Traffic Encounters and Hocman - Associating motorcycle ethnography with design

MATTIAS ESBJÖRNSSON, OSKAR JUHLIN AND MATTIAS ÖSTERGREN

Mobility, Interactive Institute
P.O. Box 240 81
SE-104 50 Stockholm, Sweden
{mattias.esbjornsson, oskar.juhlin, mattias.ostergren}@tii.se

Abstract. Brief encounters between acquainted and unacquainted motorcyclists are enjoyable moments. This truly mobile form of social interaction is difficult to study through traditional ethnographic fieldwork. However, the method is applicable when integrated in a design approach where the participants collaborate to integrate the field study, the design and the evaluation. This has made it possible to generate a novel mobile service. The service, Hocman, is a peer-to-peer application with mobile wireless ad hoc networking for PDAs. It enhances traffic encounters between bikers by playing a sound icon and automatically exchanging personal HTML pages. We have successfully demonstrated through performance tests and field trials that it is successful in doing this, and that bikers enjoy such added value to biking, especially hearing the sound icon when meeting other bikers.

Keywords: associative design, motor biking, mobile ad hoc computing, peer-to-peer, traffic encounters

Introduction

Two bikers passing each other at high speed along a highway may not seem like an interesting social event. However, in the following we present the results from a project, which in various ways focuses on these swift and mobile occurrences as an interesting challenge for the design of mobile services. First, our ethnographic fieldwork hints that these encounters constitute enjoyed social moments among bikers [12], but their brief and unpredictable occurrence leaves the bikers craving more. This is achieved through organized encounters, provided in less mobile settings, such as meetings at specific locations, planned joint trips, or interaction on message boards on the web. Second, the appreciation of traffic encounters is also visible in the field trial of our proposed service called Hocman. The prototype is designed to add value to traffic encounters between bikers during short moments of visual contact. It [10] is a peer-to-peer application, based on mobile wireless ad hoc networking, for handheld computers. During an encounter

between two bikers it plays a sound icon and accomplishes the difficult task of sharing HTML documents, images and audio clips. We performed a field trial with six motorcyclists [11], which indicated that the conceptual idea of Hocman was appreciated. The results suggest that the focus on interaction in traffic encounters fits with the current practice of motorcycling.

Hocman was generated through a design approach that specifically accounts for issues arising when developing services that exploit the specifics of mobile settings. This is a general challenge for mobile Human-Computer Interaction research (mobile HCI) [5]. Mobility, such as when people travel, is a large-scale social phenomenon. New mobile information technology makes it increasingly possible to design support for users' needs in those particular situations. However, the generation of such services requires knowledge about activities pursued and characteristics of the settings in which they occur [17]. In many cases, such as in motorcycling, the purpose of the activities is enjoyment rather than the thoroughly studied work- or learning activities. The context of use is also demanding since the user has to pay attention not only to the technology at hand, but also to other things, e.g. driving. Further, the social interaction is temporary and leaves little empirical evidence for the ethnographer.

We advocate an associative design approach, where different research and design activities such as fieldwork, design and evaluation are tightly associated together and where the participants in the project engage in all parts. We employ traditional ethnographic methods to learn more about motorcycling. However, preferred data and settings in ethnographic fieldwork could potentially lead us away from interesting social activities such as transient traffic encounters, which are hard to observe and leave few empirical traces to bring back into the design process. Therefore, it is understandable that the specific importance of the traffic encounters has been overlooked in previous motorcycling studies [23]. However, when associating ethnography with design it is easier to generate convincing arguments about such ephemeral aspects of mobile life and generate new services that lead both to better understanding of mobile activities and settings, as well as new mobile services.

The paper begins by giving a brief account of related research projects. Section three elaborates on the associative design work we have undertaken in order to

generate Hocman. Section four summarizes our results with an overview of the fieldwork, the implementation and the field trial.

