Reinforcing Co-Located Communication Practices Through Interactive Public Displays

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UbiComp'13 Adjunct, September 8–12, 2013, Zurich, Switzerland.

ACM 978-1-4503-2215-7/13/09...$15.00.

http://dx.doi.org/10.1145/2494091.2495998

Abstract
In recent years, the steady emergence of digital communication, especially social media, has increased the 'placelessness' of inter-person communication practices, i.e., lessening the need to reside co-located in order to communicate. When these communication practices carry over to co-located settings, they introduce redundancy and potentially even harm the co-located context, since use of personal technologies tends to isolate users from their surroundings. In this position paper, we want to raise awareness on how interactive public displays could alleviate this redundancy and potential isolation. We present a model of reinforcing co-located communications, and illustrate it through example use cases.

Author Keywords
Public Display; Public Space; Ubiquitous Computing; Urban Computing

ACM Classification Keywords
H.5.3 [Information interfaces and presentation (e.g., HCI)]: Collaborative computing.

General Terms
Design, Human Factors

Introduction

Internet, mobile devices and social networking services have facilitated the emergence of location-independent digital communication practices. For example, in Facebook [1] there are currently over one billion user accounts. The culture of digital sharing and communicating creates a sense of community and belonging independent of location, and fosters the emergence of digital communities. This overlay of digital communication practice then overlaps with physical communication practices, potentially creating tensions. The use of mobile devices during a co-located discussion can be isolating, and when communicating digitally, the non-verbal back channels of communication are poorly supported.

For these reasons, we suggest in this paper to re-frame certain known phenomena associated with interactive public displays such as honeypot effect [3] and situatedness [6] to foster and reinforce co-located communication within people residing in a shared space. Our contributions in this position paper are as follows:

- We propose a model for reinforcing co-located communication practices through honeypot effect and situatedness.
- We introduce and shortly analyse two example use cases of the model.

Information presentation on public displays

Existing information presentation types on interactive public displays fall roughly into two categories: One-to-one and one-to-many.

One-to-one model stands for information being presented on a public display mainly for a single person. This model is effective for the purpose of personalizing the content of the public display. As an example, in a navigation application, a person controlling the application receives information regarding his/her destination, and this information is useful only for the person in question.

On the other hand, one-to-many model is applied in various cases. For example, passive digital signage stands for broadcasting information to an unspecified number of people through public displays in urban spaces. Because the content itself is designed for broadcasting, the level of personalization is low. However, certain personalized and interactive content can be considered as belonging to the one-to-many model. Looking Glass[12] is one example. The interactive content of Looking Glass is designed for individuals or small groups. The performative nature of interactions however tends to create a honeypot effect, leading to a larger group of audience for the display. Within the four-phase framework of interactions with public displays [13], Looking Glass simultaneously influences additional phases besides personal interaction.

In this position paper, we want to bring forward the argument that by framing the phenomena associated with the one-to-many model of interactive public displays, we can design use cases which aim to reinforce the inter-person, co-located communication practices. This argumentation has similarities with utilizing public displays for social triangulation [11], as well as for providing a public content sharing canvas in third places [9].

Conceptual model

The objectives for the model of reinforcing co-located communication are as follows: 1) Gathering people in

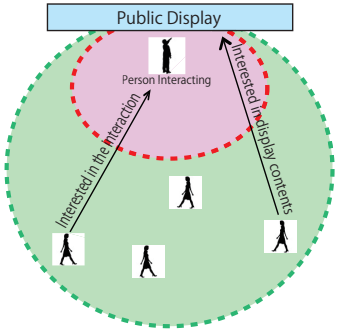

Figure 1: Two types of influence from public displays

front of the display, and 2) connecting the people with communication themes in front of the display. To reach these objectives, we define two phases. These phases can take place subsequently, or independently of each other.

People-attracting phase
First of all, public displays should attract people to promote co-located communication. To achieve this, we consider that interactions performed by a single person can influence other people around the display. We consider two types of influence, as illustrated in Figure 1. One is the honeypot effect, resulting from other people being interested in the performative interactions of one person. The other is the relevance of content, not only to the person in front of the display, but also to the surrounding people within a line-of-sight to the display.. In people attracting phase, we can design the content of the public display in consideration of these two influence factors. To produce this impact, we use existing information presentation techniques such as Looking Glass [12] and Proximity Toolkit [5].

