Ambient Information Systems 2008

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PREFACE

Current research in pervasive and ubiquitous computing is guiding us to a future where we are surrounded by innumerable information sources all competing for our attention. These information sources may manifest as both novel devices and as devices embedded in common objects, such as refrigerators, automobiles, toys, furniture, clothes, and even our own bodies. While this vision of the future has prompted great advancements in context-aware computing, wireless connectivity, multi-sensor platforms, smart materials, and location-tracking technologies, there is a concern that this proliferation of technology will increasingly overwhelm us with information. Our belief is that information should move seamlessly between the periphery and the center of one's attention, and that good technology should be highly transparent. We see ambient information systems as a way to support these ideas. Ambient Information Systems describe a large set of applications that publish information in a highly non-intrusive manner, following on from Mark Weiser's concept of calm technology. This form of information delivery has manifested in several different implementations, but the overall theme revolves around how best to embed information into our surroundings.

The Second International Workshop on the Design and Evaluation of Ambient Information Systems was held in COEX, Seoul, South Korea, on September 21st 2008, in conjunction with the Tenth International Conference on Ubiquitous Computing. Building on the success of last year's workshop at Pervasive 2007 [9], we brought together researchers working in the areas of ambient displays, peripheral displays, slow technology, glanceable displays, and calm technology to discuss and collaborate on developing new design approaches for creating ambient information systems.

WORKSHOP TOPICS

The workshop topics were for the most part listed as a set of questions. These included:

• How are ambient information systems distinct from other information technologies?

• What are examples of useful heuristics, frameworks, taxonomies, or design principles for the implementation of ambient information?

• Should Ambient Information Systems move beyond the traditional scope of vision; is there merit in Ambient Noise, Ambient Smells, Tactile Ambience, and Ambient Taste?

• How much ambient information can one perceive and comprehend?

• What, if any, are the appropriate interaction methods for these information devices?

• Where should ambient systems be placed to improve their chances of being used, without becoming distracting or annoying?

• What sorts of information are best conveyed by an ambient display?

• What are the appropriate methods for evaluating ambient information systems, particularly those that are not necessarily task-based?

• How do we describe the values of these particular technologies in our everyday lives?

• How can we make use of existing technologies? (e.g. smart materials, wearable systems, etc.)

• What knowledge from other domains should we apply? (e.g., from art, cognitive science, design, psychology, sociology)

We were also particularly interested to hear about ambient information systems in the following areas:

• Resource Consumption, e.g., power, heat, water, food, and for shared or personal resources

• Work and workload "progress" (e.g., explicitly or implicitly gathered data, or those based on a workflow)

OUTCOMES
There were 8 papers accepted to this year's workshop, which was held at the Tenth International Conference on Ubiquitous Computing in Seoul, South Korea. Some of these papers had a very strong emphasis on the design of AIS technologies, some centered on evaluation strategies, and others focused on new systems that have been developed. Below we will discuss the presentations that occurred during the workshop organized by their emphasis on design, evaluation, and new system implementation.

The Design of Ambient Information Systems
Alois Ferscha presented "Ambient Façades", which explored how people perceive urban environments by enhancing the local architecture's ability to convey what sorts of activities are taking place within a particular building by projecting information directly onto a building's façade [8]. During the workshop, an example was given of an opera house that displayed clips of the opera within to better inform people who may be looking for that particular kind of entertainment, as well as give onlookers a sense of the local culture.

Dietmar Offenhuber delved more deeply into the application of *context* on AIS design by having us consider the concept of the "Invisible Display" [5]. He proposed that the experience of an ambient display is determined by the way it is situated within its local context whether than with various intrinsic qualities, and that a redefinition of the concept of a display is needed which looks beyond the traditional notion of a screen. In his discussion, he proposes several strategies for integrating information specifically into urban contexts.

Rosaleen Hegarty presented a thought provoking piece of work on ambient interface design for Mobile Browsing Experience [1]. In this presentation she provide a strong design rational that looked at how ambient information exists in nature, comparing the signal and suggestion of a raindrop to Koert van Mensvoort's Data Fountain and Kuribayashi and Wakita's PlantDisplay. She then proposed that such observations of nature could inform the design of natural interactions and abstraction of the communication infrastructure in a mobile application, hiding the complexity and at the same time enhancing the overall experience [x].

The Evaluation of Ambient Information Systems
While all the presentations discussed the design of ambient information systems at some level, a few of the presentations were more focused on evaluations that were conducted. For instance, Fabian Hemmert described a system that involved a novel approach for conveying the status of a mobile phone to its owner [2]. This involved having the phone provide a heartbeat that was smooth and regular when no attention was required, and became erratic otherwise. Several prototypes were constructed, and a user study was conducted with 6 participants using qualitative measures such as video interviews, and self-report diaries. The results of the study showed that more work would be required to refine the system so that it is less annoying at various times, and users requested that the phones be silent when nothing requires attention, and provide a subtle, but perceivable, heartbeat like pulse when the status changes.

Umar Rashid presented a thorough case study on the utilization of ambient displays in an academic setting [6]. In this study he applied a questionnaire-based survey to collect the experiences and expectations of those who are potentially affected by the displays installed within his own department. One finding was that people reported that one of the most useful pieces of information presented on the displays is the profiles academic and research staff. During the discussion at the workshop, it was suggested that people seeing the images of a select group of people on the displays may help people to understand something about the structure of the hierarchy within the lab so that the lab directors and major contributors could be recognized more quickly. Of course, as always, people reported several other types of data they would like to see upon these displays.

New Ambient Information Systems
Ross Shannon presented the initial results for a system that monitors a person's communication behaviors with friends, and builds a model that can help remind people to stay in touch with one another [3]. During the workshop discussion, this example brought up a great deal of controversy in that people were not sure that they wanted a system that prompted people to contact their friends in such a manner, but it was concluded that there are possibilities for such a system as a form of data input for other ambient displays. For example, such a system could be used to drive an ambient display intended to promote cohesiveness amongst a social network, such as a group of friends or a project team within a company.

Lorcan Coyle presented a system that allowed people to construct "ambient jewelry" that can be shared with friends

so as to provide a strong sense of presence and awareness [4]. In this system, a user can construct a jewel of their own design, which changes based on their mouse moments, keyboard activity, connection state, etc. A user of this system can quickly see the state of his or her social network by arranging these jewels on the desktop of their computer and perceiving the subtle changes as they go about their normal activities. A bit of discussion arose during the presentation as to the possible difficulty in explaining how each user mapped their actions to the animation shown on their jewels, and whether this would provide an overall benefit to a community by spawning more back channel communication and socialization.

Silva Torsi described a new system that made use of some of the tenants of ambient display technology to inform the development of a device for landmine detection [7]. In this system a display was attached to a standard landmine detector, and the basic steps of landmine detection were isolated to produce a visualization that made the process more efficient by offloading some of the cognitive effort of the operator.

CONCLUSION
We consider this year's workshop to have been a great success. Several valuable discussions were spawned, and as with last year, some very strong research connections were created that will hopefully lead to good collaborations in the future. Because of the success of this workshop, we are already considering where would be the optimum place to host AIS 2009.

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