Related Work

Bikers frequently use message boards on the Internet, which relates our research to other studies of online communities [28]. Such studies have explored the use of Internet to support exclusively online phenomena, such as MUDs [6], virtual communities [18] or newsgroups [30]. In these social environments people meet face to face, but under new definitions of "meet" and "face" [27]. Despite the fact that some studies discuss geography-based online communities [24] they rarely discuss the connection, and dependency, between activities taking place in the real world and those which takes place online. Our work is also related to mobile technology services supporting social interaction, such as interpersonal awareness devices [1, 2, 15, 19]. These studies propose badges, devices, and software services to provide interpersonal awareness and support collaborative activities among groups of users. They vary in their ability to mediate personal expression, and are designed for semi-stationary settings. The users must be in close range, and standing still or moving slowly relative to each other. Systems designed for such settings are not applicable to bikers who move at high speed over large areas. The related prototypes are aimed for a different context of use than Hocman. They support, or encourage, interaction occurring face-to-face and often between acquainted users. Consequently they differ in their design, most prominently in terms of user interface, but also in networking, software architecture, and hardware platform. Moreover, they are tested in environments where the social interaction is governed by other principles than traffic encounters.

Method

Chincholle et al argues that future mobile technology will include more services that exploit the benefits of mobile life [5]. The design of these kinds of services is a challenge to the mobile HCI research both regarding service content as well as contexts of use. The design approach used in this project enables such development in the area of support for motorcycling.

Mobile HCI researchers quickly jump to design, according to a literature review by Kjeldskov and Graham. The field is biased towards constructing new systems

and, at best, evaluates them in laboratory settings [17]. They claim that the lack of understanding of design and technology-use limits the accumulation of knowledge, and argue that the domain may run into a situation where there are more variations in applications than meaningful innovations. Thus, the design of mobile services could possibly benefit from an increased understanding of mobile activities. For similar purposes ethnographic studies have reached widespread use in the field of Computer Supported Cooperative Work (CSCW). However, in the case of motorcycling, the challenge of applying this method is three-fold. First, motorcycling, like many other mobile activities, is basically not a work activity. However, ethnographic fieldwork has lately undergone an extension of scope to also include studies of leisure activities [4, 13, 29]. This development illustrates the possibility of applying traditional CSCW research methods to these non-work contexts, but also the relevance of findings from these contexts to core CSCW issues [4]. Second, biking is a "truly mobile" [26] activity that can occur almost anytime and anywhere. Further, it is hard to delimit the community to be addressed. Boundaries between insiders and outsiders are blurred, while abundant meaningful interaction occurs between unacquainted, as well as acquainted, participants. It differs from traditional CSCW ethnographies on social communities in geographically bounded settings such as, control-rooms of undergrounds, air-traffic control, and emergency rescue. This makes it difficult to acquire empirical data such as in the form of video recordings. Third, it is not always the case that detailed empirical investigations in practice contribute to design. In the CSCW community, ethnographers criticize designers for lack of knowledge about the nuances of the activities addressed, whereas designers criticize the ethnographers for not coming up with anything but vague and obvious design implications [25]. The problem could be due to the understanding of ethnography as in the best case determining design. Such an approach has been suggested in the form of an "iterative" process where findings from the fieldwork are used to deduce services [22]. However, such an approach suggests first that there is a "problem" to be solved, and second that the description of it can be comprehensive and accurate.

Associative Design

We employ a way forward where research and design activity is better understood as a form of associative work [20] where materials and people are combined and recombined [21] as a local activity to generate innovative mobile services. Associative design emerges when participants in design establish a sustained collaboration involving dialogue and shared handling of material objects. The participants in the design process engage because they acknowledge its necessity in order to generate innovation. Further, they recognize disparate interests in their individual professional identities, making it easier to engage in mutual work.

The first step towards associative design is to treat ethnographic field data as a topic in a dialogue between the project workers, rather than documents in lectures on ethnographic findings. Paul Dourish argues that ethnographers and designers could engage in modest dialogues with preserved orientation and interest in sharing their knowledge [8]. Ethnographic field data can inform design without forcing the ethnographers to become designers: "…design implications of such studies should arise through an explicit dialogue between researchers from different disciplines (rather than require social scientists to be able to engage in design, or vice versa)" [8, p 156]. We argue for an even more committed engagement where ethnographers' involvement overlaps the work of other participants during the different phases of the project. The willingness for mutual engagement is sustained first and foremost by an understanding of design as necessarily undetermined by ethnography. Thus, the ethnographer does not believe that his role is just to deliver an ethnographic account and then leave. Moreover, the participants focus on the multitudes and openness in their individual orientations and interests, instead of looking for specialization that also opens up for collaboration.

