

The Chatty Environment

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Abstract

Visually impaired persons encounter serious difficulties in conducting an independent life, which are inherent to the nature of their impairment. In this proposal, we briefly describe a way of deploying pervasive computing technologies to cope with some of these difficulties and support the visually impaired in living a more independent life – the chatty environment. We then present a prototype of the chatty environment and explain how PerCom 2004 attendees will be able to experience it.

1 Independent Living for the Visually Impaired

Visual impairment has one preeminent characteristic: the blind person is in need of guidance and assistance. Think for example of shopping in the supermarket. Thousands of items, feeling all the same, spread over hundreds of shelves. Visually impaired people will therefore only go shopping to their local supermarket and buy only few products in well known locations. Or think of a modern airport terminal or railway station. The blind person will not be able to find the way by herself – an architecture with several floors connected in the most intricate ways is simply too complex to comprehend without any visual information.

In order to allow a higher degree of independence for the visually impaired, we have introduced the paradigm of the *chatty environment* [1]. This environ-

ment tries to make a part of the huge bulk of visual information available to the visually impaired also. For that, it uses other media – a first prototype is based on audio, whereas later system versions may also use other channels, like tactile feedback.

2 The Chatty Environment

We are currently in the process of building this first prototype as part of the ETH Zurich campus. Some components of the prototype are:¹

- **Tagged Entities** in the environment. A large number of the chatty environment's entities are tagged through electronic beacons. Thus, a *virtual aura* arises around the tagged real-world entities, making them detectable.
- **World Explorer**. The world explorer is a device carried by the user. It is the interface between the user and the tagged entities in the environment. When the user moves into the aura of an object, the explorer senses the object and mediates the information exchange between user and object. It does so through a standard interface, designed to have the same “hear and feel” for all objects. A description of the interface can be found in [2].
- **Communication Infrastructure**. More information about the environment's objects than on the beacons themselves is stored in the background

¹A thorough description of the system can be found in [2]

infrastructure. To access this data, the world explorer uses the background communication infrastructure. Therefore, the explorer is equipped with Bluetooth and WLAN 802.11 communication facilities.

3 Envisioned Interaction

The chatty environment will be illustrated at PerCom 2004 by a scenario copying a railway station. The visually impaired user, traveling on her own, arrives at the station where she is supposed to change trains. The chatty environment shows her the way to the track of the connecting train. En route, all objects the user is passing by (fast-food-shop, ticket counter, souvenir shop) are being announced by the chatty environment. The user is also presented objects located further away, which are indicated by virtual signboards (e.g., restrooms, left luggage, etc.). The user may at any time “plunge” into one of these objects and either get more information about it or perform an action on it.²

The railway station will be simulated in the PerCom demonstration hall. Starting from our booth, which represents the arriving train, a route leading to the connecting train will be set up. Different places in the hall will depict various points of interest (depending on the available facilities), for example:

- Another location constitutes the track of the connecting train.
- A model of a train will show possible user interactions with objects in the environment, like opening one of the train’s doors.
- Other entities, like restrooms, ticket counter, station supermarket, or left luggage.

PerCom attendees will have the opportunity to experience the chatty environment with a blind cane enhanced by the world explorer (the user’s portable device – a speech-enabled PDA). By starting at our

²There is also an indoor navigation component in the chatty environment. Since this part of the project heavily relies on measurements of the signal strength of WLAN and Bluetooth signals (which are very much location dependent and require some training time to be accomplished), this part of the system will not be available at PerCom 2004.

booth, they can walk through the demonstration hall, listening to what the chatty environment reveals them about the surroundings. If we have the agreement of the organizers, the PerCom attendees may even experience the environment with a blindfold. To avoid any risks, one of our staff will serve as a companion.

4 Technical Requirements

The demo will need two separate locations to represent both trains – the arriving and the connecting. At the first location (arriving train), the staff (two people) will be present, so a table would be of advantage, although not imperative. At the second location (connecting train), a small table is necessary to place the model of the train on it. Some other 4-5 locations will be used to attach Berkeley Motes to them (places like the doors to the restroom, etc.). No extra space is needed there, but we need the organizer’s agreement to temporarily install these beacons.

WLAN access would be advantageous, although the demo will also run in a slightly restricted form without it. A posterboard at our main location would also be valuable. Since the system can be fully experienced only by one person at a time, a member of our staff could introduce the system to other attendees waiting their turn with the help of a poster.

References

- [1] Vlad Coroamă. The chatty environment – a world explorer for the visually impaired. In Joe McCarthy and James Scott, editors, *Adjunct Proceedings of UbiComp 2003*, October 2003.
- [2] Vlad Coroamă and Felix Röthenbacher. The chatty environment – providing everyday independence to the visually impaired. *UbiHealth Workshop, Seattle*, October 2003.