

CSCW '98 DEMO PROPOSAL:

The Hummingbird: Mobile Support for Group Awareness

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PLAY: Applied research on art and technology

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ABSTRACT

The *Hummingbird* is a small portable device which supports social awareness between people who frequent the same physical location. The Hummingbird uses wireless communication to give members of a group continuous aural and visual indications of which other group members are in the vicinity. Although many solutions for providing awareness information exist, they are either tied to the desktop (e.g. ICQ) or dependent on a pre-existing infrastructure (e.g. Active Badges). Hummingbirds have the advantage of working any time, anywhere, which will be shown in this demonstration.

We will let attendees get hands-on experience with the Hummingbird prototype, but the demonstration will not be limited to the demo room. Attendees will be allowed to borrow Hummingbirds and use them in the conference area. In this way, participants will be able to explore how Hummingbirds can support group awareness during a conference situation.

DEMONSTRATION REQUIREMENTS

No special requirements, except some table space.

PRESENTER INFORMATION

The demo presenters are all part of the research group *PLAY: Applied research on art and technology* at the Viktoria Research Institute. Their roles in the Hummingbird project are as follows:

- Lars Erik Holmquist: project leader, concept design
- Joakim Wigström: hardware design
- Jennica Falk: evaluation, hardware design



The Hummingbird prototype

BACKGROUND

The work situation in a modern office can be very different from the setting of only a few decades ago. Nowadays, employees do not necessarily come in at regular hours and spend their whole time working at the same desk. Instead work is often much more flexible, and much time can be spent working at other places than the office. While much communication can now be carried out via phone or e-mail, informal face-to-face communication is still very important [11]. However, much time can be spent looking for people in order to initiate communication or call a group meeting, which in turn makes it important to fully utilize the situations when people really *are* present. Many groupware systems support informal communication by conveying awareness of other people's activities, e.g. *Portholes* [2], *@Work* [8] and *TeamRooms* [7]. The recent success of the commercial product *ICQ* (<http://www.icq.com/>) shows the need for people to keep track of the activities of colleagues and friends.

However, solutions such as those above assume that people spend most of their time at a desktop workstation. If people are working from several places (using laptop computers or PDA:s), workstation-based solutions will not work very well for initiating face-to-face communication. Beepers and mobile phones are tools which can be used regardless of where the user is situated, but these do not provide continuous awareness information. A call via phone or beeper can also be disruptive, since there is no way of knowing what activity the person at the other end is engaged in, and for this reason many people are wary of using them when not absolutely necessary.

HUMMINGBIRDS

To support informal workplace communication, we have developed a prototype which we call the *Hummingbird*.

Usage description

Hummingbirds are small electronic devices, designed to be worn or carried at all times. Each member of a group is given their own Hummingbird. Users bring the Hummingbird with them at all times when they want their presence to be detectable by the rest of the group. Whenever two or more Hummingbirds are in the vicinity of each other, they will “chirp”, and the identities of other Hummingbirds that are nearby will be shown on the devices’ displays. Thus a Hummingbird will give users continuous information of which other Hummingbird-equipped group members are close. “Close” in this case is approximative. Indoors, it is when users are no more than a couple of floors apart in the same building; outdoors, it is within “shouting distance”.

Most of the time using the Hummingbird, users will concentrate on other activities. The Hummingbird will melt into the background, to be brought to the foreground of attention only when desired, or during periods of unusual activity (e.g. when the device becomes unusually quiet or unusually active). This makes its design related to the principles developed for *calm technology* [10] and *ambient media* [4].

Technical Description

A Hummingbird consists of a circuit board with a micro-controller, an LCD-screen, a miniature speaker, and a radio transceiver operating on the 433,92 MHz-band. The Hummingbird gets its power from a set of rechargeable batteries. Each Hummingbird is programmed to continuously transmit an identification code, while simultaneously listening for the codes of other Hummingbirds in the vicinity. Whenever another Hummingbird is found, an identifying letter shows up on the LCD display and the Hummingbird emits a “chirping” noise generated by the speaker. Since each Hummingbird in the vicinity gives rise to a separate sound, a Hummingbird generates noise at a level relative to how many other Hummingbirds are in its vicinity. The noise level gives a continuous indication of how “crowded” the environment is, even when the other Hummingbirds can not be heard directly.

To make the prototypes useful, they need a protective “carrying case”. At the moment we have encased the Hummingbirds in mobile phone “holsters” of a type readily available in electronics stores. The holsters are comfortably soft to the touch and are provided with “carrying hooks” to make them easily wearable.

USER TESTS

We have performed two user tests with the Hummingbird prototypes, designed to contrast different ways in which they may be used.

In the first test, four subjects used the Hummingbirds for a few hours during the Roskilde festival, a major outdoor rock festival which attracts approximately 80,000 visitors. The subjects were instructed to wander around the festival area and use the information provided by the Hummingbirds in any way they wanted to. We found that the participants

enjoyed using the Hummingbirds in this setting and that they found it comforting to be able to know when other group members were nearby. It was however sometimes frustrating to know that someone was near without being able to see them. This test showed that the Hummingbirds worked as intended in that they strengthened the awareness between group members and made the users more likely to keep in contact.

The second user test was performed in an office setting, where the test subjects rooms were spread out over several floors. Four co-workers, who were all associated with the same project, were equipped with Hummingbirds. For one day, the subjects carried their Hummingbirds with them at all times. The results on the work situation were pronounced, although not dramatic. The Hummingbirds gave users a much higher awareness of when other members of the group arrived or left the building, and the subjects started to rely on and use this information almost immediately. This test made it obvious that devices such as the Hummingbirds have very high potential for use in an office environment.

RELATED WORK

Hummingbirds are a kind of wearable computers [6], since they are computational devices designed to be carried everywhere, they provide the user with augmented information about their environment, and they are always “on”, i.e. constantly scanning the surroundings and providing information. However, rather than being general information processors like many wearable computers in the literature, Hummingbirds are designed to perform a single specialized task.

Several wearable computers which perform specialized tasks exist. For instance, *Thinking Tags* [1] compare a profile input by a user to that of another tag, and give a visual indication when two users’ profiles match. Unlike Hummingbirds, their primary function is to augment a communication that has already been initiated, rather than to provide continuous awareness. *Active Badges* [3] is a system which provide continuous location information of their wearers, which may be used for awareness information. These rely on an infrastructure of sensors in the environment and can not be used outside this setting. A related system is *PARCTABs* [9], palm-top sized computers which provide location-specific services in a ubiquitous computing environment. Finally, the commercial product *Lovegety* [5] is a small device used to initiate contact between users of different sex who are on the same, user-selectable “wavelength”. The huge commercial success of this device indicates that it fulfils an important need, at least in its native country Japan where it has sold in record numbers.

CONCLUSIONS

Hummingbirds is a new technology for group awareness, which has been proven to work well in the limited user tests which have been performed so far. We believe that Hummingbirds provide a viable way to support group awareness and informal communication in a variety of work settings.

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