We also suggest moving beyond the dialogue to account for material aspects of design work, both in terms of the tangibility and physicality of the materials brought back to the lab by ethnographers, as well as the materiality of the prototypes. First, ethnographic data is brought to the place where the fieldworker and the designer work together – the laboratory. This data is in the form of images, videos, notes etc. In accordance with Bruno Latour, we argue that the power of research labs can be explained as sites where massive amounts of inscriptions are brought together. Labs are sites where "…domains which are far

apart become literally inches apart; domains which are convoluted and hidden become flat; thousands of occurrences can be looked at synoptically…In our cultures 'paper shuffling' is the source of an essential power, that constantly escapes attention since its materiality is ignored" [20, p 54 -55]. He draws attention to the representation of other objects and how these are arranged and rearranged at a local site, such as the lab, to create innovation with an impact on the world outside. Thus, we have to look not only upon the interaction between ethnographers and designers as a conversation, but also at the necessity of gathering data at a specific place and collaboratively shuffling them around. The sustained relation between the researchers and the designers, as well as the opportunity to juxtapose technology and inscriptions was essential to enable interesting associations. Thus, the design is associated with the empirical findings, but also with available technology.

Designing Hocman

Three broad phases comprising fieldwork, design, and evaluation can be identified in the process of creating Hocman. The development involved the participants in a dialogue with the available materials from which the design problem and its solution are worked out simultaneously. The findings from the fieldwork played a major role in the design process, where they informed the development of the prototype. When the fieldwork came to an end, the discussions on feasible design ideas resulted in a tangible proposal – the Hocman prototype. It was then redesigned prior to the evaluation.

Fieldwork

We applied techniques of ethnographic fieldwork involving the researcher participating, overtly or covertly, in people's daily lives for an extended period of time in order to understand motorcycling. The fieldwork was carried out in the region of Stockholm during three months by one of the researchers who owns a bike. The researcher visited known meeting-places and took part in joint trips. We also studied a popular public message-board on the web for bikers. The empirical material, which includes field notes, recorded interviews, and recordings of the message board, were transcribed and coded. This diversity gave us the opportunity to think about and explore what motorcyclists do, in a number of

different ways. We went through the transcripts identifying a set of themes. The idea of the specific importance of social interaction during traffic encounters emerged during the analysis. It was challenging to ground the hypothesis in the available empirical data since this truly mobile activity of high-speed meetings leaves scant empirical evidence for an observer. Instead, the availability of traditional observables e.g. from the message board, could easily have drawn us, and the design, in another direction. This is also evident from most other motorcycling ethnographies, which do not attach similar importance to social interaction in traffic [23]. However, our hypothesis could be initially strengthened with reference to the on-going discussions on the message board. The data gathered from it was used both as empirical findings to describe the activities, and as a support for our interpretation of the importance of traffic encounters. Second, even though our hypothesis was mostly based on indirect evidence, we had the opportunity to investigate the idea through associating to design and user testing. However, the generation of design ideas was something that occurred in conjunction with the analysis. In the end it supported us in making our somewhat bold interpretation of motorcycling activities.

Concept Innovation

A number of more or less undocumented ideas emerged during the design work from all parties involved. We discussed the viability of different context aware [9] services such as: games, scores based on individual driving styles, or sharing of travel logs to enable de facto road maps. In these discussions we compromised between three things: what bikers appreciate, what had already been suggested in the literature and what was possible to technically achieve. As such we combined and associated knowledge of the social interaction between bikers collected in the fieldwork with various computer science issues. Ideas were abandoned if they were deemed not fun for bikers, or likely to encourage particularly dangerous driving behavior. If they had been suggested earlier and resembled the work of other researchers they were dropped; our goal was to generate innovative services. Furthermore, if a particular design was deemed technically difficult to achieve it too was eventually discarded. We finally settled for a preliminary version of a concept that would enhance bikers' social interaction. This tool would help bikers when referencing real-world meetings and help them in planning future trips,

possibly with the people they had already met. As such it would work as a log of all the encounters a biker took part in.

