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# A New Urban Technoscape Component: The Smart<sup>2</sup>Poster

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**Abstract**

This paper presents the Smart<sup>2</sup>Poster concept, based on a traditional visual communication tool enhanced by the integration of a proximity technology such as the Near Field Communication (NFC). The concept has been designed and prototyped to study a situated interaction modality, bridging digital information and the surrounding physical world, by means of familiar objects (a poster, a smartphone and/or a TV screen). Two different usage scenarios have driven the design and the implementation of one prototype born to enable offline mediated interactions among public administrations and citizens.

**Author Keywords**

Mobility; Mobile communication; Smart-Poster; NFC; Mediated Interaction; Smart City; Proximity.

**ACM Classification Keywords**

H.5 INFORMATION INTERFACES AND PRESENTATION:  
H.5.2 User Interfaces: Input devices and strategies;  
Interaction styles; Prototyping.

**Introduction**

Mobile technology has been extended our world, multiplying the opportunities to access to information and

changing the social interactions and the communication habits. For example, for a great part of mobile users, the phone call is no longer the most important function [7], but mobile applications and context-triggered services represent the most used features [5,6]. The generation and socialization of the contents among people has also been innovated by mobile mediated communication. A number of modalities of social sharing - within private relationships, peers communities, public networks - have arisen; for instance, many governments and administrations are currently trying to find new ways to communicate with the citizens and to encourage their involvement through the ICT. These approaches are always in progress and essentially try to create a shared culture, based on citizens' interaction, feedback and engagement. These special kind of social interactions even more take place in the digital domain, in particular on the Internet and social network platforms [8, 9]. In these cases, the relations result less dependent from the physical and simultaneous presence, but other forms of mediated interactions can renew them [3]. In particular mobile devices facilitate the connection between people and context, enriching the experience with dimensions such as the physical space awareness and the time perception. According to Ito [4], the place can be intended as enabler of new relationships. In his vision, the "locality" makes the social practice "*a dynamic production involving materials and actors located in multiple ways*" (p.21). The social interaction can benefit of materialized texts, infrastructures and architectures, as well as smart-objects [1]. This vision is coherent with the Weiser's work on the ubiquitous computing [10]. It envisages that our everyday environment will be enhanced by traditional objects enriched with new digital technology, capabilities and interaction modalities [2].

### The Smart<sup>2</sup>Poster Design Process

Starting from the aforementioned considerations, the Handheld & Usability Research Unit of the Istituto Superiore Mario Boella has designed and prototyped a solution called Smart<sup>2</sup>Poster. As ingredient of a futuristic sociotechnical environment, it aims at stimulating new interactions among citizens, public spaces, information resources, in order to support the discovery of local opportunities, in terms of cultural and social experiences. Employing a Peer-to-Peer communication, based on the NFC technology, the Smart<sup>2</sup>Poster allows to access to dedicated contents, download files, send messages. Furthermore, through the integration of sensors and actuators, it enables actions on the surrounding environment (e.g. to control a door opener).

The need of local entities and public administrations to wide spread activities, events, and promoting new forms - at the same time easy and interesting - to communicate with the citizens has been the inception of the iterative design process. The results of an early exploratory study, addressed to understand the users' requirements (collected through the literature review and expert interviews) have inspired the concept generation phase, progressing from the usage scenarios definition to progressive levels of fidelity prototyping.

The interaction with the Smart<sup>2</sup>Poster has been driven by two usage scenarios: one individual and one collective.

- The individual usage scenario describes a situation where a person interacts with the Smart<sup>2</sup>Poster to obtain information or services (e.g. a city events agenda, a touristic map ...). In this case the user interaction is based on the personal NFC-enabled smartphone, playing the role of the main input/output device. The person is simply

requested to tap the device onto some place-marks of the poster (hiding a NFC tag), to access to the correspondent features.

- The collective usage scenario envisages situations where a group of people, such a class during a lecture, or a group visiting a museum, interact with the Smart<sup>2</sup>Poster to receive shared contents, perform group activities, work together, based on the content visualized on a large screens or other shared connected devices. Also in this case, the NFC smartphone keeps being the input device. Moreover, it can be used to convey the shared content or customized information to each single group member.

An important part of the design process has concerned the graphic theme and the content architecture. The interface of the poster essentially consists of a visual layout working as a powerful metaphor, able to catch the attention of people and engage them on the topics of interest. In our case, the illustration of one ideal Smart City has been drawn, in order to suggest a vision recalling the real world as scenario holding near future innovations the local administration is working for. On the illustration, some details have been identified to be connected to specific matters (Figure 1 shows some of them: Public Security, Accessibility, Energy, Environment ...). Each one, designed as placeholders and labelled, has been then equipped with NFC tags. The interaction with the poster is based on a visual exploration and a simple gesture, the tapping, analogous to the movement we do when we indicate with the finger one interesting object. Any ad-hoc application is not required to be installed.



**Figure 1.** Interaction with the Smart<sup>2</sup>Poster

Intermediate evaluations have allowed to gather feedbacks, feeding the design and implementation. Then the Smart<sup>2</sup>Poster was presented at the International Book Forum of Turin 2013. For the whole lasting of the Forum, qualitative and quantitative data have been collected to study the user experience in the field.

### Implementation

The Smart<sup>2</sup>Poster is made by a surface behind which several smart tags (NFC tags) are pinned to be read by the latest generation smartphones. The solution also involves a server and one or more screen displays. Each NFC tag on the poster directs to a URL, which is mapped to a different server resource. By tapping on a tag with a NFC-enabled smartphone, a request is sent to the server, which controls the contents and takes two actions: it replies with the appropriate resources to the smartphone client and it also displays related, additional contents on the screen, or alternatively it may trigger an action on a connected device, like opening a door or printing a paper.

### Conclusions and further perspectives

The analysis of the collected qualitative and quantitative data reveals that the Smart<sup>2</sup>Poster results “intriguing” and “easy to use”: the poster is recognized as a familiar component of the urban scape, and in general not worrying since it does not propose technological complexities. The visual communication contributes catching the attention and keeping the users engaged in the exploration. The Smart<sup>2</sup>Poster allows at a glance to guess the topics of interest, and perform an exploration of them according to personal needs, time availability,

interests and context. Finally, being a situated smart-object, people focus more on the physical and social context. Some usability issues will be addressed to improve the user experience. The poster represents a situated connection opportunity, which can be made available everywhere. The Smart<sup>2</sup>Poster purpose is contributing to shape the contemporary *technoscape*, composed by pervasive technology, augmented environments and ubiquitous interactions, promoting new patterns of social change, participation and creation of new relationships.

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