

# Chapter 7.10

## Trust and Privacy Permissions for an Ambient World

**Linda Little**

*Northumbria University, UK*

**Stephen Marsh**

*National Council Canada, Canada*

**Pam Briggs**

*Northumbria University, UK*

### ABSTRACT

Ambient intelligence (AmI) and ubiquitous computing allow us to consider a future where computation is embedded into our daily social lives. This vision raises its own important questions and augments the need to understand how people will trust such systems and at the same time achieve and maintain privacy. As a result, we have recently conducted a wide reaching study of people's attitudes to potential AmI scenarios with a view to eliciting their privacy concerns. This chapter describes recent research related to privacy and trust with regard to ambient technology. The method used in the study is described and findings discussed.

### INTRODUCTION

Ambient intelligence (AmI) and ubiquitous computing allow us to consider a future where computation is embedded into our daily social lives. This vision raises its own important questions (Bohn, Coroama, Langheinrich, Matern, & Rohns, 2005). Our own interest in trust and privacy predates this impending vision, but nonetheless holds a great deal of relevance there. As a result, we have recently conducted a wide-reaching study of people's attitudes to potential AmI scenarios with a view to eliciting their concerns and ideas. This chapter documents the results of this study, and contextualizes them through:

- Considering the concept of AmI and ambient technology, and the social implications of AmI use.
- Exploring relevant existing work in trust and privacy and discuss this in relation to ambient devices.
- Presenting and discussing general user concerns and highlighting problems of exclusion.

When trying to understand how trust and privacy issues are implicated in an ambient world focusing on purely technical approaches is not sufficient. In the e-commerce literature, trust is well documented, traditionally emphasizing the need to develop systems that appear trustworthy (e.g., Shneiderman, 2000). Bødker (2004) argues “technical approaches seem to relate trust directly to the construction of secure systems, thereby implying that users are purely rational, economical actors.” In an ambient world, e-services will be accessible anywhere, anytime. Therefore, this chapter considers the social nature of trust and privacy with regard to ambient technology (see Egger, 2003 for a review of trust in e-commerce).

The chapter is structured as follows. In the next section, we comprehensively discuss the concept of privacy and its meaning in both physical and virtual worlds. Following this, we discuss the phenomenon of trust and how, in the AmI future, trust will remain a cornerstone of social interaction. The results and implications for AmI of our study are presented in Section 3. We conclude with a discussion about what privacy and trust considerations might mean in the light of these results, and a preliminary set of guidelines for the design of AmI devices and technology that take these implications into account.

## **The Concept of Ambient Intelligence**

Ambient intelligence (AmI) refers to the convergence of ubiquitous computing, ubiquitous communication, and interfaces that are both socially

aware and capable of adapting to the needs and preferences of the user. AmI evokes, or perhaps presages, a near future in which humans will be surrounded by “always-on,” unobtrusive, interconnected intelligent objects, few of which will bear any resemblance to the computing devices of today. Mark Weiser (1991) envisaged a world where computers would be implanted in nearly every artefact imaginable. A person might interact with hundreds of computers at anyone point in time, each device invisibly embedded in the environment and wirelessly communicating with each other. These embedded devices will communicate seamlessly about any number of different topics, for example, your present state of health, when you last ate, and what it was you ate. Interactions with other devices and, at the same time, other people, will become anywhere, anytime.

The majority of current work on AmI is driven by technological considerations, despite claims that it is fundamentally a human-centred development that will essentially set people free from the desktop; hence Punie (2003) has argued the societal and user implications of AmI should be made more explicit. One of the particular challenges of AmI is that the user will be involved in huge numbers of moment-to-moment exchanges of personal data without explicitly sanctioning each transaction. In the present, we already carry around devices (mobile phones, personal digital assistants) that exchange personal information with other devices, but we initiate most exchanges ourselves. Nijholt, Rist, and Tuinenbrejier (2004) argue research tends to focus on the interaction with the device or environment, and not with other people or how the user is willing, able, or wants to communicate with the environment or have the environment communicate with them.

As humans are inherently social beings, and our actions are always directly or indirectly linked to other people, how will AmI technologies impact upon our social world? Questions naturally arise: Will people begin to rely heavily on AmI technology? Will people be comfortable exchange-

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