Hocman

We decided to build a peer-to-peer application based on mobile wireless ad hoc networking (MANET) for PDAs to learn about our hypothesis about motorcycling, as well as the technical feasibility of Hocman. The service is novel in many senses. First, the context of use is previously unexplored. Second, it is designed for unacquainted users. Third, although the technology achieving MANET is well studied, applications of it are rare. Fourth, PDAs have never been suggested to add value to traffic encounters.

Wireless ad hoc networking allows devices to communicate directly with each other without any dedicated infrastructure, as long as they remain within wireless reach. Operation without infrastructure fits well with biking since traffic encounters take place anywhere on the road network. As MANETs are limited to device-to-device operation, they cannot rely on infrastructure at any level of networking such as base stations, routers, or servers. It is therefore appropriate to use a peer-to-peer model where all devices have symmetrical capabilities. The application was implemented on PDAs (fig. 1) since they can be carried around either by hand or in a pocket by a biker. Energy consumption is a crucial issue and they are designed to rest in stand-by mode most of the time. However, this characteristic is disregarded since some bikes are equipped to charge electrical devices.

Fig. 1. The hardware used in the Hocman prototype (left). A typical biker's page, consisting of a photo and contact information. (middle). A screenshot of the log (right).

The application consists roughly of three major components: an HTTP server to make available content in the form of HTML documents over MANETs; an HTTP client to download such documents; and a protocol (referred to by us as Rapid Mutual Peer Discovery, RMPD) to index and discover other peers whenever they are within wireless reach. A peer is required to have a default

HTML page, which can contain for example, contact information, driving statistics, particular interests and personal images.
We synchronized the HTTP client, and the RMPD protocol, in such a way that it would automatically trigger a download operation of default pages from all peers discovered. The default pages would then be inserted into a database that builds up a log of Hocman-supported encounters with other bikers. This log is available through an internal browser allowing it to be viewed at all times.
A technical evaluation was necessary since PDAs and networking technology are traditionally used in indoor office settings and it was unclear whether they could successfully be transferred to the road domain. Therefore we devised a performance test to learn about their technical limitations.

Planning The Field Trial

The performance test showed that it was feasible to share HTML pages during encounters between bikers while driving. However, we were curios about how bikers would receive the prototype and we began planning an evaluation. We quickly ran into some methodological intricacies due to the mobile nature of biking. It is an activity that takes place almost anywhere and anytime in a vast geographical area among unacquainted users. Hence, limitations of use had to be introduced to enable data collection. We settled for a field trial, which would let us obtain holistic data on usage in an almost "realistic" setting. However, the context of use was restrained to a circular route. Hocman use was also restricted in time to enable traffic encounters.
Furthermore the design of Hocman was altered as we added a sound icon to be played when logging occurred. Thereby, the process of setting up for evaluation widened the Hocman concept to also providing awareness of upcoming encounters. By playing the sound icon – a short "chirp" – we could provide the bikers with an understanding that first and foremost the encounter involves another Hocman enabled biker. Second, the sound would also tell there is more to this encounter, i.e. there is an exchange of default pages taking place.

Field Trial

The field trial of Hocman was performed with six different bikers on two occasions. We placed three bikers each time at separate rendezvous locations

along a circular route. Having them come to different locations was important, as we wanted to keep the test persons unaware of each other to better reflect a realistic situation. Each driver was rigged with a PDA running Hocman. The bikers drove two laps in different directions to maximize the number of encounters. We also used a "dummy" participant i.e. a researcher driving a bike equipped with Hocman, to further increase the number of encounters. Each lap took approximately seven to eight minutes to drive and afterwards each biker was invited to a semi-structured interview. The interviews were performed individually and in parallel to keep the bikers unacquainted throughout the evaluation.

