Designing for Performative Interactions in Public Spaces

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ABSTRACT
Building on the assumption that every human action in public space has a performative aspect, this workshop seeks to explore issues of mobile technology and interactions in public settings. We will examine the design of performative technologies, the evaluation of user experience, the importance of spectator and performer roles, and the social acceptability of performative actions in public spaces. The workshop will aim to bring together researchers and practitioners who are interested in the rapidly growing area of technologies supporting use in a public setting, and through this, explore the themes the workshop offers, plan for publications which synthesize together this disparate work, and finally to facilitate future collaborations between participants.

Categories and Subject Descriptors
H.5.2 User Interfaces: User-centered design, Theory and Methods, J.4 Social and Behavioral Sciences: Sociology.

General Terms
Design, Human Factors.

Author Keywords
Social Acceptability, Spectator Experience, User Experience, Mobility, Performative Interaction.

INTRODUCTION
Recently, different performative or theatrical metaphors have accompanied the development of novel embodied interaction formats and experiences with ubiquitous technologies [15]. Embodied interaction interfaces in interactive installations, as well as in mobile and wearable devices, create opportunities for moving the locus of interaction from the virtuality of the screen to the physical space or from screens in a primarily personal context to screens in a primarily public context. Recent examples of this work include interactive public screens [11], multimodal art installations [7], wearable sensing devices to augment entertainment experiences [16] and mobile devices that can be used as props thanks to sensors [17].

The workshop aims at attracting concurrent research within both theoretical and constructive fields that contributes to the discussion around the workshop's main themes. In particular we are interested in exploring novel interface technologies such as multimodal, ubiquitous, and wearable interfaces, and how they shape, choreograph, and/or articulate mobility and performative interactions in public settings.

THEORETICAL BACKGROUND
The etymology of the term "performance" shows that it does not have the structuralist implication of manifesting form but is rather a processual sense of bringing to completion or accomplishing [4]. Anthropological studies of performance have roots in a pragmatic view of experience. Particular principles can be identified from this perspective to performative interactions beside *accomplishment and intervention*, for example their *event and processual character*. Performances are not generally amorphous or open-ended; they have diachronic structure: a beginning, a sequence of overlapping but isolable phases, and an end. Finally, another key issue revolves around the issues of expression and experience when actively or passively participating in a performance.

Reeves et al. [12] present a taxonomy with four broad design strategies for the performer's manipulations of an interface and their resulting effects on spectators: the "secretive", wherein manipulations and effects are largely hidden; the "expressive," in which they tend to be revealed, enabling the spectator to fully appreciate the performer's interaction; the "magical", where effects are revealed but the manipulations that caused them are hidden; and, the "suspenseful", wherein manipulations are apparent but effects are revealed only as the spectator takes his or her turn.

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Commenting on the work of [12], Dalsgaard and Koefoed Hansen [1] observe how the user (particularly when in a public setting) is simultaneously operator of, performer in, and spectator to her own interactions. Thus, a central facet of aesthetics of interaction is rooted in, as they put it, the users' experience of themselves "performing their perception." They argue that this three-in-one situation is always shaping the user's understanding and perception of the interaction, and they address the notion of the performative spectator and the spectating performer. [1] thus also implicitly addresses Merleau-Ponty's notion of "seeing-myself-seen" [9].

WORKSHOP THEMES

There are four main aspects of performative interactions in public spaces that the workshop will address.

Technologies for performative interaction

A variety of interface technologies can shape and contribute to performative interaction in various ways. Computer vision can be used to track objects and bodily movements as well as facial expressions. Other sensors such as microphones can process sound (e.g., voice). Wearable sensors and devices can be used to interpret gestures and their expressivity. However, performative interaction is not only supported by input, but also by multimodal processing and by output solutions. In fact, tangible interfaces such as multitouch are characterized by unifying input (control) and output (representation). The augmentation of input signals creates feedback loops that in turn affect the performative interactions.

- **What are input interfaces that can be used to track performative interaction?** (Including computer vision, sensing, devices, etc.)
- **What processes might we employ on multimodal inputs (for example, fusion) in real-time of performative interactions?**
- **Affective loops and outputs solutions.** What techniques can be used (e.g., projections, mixed reality, etc.) effectively in real-time performative interaction?

