

An Ambient Workplace for Raising Awareness of Internet-Based Cooperation

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Abstract. This paper discusses a prototype desktop ambient display system known as the Ambient Workplace (AW) that is used to visualise some aspects of cooperation among a group of co-workers. The AW draws on the ambient technology paradigm by providing a visualisation that represents the interactions of the co-workers (either individuals or groups) in their peripheral attention zone. The paper discusses the development of a prototype system based on a series of indices and uses a maritime flags metaphor. The paper also presents some early results from a user study.

1 Introduction

The Internet has had a substantial impact on many areas of computing, including computer supported cooperative work (CSCW) and many software applications have been adapted or developed to harness its potential. The result has been a change in the nature of communication and work, from one where people communicated in closed-network groups to one where people can be working on the same project anywhere in the world. The change in working patterns has altered way that relationships start, develop and end among people in professional and private contexts. Software applications such as instant messaging, web mail, web-based videoconferencing, appeared at an impressive rate. More recently, new forms of Internet-based cooperation have appeared supported by emerging technologies, such as ‘Wiki’ for collaborative editing, ‘Blog’ for easy publishing or ‘Skype’ for voice communications.

The combination of information technology and social aspects such as co-operation has resulted in substantial interest within the scientific community, with researchers focussing on issues such as design methodologies, user testing and social aspects. In contrast this paper explores how to visualise co-operation within a group of co-workers.

The paper begins with an explanation of the motivations and background of the Ambient Workplace and continues with an outline of the metaphors used, a description of the system, results from a user study and finally some conclusions and future directions.

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2 Motivation of the Research

Prior work in the field of CSCW stresses the importance of awareness. Gutwin and Greenberg [6] explain that ‘it is becoming more and more apparent that being able to stay aware of others plays an important role in the fluidity and naturalness of collaboration’. Dourish and Bellotti [3] introduced the concept of awareness that they defined as ‘an understanding of the activities of others, which provides a context for your own activity’. Ellis [4] argued that ‘the philosophy of groupware is to encourage cooperation by making it known and instantly apparent to all who is sharing what with whom’. Humphries et al. [9] define activity awareness as ‘knowing what has happened, what is happening and what will likely happen in the future over extended periods of time’. Greenberg [6] indicates that there are many forms of awareness:

- *Informal awareness of a work community is the general sense of who is around and what they are up to.*
- *Social awareness is the information that a person maintains about others in a social or conversational context. For example, whether another person is paying attention, their emotional state, or their level of interest.*
- *Group-structural awareness involves covers aspects such as the roles and responsibilities of the participants, their views on certain issues, their status and the processes within the group.*
- *Workspace awareness includes information about the identity of those in the workplace, their location, their activity, and the immediacy of changes with which others’ activities are communicated.*

This paper deals with workspace awareness in an Internet-based collaboration platform. It is acknowledged that being kept informed of what is happening in a shared environment is a crucial aspect of collaboration; it is therefore important to explore which techniques can be used to enhance awareness. Several solutions have been developed including: update notifications via email and displays indicating the number of people reading the same webpage [13]. Other methods make use of graphics for example: the icons indicating who is online in MSN Messenger, avatars [11], representing users as abstract shapes [2], visualisations on mobile phones [1] and representing the other users actions in virtual environment [12]. In many cases awareness cues are only provided when the client (CSCW) application is running. In the other cases, the user is not given any feedback on the interactions that are occurring in the collaborative environment

Ambient displays that provide unobtrusive awareness information could be seen as one way to avoid the problem of having to make people log in. Furthermore, displaying workspace awareness information in everyday tools such as email, wallpaper or an IM client provides an elegant way to make sure the information is always available. The purpose of ambient displays is to convey information in the user’s peripheral attention and visual zone in a way that does not require their specific attention. This approach builds on the idea introduced by Heath and Luff [8] of