Results

In this section we give a brief summary of the findings of the three phases of the project: the fieldwork, the implementation of the prototype and finally, the field trial with bikers.

Fieldwork

Here we sum up the series of activities that constitute biking (see [12] for more details). This concerns the specifics of social interaction, i.e. the different ways in which the bikers interact, and how these practices relate to each other i.e. how they organize biking to increase the likelihood of traffic encounters.

Riding is, of course, central in motorcycling. A principal reason for being a biker comes from the strong tactile experience given by the roar and vibrations of the engine. Bikers ride to experience the feeling of acceleration and the centrifugal force when taking turns. Accordingly bikers crowd winding roads far from inhabited areas. These roads are very popular, and well known in the biker-community. The knowledge of the "enjoyable" roads is passed around by word of mouth, on motorcycling web sites, or as in some cases, marked up on certain road maps.

Encounters with unacquainted bikers in traffic are another enjoyable aspect of biking. In view of the high speed and maneuvering there is not much time for interaction during the encounters. Still, we argue that most bikers engage in communication during encounters beyond what is necessary for coordination.

During the meetings, they greet each other and interact with a wave, or flash their headlights.

The enjoyment of traffic encounters is observable since it is a popular topic on the message-board. For example, one particular discussion among ten bikers concerned the identity of a biker someone saw being stopped by the police when passing by on his motorbike. This illustrates both the nature of encounters as well as their keen interest in them. First, even though the bikers had actually met that day, they were still unsure about who this person was. Second, the encounter gave a glimpse of how the activities that occurred called for later elaboration. The length of the discussion, i.e. ten messages over a time span of twenty minutes, displays the interest in sorting out the issue.

Fig. 2. Pictures from the weekly meeting at the "The Yellow Café" (left). Motorcyclists performing stunts (right).

Certain stretches of road and locations attract more bikers than others. The resulting audience makes them excellent places to express one's identity. This is done in several ways. Some bikers take to spectacular stunts, for example doing "stoppies" (fig. 2) where they brake hard with the front and make the rear wheel lift high up in the air. More subtle ways of expressing oneself also exist. For instance, the bikes themselves are designed to give an impression of impressive performance and appeal [23]. Hence a biker then displays an attitude towards biking by his or her selection of motorcycle. Some elaborate on this with personalized designs and original clothing.

Similar to what they do on the road, many bikers express their identity on the web with pictures or movie clips displaying their bike, or demonstrating their skills. They use thumbnail pictures in their signatures to show off, and take an interest in giving and receiving recognition for their performances.

Social interaction between bikers also takes place in many other forms and settings than the brief and random traffic encounters. The chances of interacting with unacquainted bikers are rather low since the roads constitute such a vast

public place. Moreover, even if bikers want to meet someone they know it is still improbable to randomly come across that person. Consequently, they have developed many ways to increase the likelihood of enjoyable social interaction. One way is to ride around a specific site (fig. 2). Such places are often given by tradition, but they can also be selected through contingent negotiation. In these semi-stationary settings, the possibilities for expressing one's identity are rather good. On the other hand, such practice is apparently unfulfilling in terms of riding experience. They also organize trips to explore untried roads with familiar bikers. This provides a decent driving experience, however it too is unfulfilling in the sense that it is mostly restricted to acquainted bikers.

Motorcyclists have enthusiastically adopted the message board to further increase interaction. Apart from elaborating on brief traffic encounters, they use the message-boards to organize their riding. There is a better chance of lengthy interaction on the message board than during the brief encounters along the roads. The thumbnails also facilitate coupling individual members of the message board to bikers met on the roads, reconciling the on-line and the real world. However, interaction on the web is different from all other forms of biking interaction in that it lacks the riding experience per se.

Some other deficiencies do also exist. It is an asynchronous message exchange, which makes it difficult to negotiate the activities. Discussions are lengthy, occasionally spanning several days, and participants are not present all the time. Consequently, not all participants are aware of the decisions taken during the discussion, not even the initiator. Since the message board is public, much confusion is caused by the different interests and situated practices of the participants.

