

# Visualizing Ambient User Experiences: Any How

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## ABSTRACT

As interactive systems become increasingly complex and entwined with the environment, technology is becoming more and more invisible. This means that much of the technology that people come across every day goes unnoticed and that the (potential) workings of ambient systems are not always clearly communicated to the user. The projects discussed in this paper are aimed at increasing public understanding of the existence, workings and potential of screens and ambient technology by visualizing its potential. To address issues and implications of visibility and system transparency, this paper presents work in progress as example cases for engaging people in ambient monitoring and public screening. This includes exploring desired scenarios for ambient monitoring with users as diverse as elderly people or tourists and an interactive tool for mapping public screens.

## Author Keywords

Visibility, monitoring, ambient interaction, User-Centred Design, data visualization

## ACM Classification Keywords

H5.m. Information interfaces and presentation: Miscellaneous.

## INTRODUCTION

Most people nowadays engage and deal with technology in their activities and environment everyday. Computing has been integrated in many facets of everyone's daily life, moved away from the desktop, and been miniaturized to such an extent that Mark Weiser's ubiquitous computing vision of invisible tools [4] has become near to being realized. Particularly in the domain of ambient interaction, technology, such as sensor systems, has begun to shape into almost invisible technology that can be used to unobtrusively acquire the information that comes from people's daily living environment and activities.

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Consequently, much of the information that is stored and collected by technology such as sensor systems, CCTV cameras and RFID enabled travel cards can go unnoticed, on an almost subconscious level, without interrupting what people are doing or requiring one's conscious attention. Although unobtrusively, nevertheless it is there, resulting in information being shared and exchanged with local or remote people that are not always known to each other. Thus, the consequence of Weiser's ubiquitous technology vision and the concurring new forms of ambient, almost invisible interaction, is that it becomes difficult to know what type of device one is interacting with, and with which party or person data is being shared.

As one thus no longer has a clear control or insight in the workings of the system and the sharing of data, this has obvious consequences for people's feelings of privacy, but also for engaging users in the design of interactive systems, because the near invisibility and novelty of ambient technology makes it difficult to imagine such systems and the (sensor) data streams it can produce. The deployment of user-centred design methods and tools that can help to visualize such 'invisible' data streams and technology could therefore be very helpful. However, as the field of ambient interaction is still being matured, examples of the development and implementation of such strategies for this purpose are still scarce.

## PROJECTS

The aim of the miscellaneous projects discussed in the following paragraphs, is to address the challenge of visualizing interactions to engage users in unlocking the potential of ambient technology while provoking democratic discussion of its implications. The following projects are currently being conducted under our supervision in collaboration with research partners, researchers and students at CREATE-IT Applied research centre at the Amsterdam University of Applied Sciences.

## Senior Create-IT

The focus of the Senior Create-IT project is to engage elderly residents in the design of an ambient monitoring system in assisted living environments. A focal point of this project is to map the desired sensor data sharing needs (and privacy and design considerations) of the elderly residents.

To engage elderly in the desired workings of an ambient monitoring system, an interactive dollhouse has been developed (See fig. 1) that demonstrates the workings of the actual proposed system. This dollhouse (a scale model copy of the study participants' home) has been equipped with simple sensors that are able to track movement and so simulate the actual monitoring environment. The dollhouse communicates with a graphical user interface that displays simple feedback on what is being monitored in the dollhouse. It was used in a residential care centre in Naarderheem, The Netherlands in interview sessions [2]. Furthermore, a second version has been developed (in collaboration with Waag Society), which is still being used in other locations to explain the (desired) workings of the system, generate democratic discussion and gather opinions of monitoring the daily activities of elderly involved in the study.



Figure 1. The interactive dollhouse.

### Senior Watch-IT

The Senior Watch-IT project aims to further investigate the needs and attitudes of care specialists and elderly people with regards to ambient monitoring of daily activities. It particularly explores desired data visualizations of the sensor output derived from ambient activity monitoring systems. This currently includes a comparative study of five iPad applications with elderly people, which have been developed for this purpose. It also involves co-creation workshops with elderly care specialists to gather their opinions and needs with regard to sensor data visualizations.

### Screen-IT

To map the current and future potential of public screens, an interactive map has been developed which enables the localization, categorization and annotation of public screens. Currently, public screens are predominantly used for the purpose of advertising [3]. The developed map enables people to add, visualize and filter different public screens so to increase awareness and understanding of how public screens (and possibly other pervasive technology) is used and might be applied for other purposes.

### ITour

The ITour project investigates the potential and acceptance of using (sensor) technology and ambient media to collect, uncover and interpret data regarding tourists' movements, behaviour and experiences in the city of Amsterdam. The goal of this data collection and interpretation is to provide tourists with better and more targeted (ambient media) services. It focuses on developing and visualizing user scenarios (using techniques such as photo-based storyboards [1]) to explore and assess these in close collaboration with the targeted groups.

### DISCUSSION

These projects are some of the myriad ways in which the visibility of ambient technology can be uncovered and discussed with users. Through presenting these projects as they are being developed, the intention is to share explorations of what user-centred strategies for managing ambient visibility might look like and to consider the issues in respect to (in)visibility of ambient systems and monitoring in a critical and reflective manner. Sharing these explorative strategies for visualizing ambient interactions that might act as future inspiration, commentaries or critique, this paper aims to foster dialogue and support further awareness and investigation to improve current strategies and practices for designing, investigating and managing 'invisible' technology.

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