People-connecting phase
In people connecting phase, the objective is to promote co-located communication among people who have gathered in front of the display. We define three techniques to achieve this. In the first case, content of the public display itself promotes co-located communication. To achieve this, the content should be situated and related to common topics within the people residing in the space. In the second case, the public display is promoting existing communications that take place within the space, but not in the immediate vicinity of the display itself. To achieve this, the public display should somehow sense and collect data regarding communication and shared topics within the space. One possibility is to leverage a sign-in service, in which each person signing into the space also discloses potential discussion topics. Finally, in the third case, people utilize the public display as an active part of the co-located communication, for example as part of an f-formation [8]. In this case, the public display should provide functionality that supports co-located discussions, i.e., to present supporting material for the discussions. The inclusion of personal devices can also be considered, while remembering that our original argument was juxtaposed with the usage of isolating technology.

Possible use cases

Cooperative Content Management Service
This use case entices people to cooperate in order to obtain beneficial information from a public display. For example, in the case of interactive coupon distribution, we can design the interaction logic to include multiple people prior to disclosure. This soft requirement of cooperation can serve as an incentive to communicate on-site.

Check-In Service
In this use case, the public display actively discloses information regarding the people who have checked into the associated space. This helps people to discover optimal discussion partners from within the space, and also help people to express their topics of interest in a facilitated manner.

Related work

Promoting community awareness through public displays has been considered in the literature. A model was discussed in detail, and empirical data was gathered through observations and contextual inquiry [2]. A concept of 'Interacting Places' has also been proposed and empirically analysed [10].

Emergence of pervasive displays are discussed from various aspects in [4, 7], and research predicts an increase in the amount of displays to be deployed. This creates an increasing potential, while we still face several challenges of social, psychological and technical origin.

Conclusion

In this paper, to increase co-located communication for local community, we proposed the communication promotion model for local communities and based on the communication promotion model, we suggested example use cases. In the future, we are planning to implement subsets of the presented use cases and subject them to empirical evaluation according to the guidelines proposed in [2].

Acknowledgements

This research was partly supported by National Institute of Information and Communications Technology (NICT).

References

[1] Facebook. http://www.facebook.com.

[2] Alt, F., Schneegab, S., Schmidt, A., and Müller, J. Memarovic, N. How to evaluate public displays. In *Proc. PerDis '12*, ACM (2012).

[3] Brignull, H., and Rogers, Y. Enticing people to interact with large public displays in public spaces. In *Proc. INTERACT 03* (2003).

[4] Davies, N., Langheinrich, M., José, R., and Schmidt, A. Open display networks: A communications medium for the 21st century. *IEEE Computer 45*, 5 (2012), 58–64.

[5] Greenberg, S., Marquardt, N., Ballendat, T., Diaz-Marino, R., and Wang, M. Proxemic interactions: the new ubicomp? *Interaction 18* (2011), 42–50.

[6] Jose, R., Otero, N., Izadi, S., and Harper, R. Instant places: Using bluetooth for situated interaction in public displays. *Pervasive Computing 7*, 4 (2008), 52–57.

[7] Kostakos, V., and Ojala, T. Public displays invade urban spaces. *IEEE Pervasive Computing 12* (2013), 8–13.

[8] Marquardt, N., Hinckley, K., and Greenberg, S. Cross-device interaction via micro-mobility and f-formations. In *Proc. UIST '12*, ACM (2012), 13–22.

[9] McCarthy, J. F., Farnham, S. D., Patel, Y., Ahuja, S., Norman, D., Hazlewood, W. R., and Lind, J. Supporting community in third places with situated social software. In *Proc. C&T '09*, ACM (2009), 225–234.

[10] Memarovic, N., Langheinrich, M., and Alt, F. The interacting places framework - conceptualizing public display applications that promote community interaction and place awareness. In *Proc. PerDis '12*, ACM (2012).

[11] Memarovic, N., Langheinrich, M., Alt, F., Elhart, I., Hosio, S., and Rubegni, E. Using public displays to stimulate passive engagement, active engagement, and discovery in public spaces. In *Proc. MAB '12*, ACM (2012), 55–64.

[12] Müller, J., Walter, R., Bailly, G., and Nischt, M. Alt, F. Looking glass: a field study on noticing interactivity of a shop window. In *Proc. CHI '12*, ACM (2012), 297–306.

[13] Vogel, D., and Balakrishnan, R. Interactive public ambient displays: transitioning from implicit to explicit, public to personal, interaction with multiple users. In *Proc. UIST '04*, ACM (2004), 137–146.