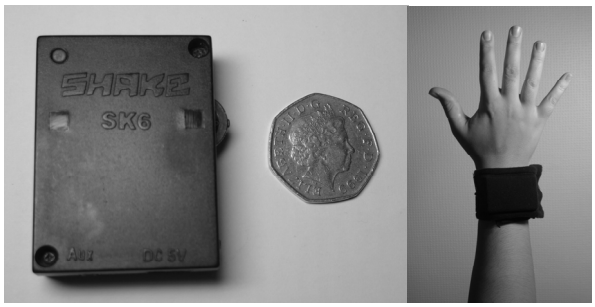

Figure 1. Sensors, such as the SHAKE [13], can be worn on different places of the body to capture movement. The SHAKE contains an accelerometer, magnetometer, and gyroscope.

Evaluating user experience

The design and evaluation of the user experience for performative interactions is a major issue in that these performative experiences are so closely related to the feeling, emotional experience, and satisfaction of the interaction. Although the exact scope and definition of user experience is still debatable, clear themes and issues seem to have emerged as important to user experience [10]. It is clear that user experience is highly dependant on the context where the interaction is taking place and that user experience develops and changes over time with repeated exposure to the interaction. With respect to mobile interfaces, evaluating and designing for user experience is difficult due to the divergent contexts where performative interfaces might be used. These interfaces are also used repeatedly across variable timescales throughout different contexts. This presents a difficult issue for designers in identifying the important issues for user experience and evaluating them in an effective way.

- **How do performative interactions affect user experience?** What factors are important when thinking about the user experience of performance? How does a mobile performance affect this?
- **How is the user experience of a performative interaction evaluated?** What kind of methodology captures user experience? How can performative use of technology be elicited naturally?
- **Where/How should user experience be evaluated in mobile settings?** How do divergent contexts affect user experience? How can these be simulated, created, and/or observed effectively?

Figure 2: Example of a multimodal art installation in public space that brings visitors to performative roles [7].

Spectator / Performer Roles

Given the variety of settings where mobile interfaces are used, both in public and private spaces (and everywhere in between), the presence of the spectator plays an important

role in the performance. Reeves *et al.* [12] argue that interfaces should be designed with the spectator experience in mind because the visibility of the manipulations and effects of one user's interaction greatly influence the spectator's experience. Goffman describes the vital role that audience members play in everyday performances of actions [2, 3], and as i.e. [1] further argues, also interfaces and interaction design that explicitly or implicitly require a performance are influenced by 'audiences'. Following this, mobile and wearable devices present new challenges for interaction design, because the interface is almost always 'on the move' in public space:

- **How do spectators influence performers or affect performance?** What do spectators want or need from an interaction and how is this attained? What implications does this have for the user and for interaction design?
- **How could/should spectators participate in mobile or wearable performance?** Is it desirable and/or possible to design for interaction that includes interplay between users and spectators? How does this change the spectator's role?
- **How can spectators play a role in evaluation?** What kind of methodology takes into account the affect of spectators? What factors need to be addressed in this kind of evaluation?

Figure 3. Artwork, such as this scarf that shields an individual's phone from observers [8], highlights how using technology in public and mobile settings is convenient while also requiring users to socially negotiate their public and private spaces.

Social Acceptability

Because performative interactions put users in public spotlight, the social acceptability of the performance is evaluated by the performer before, during, and after the performance. It even has an effect on the process of deciding to participate in the performance in the first place. Although social acceptability is important to consider during the design of performative interactions [13], research into how this can be achieved is limited. One of the few examples shows how surveys evaluating user willingness to perform a given action [14] can be used to assess social acceptability, however this addresses just a small part of social acceptability. We are interested in the following questions:

- **What are the factors that influence social acceptability?** How do users collect information and make decisions about social acceptability? How do previous experiences (own and others') influence the perceived social acceptability of upcoming or potential participation?
- **How can the social acceptability of a performance be evaluated during design?** What techniques and methods can we use to study it?
- **How does social acceptability change over time?** How can we distinguish between long-term (cultural specific) changes and short-term (performance specific) changes? How does the documentation of previous users (e.g. on YouTube) influence prospective users?

WORKSHOP GOALS

We encourage paper submissions that explore work-in-progress or early results that reflect upon any of the main workshop themes. For example, accounts of novel interactive technologies; evaluations of user experience in public settings; analyses of purely theoretical aspects such as spectator and performer roles or frameworks for understanding the relationship between public settings and interaction design; and empirical or theoretical studies of social acceptability of technology use in public settings. Preference will be given to submission that outline works-in-progress or early results.

