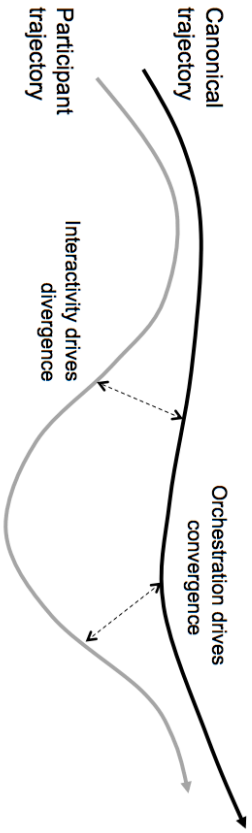

Figure 3. The divergence and convergence of canonical and participant trajectories driven by interactivity and orchestration.

proposed that mixed reality performances in particular, but perhaps other wider classes of experience too, can be understood and described in terms of three fundamental kinds of trajectory [3, 2]: canonical, expressing an authors intended journey through an experience; participant, expressing a participant's actual journey; and historic, expressing one way in which the experience might be retold or replayed afterwards. In turn, the ways in which these various trajectories diverge, converge and interweave define the performative and social nature of the experience (Figure 3).

Weaving together these interlinked pieces of conceptual work is our long-established practice of developing, deploying and studying interactive experiences "in the wild" through direct technological intervention. This has covered a range of settings, from performance art pieces that deploy novel ways of interacting with the city, such Uncle Roy All Around You [1], to engaging visitors at amusement parks [10], to collaborative creative drawing on large screens at festivals [12], to large-scale, long-term interactive augmented reality artwork installations [11]. The core challenge here is to iteratively and tightly weave together technology development, public deployment, ethnographic study, and conceptual work.

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References

[1] Benford, S., Crabtree, A., Reeves, S., Flintham, M., Drozd, A., Sheridan, J. and Dix, A. The Frame of the Game: Blurring the Boundary between Fiction and Reality in Mobile Experiences. In *Proc. CHI '06*, ACM.

[2] Benford, S. and Giannachi, G. *Performing Mixed Reality*. MIT Press, 2011.

[3] Benford, S., Giannachi, G., Koleva, B. and Rodden, T. From Interaction to Trajectories: Designing Coherent Journeys Through User Experiences'. In *Proc. CHI '09*, ACM.

[4] Dix, A. Challenges for cooperative work on the web: An analytical approach, Computer Supported Cooperative Work 6, 2-3, 135–156, 1997.

[5] Goffman, E. *Frame Analysis: An Essay on the Organization of Experience*. Harper & Row, 1974.

[6] Marshall, J., Benford, S. and Pridmore, T. Deception and Magic in Collaborative Interaction. In *Proc. CHI '10*, ACM.

[7] Reeves, S., Sherwood, S. and Brown, B. Designing for crowds. In *Proc. NordiCHI '10*, pp. 393-402, ACM.

[8] Reeves, S. *Designing interfaces in public settings: Understanding the role of the spectator in Human-Computer Interaction*. Springer, 2011.

[9] Reeves, S., Benford, S., O'Malley, C. and Fraser, M. Designing the Spectator Experience. In *Proc. CHI '05*, ACM.

[10] Schnädelbach, H., Egglestone, S. R., Reeves, S., Benford, S., Walker, B. and Wright, M. Performing Thrill: Designing Telemetry Systems and Spectator Interfaces for Amusement Rides. In *Proc. CHI '08*, ACM.

[11] http://www.youtube.com/watch?v=QKL7_n1UvQ0

[12] http://graffito.bigdoginteractive.com/