

Hocman: Supporting Mobile Group Collaboration

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ABSTRACT

We introduce the Hocman prototype, supporting mobile group collaboration among motorcyclists. The design is based on findings from a field study. The motorcyclists are a group with a strong social commitment, however their mobile practice creates collaborative problems. They deal with it by using a website on the Internet, but collaborative issues still remains. For this purpose we have developed a prototype, based on web technology. The prototype is built for handheld computers and wireless communication, allowing the users to share rich content when being in the vicinity of each other.

Keywords

Mobile computing, CSCW, ethnographic fieldwork, ad hoc networking

INTRODUCTION

Motorcyclists are a highly mobile group with strong social commitment, who often engage in collaborative activities. The fieldwork we have conducted reveals the problematic issues of coordinating their practice. Main issues concern the handling of contingent meetings, group awareness and making relevant information available. The group, we have studied, spends a considerable amount of time on a public web site in order to minimize the impact of these problems. The relevant information provided in the virtual is seldom available in real life. We also believe that the practice on the web site would gain from an aid for references to real life events.

The aim of this paper is to introduce a prototype supporting mobile group collaboration. An application-oriented approach has been chosen, beginning with empirical fieldwork, informing the design process. We have participated at a considerable amount of motorcyclists' events in the physical world, and spent time on their web site. We present the Hocman prototype, which is a HTTP peer-to-peer application, over wireless ad hoc networks, for handheld computers. It is implemented in C/C++ for

devices running the Pocket PC operating system, using IEEE 802.11 compatible network interface cards.

RELATED WORK

There are several research projects that propose badges and devices to provide interpersonal awareness, in order to support collaborative activities. The principal ones are the Hummingbird device, GroupWear Tag, and the Meme Tags System. Hummingbird [3] is a device used to monitor the presence of other Hummingbirds in the close proximity. The carrier of a Hummingbird has no control in how the presence is displayed to the others. It is predefined to a "humming" sound and displaying a unique symbol denoting the detected device. The exchange of presence information provides no means of conveying an expression by the user. The GroupWear [2] is an active badge system that lets user share and compare their answers to a set of multiple-choice questions. In order for the users to have a meaningful exchange, the questions are pre-set and cannot be altered by the individual. The Meme Tags System [1] also provides mechanisms to monitor other user's presence, but at a shorter range than the Hummingbird device. In addition to the awareness mechanism, the Meme Tags System also offers a simple way for personal expression. It allows a user to enter and share "memes," a short sentence containing a poem, wisdom or any message the user finds appropriate.

THE MOTORCYCLISTS

The motorcyclists studied are a highly mobile group that spends a considerable amount of time on the roads. There are several reasons for each member to pass time together; they organize trips to explore unfamiliar roads; they teach each other how to maneuver on familiar ones; or they simply go to enjoy the bends in a particular road. They meet at places to share experiences with members of their own group, as well as hanging out with non-members. When meeting, a good portion of the activities concerns showing off. Some of the times they impress with newly modified bikes, for instance equipping them with high performance exhaust pipes, breaks, seat cowls, etc. At other times they show off by performing stunt tricks, such as balancing on the front or back wheel.

A primary prerequisite when showing off is the need to be at least two persons, one performing the act and one

observing it. However, coordinating a group of motorcyclists is problematic due to the extreme mobility of each individual. In motorbike communities they try to solve this by agreeing on certain places to meet, or requiring the biker to engage in tightly knit fraternity, or by using information technology. Irrespective of how they chose to handle the coordination some problematic issues remain to be dealt with:

- How to sort out mobile volatile contingent meetings? (Who did that, then and there?)
- How to locate someone in the vicinity? (How to find a friend without scheduled appointment?)
- How to receive and distribute relevant information? (How to express interests and personality?)

The group we have studied uses a message board on a public website to address these issues. They handle contingent meetings by following up their trips by discussing unrecognized bikers. Location is solved indirectly since some members wear a sweater with an URL to the web site, printed on the sleeve. To express interest and personality, a signature, containing a thumbnail picture and a nickname, follows message entries.

Despite the message board, the problems listed above are still present. In many occasions this is due to the fact that communication is separated in time and place from the actual situation discussed. In reverse, in real life there is often a need for information only available at the web site. The Hocman prototype will provide a digital reference of the real world meetings, as well as providing rich information, which is abundant in the virtual.

HOCMAN

The Hummingbird, GroupWear or MemeTags System only address part of these issues, since the possibilities to mediate personal expression is limited. Web technology provides a greater set of options to display and distribute content suitable for this purpose. However web-applications currently available do not provide co-located awareness functionality.

Hocman is a HTTP peer-to-peer application that enables sharing of HTML documents, audio clips and images over ad-hoc networks. The application possesses the ability to supply appropriate identity during contingent meetings. In *cruise mode* upon discovering a new peer Hocman will perform an automatic background download of a predefined index-page. This page could for example contain a thumbnail picture of the bike, nickname, phone number, etc. Cruise mode is helpful when handling contingent meetings in retrospect.

In *explore mode*, Hocman provides group awareness. Whenever the users are in the vicinity of each other, they

will be appended in each other's list of accessible peers. This mode is useful when attending crowded bike meetings where hundreds of bikers are present. Apart from the awareness mechanism the user will also benefit from the browsing capabilities. It is possible to explore the HTML-pages in the vicinity. At gatherings this could be used to inspect pages describing the modifications of a bike.

The prototype is implemented in C/C++ and is working on devices running the Pocket PC operating system. In this case on two sets of devices: Compaq Ipaqs 3660, equipped with a Lucent Orinoco WLAN card; and Symbol PPT 2700 with a built-in Spectrum24 WLAN card. The network cards are configured to communicate in IEEE 802.11 IBSS mode.

The prototype forms a simple yet effective peer-to-peer application platform by combining three parallel entities: a HTTP server, a HTTP client and a simple discovery protocol. The server implements limited HTTP 1.0 functionality and maps incoming GET commands to the local file structure. In order to support basic user driven surfing activities, such as following links, reloading and retrieving documents, the client renders HTML and issues HTTP commands. The discovery protocol allows the devices to discover each other's server entity. The protocol also dispatches automatic downloads in cruise mode.

FUTURE WORK

The Hocman prototype will be further developed with CGI scripting, which allows posting and processing of data; and HTTP proxies, which will serve as a bridge between an ad-hoc network and the Internet. The prototype will be evaluated in two steps. First, the concept will be tested by a questionnaire on their message board. Then the prototype will be introduced to a limited group of motorcyclists.

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