During the conference, we will present the results of the workshop in the form of a poster. This will detail a summary of the workshop discussions and include information about the workshop website.

The workshop will aim to facilitate the following outputs:

- Workshop Results: A summary of the workshop results will include an organized summary of the participants' work in performative interaction, new ideas about evaluation methodologies for the workshop themes, and summaries of the discussion groups around key issues. These will be made available in a poster format during the conference.
- Publication: A special issue of a journal and/or collectively authored journal paper(s) that combine workshop participants' work under the themes outlined in this proposal and the issues addressed during the workshop as well as in the position papers.
- Network: The setting up of a network of researchers and practitioners who are interested in performative

interactions with and around technology in public settings with a view to forming future collaborations.

- Website: A workshop website will be created that will host the results of the workshop and facilitate further discussions of the workshop themes after the workshop. Accepted papers will also be made available on the workshop website.

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REFERENCES

1. Dalsgaard, P., Koefoed Hansen L., Performing Perception—Staging Aesthetics of Interaction, ACM TOCHI, 15(3), 2008.
2. Goffman, Erving. The Presentation of Self in Everyday Life. Penguin Books, London, 1990 [1959].
3. Goffman, Erving. Behaviour in Public Space; notes on the social organisation of gatherings. Free Press of Glencoe, New York, 1966.
4. Jacucci, G., Interaction as Performance. Cases of configuring physical interfaces in mixed media. Doctoral Thesis, University of Oulu, Acta Universitatis Ouluensis, 2004.
5. Jacucci, G., Wagner, I., Performative Uses of Space in Mixed Media Environments, In Davenport, E., Turner P., Spaces, Spatiality and Technologies, Springer, London, 2005.
6. Jacucci et al., A Manifesto for the Performative Development of Ubiquitous Media, Proc. 4th Decennial Conference on Critical Computing, pp. 19-28, 2005.
7. Jacucci, G., et al., Bodily Explorations in Space: Social Experience of a Multimodal Art Installation, Proc. INTERACT 2009, Springer, 2009, pp. 62–75.
8. Malia, J. Private Public, 2006, Knitted artwork. <http://www.interaction.rca.ac.uk:8080/people/alumni/04-06/joe-malia/projects/project3.html>
9. Merleau-Ponty, Maurice. Phenomenology of perception, Routledge classics; London, 2005 [1962].
10. Law, E. L., Roto, V., Hassenzahl, M., Vermeeren, A. P., and Kort, J. 2009. Understanding, scoping and defining user experience: a survey approach. In *Proce. CHI 2009,* ACM Press (2009), New York, NY, 719-728.
11. Peltonen, P., Kurvinen, E., Salovaara, A., Jacucci, G., Ilmonen, T., Evans, J., Oulasvirta, A. and Saarikko, P. "It's Mine, Don't Touch!": Interactions at a Large Multi-Touch Display in a City Centre. In *Proc. CHI 2008*, ACM Press (2008), New York, 1285–1294.
12. Reeves, S., Benford, S., O'Malley, C., and Fraser, M. 2005. Designing the spectator experience. In *Proc. CHI 2005*. ACM Press (2005), New York, NY, 741-750.
13. Rico, J., and Brewster, S. Usable Gestures for Mobile Interfaces: Evaluating for Social Acceptability. To appear in *Proc. CHI 2010,* ACM Press (2010), New York, NY.
14. Ronkainen, S., Häkkilä, J., Kaleva, S., Colley, A., and Linjama, J. 2007. Tap input as an embedded interaction method for mobile devices. In *Proc. TEI 2007*, ACM Press (2007) New York, NY, 263-270.
15. Sheridan, J.G. et al. (2004) Understanding Interaction in Ubiquitous Guerrilla Performances in Playful Arenas. In Pro. British HCI '04, pp. 3-17, Springer-Verlag.
16. Schnädelbach, H., Rennick Egglestone, S., Reeves, S., Benford, S., Walker, B., and Wright, M. 2008. Performing thrill: designing telemetry systems and spectator interfaces for amusement rides. In *Proc. CHI '08*. ACM, New York, NY, 1167-1176, 2008.
17. Sundström, P., Ståhl, A., and Höök, K. 2007. In situ informants exploring an emotional mobile messaging system in their everyday practice. *Int. J. Hum.-Comput. Stud.* 65, 4 (Apr. 2007), 388-403.