Implementation

A joint consideration of the ethnography and the field trial eventually led us to formulate a concept aiming to add value to bikers' social interaction. Accordingly, a prototype was then developed. It is implemented in C/C++ interfacing the PocketPC system API (see [10] for additional details on the implementation). We completed the prototype for two sets of devices: Compaq Ipaq 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 in order to enable ad hoc communication. We conducted a performance test to examine the prototype's ability to distribute HTML pages while driving.

There are several studies of how the performance of the communication sub layer is affected by mobility [3, 7, 14, 16]. In these studies the performance is measured with metrics such as throughput, delay and loss rate. In these tests the dominating definition of mobility is the random waypoint model i.e. a relative large number of nodes moving randomly within a flat rectangular area. Our investigation of the performance of Hocman differs radically in that it concerns an application and not a communication sub layer. Also, all testing is performed in a real world implementation. We identified three relevant factors. The first factor concerns mobility i.e. the quicker a meeting is, which depends on the participant's relative speed, the less time there is to transfer data. The second factor concerns the number of active prototypes in a scenario i.e. a large number of prototypes will compete for the same bandwidth and obstruct each other. The third factor concerns the amount of data and the number of embedded resources, which the prototype is able to distribute during a meeting.

The goal of the test was to ascertain the limits of functionality, i.e. to determine conditions of mobility where the prototype ceases to operate as intended. This condition was set to a failure in file download; failure to be added to the log; or failure to appear visually.

Peer	Download from	Object	Speed [km/h]		
			50	70	90
C	A	page	100	100	100
		image	100	100	40
		audio	100	100	20
	B	page	100	100	100
		image	60	100	60
A	C	page	100	100	100
		image	100	100	80
B	C	page	100	100	100
		image	100	100	100

Table 1. The download success rates for each peer, in percent.

In the test scenario three Hocman peers were used. Each peer was running on a Compaq Ipaq 3660 with a Lucent Orinoco Network Card, set in IBSS mode with no encryption. We constructed three websites and assigned each site to a particular peer. We placed two Hocman PDAs next to a straight, flat road and

rode by with a third unit at various speeds. Each test run was repeated five times. For each repetition we monitored the success of download, log and page display operations. The success rate (in percent) for each peer and each speed, are given in table 1.

In the column, showing the success rates for 50 km/h, peer C failed twice to download the embedded resource from peer B. We have not found the cause for this. In the column showing the rates for 90 km/h we note that all peers, except peer B fail to download the embedded resources. However, all nodes are successful in downloading the index pages. In conclusion, the results of the performance test assured us that the implementation would work in a field trial with bikers driving in a naturalistic setting.

Field Trial

We conducted field trials where bikers tested the prototype during a limited period of time (for more details on the results, see [11]). We wanted to learn about the users' experience, and to get indications whether the prototype was built on the correct assumptions, i.e. that the hypothesis of bikers particularly enjoying traffic encounters was sensible. The results are summarized in the following:

- In general, Hocman was able to add to *the enjoyment of driving*. The bikers appreciated hearing the sound icon, inspecting logs and browsing contact information. However, they did not believe that Hocman would rationalize biking.
- The bikers found it interesting to read the information on the downloaded pages. They also had many suggestions about what data the pages could contain, which acknowledges that Hocman provides ways for bikers to *express identity and community membership*. On the other hand, there was no consensus on the matter of sharing pages with all users or a limited group. However, all agreed that some sort of user defined filtering or sorting mechanism would improve the concept.
- Fundamentally, all bikers recognized that the sound icon indicated the proximity of other Hocman users. About half of the subjects could also account for where and when it was heard, which indicates that they had plenty of time to react and look around. More importantly, almost all of the bikers enjoyed hearing the sound icon to an extent that was surprising

to us. For instance, some bikers changed their driving behavior, i.e. they waved more, or less, than ordinary when otherwise passing a biker. The feedback we got about hearing the sound icon indicates that Hocman was able to enrich *traffic encounters*.

- Besides remembering where they heard the sound icon, most users were also able to associate a particular log entry to it. They easily related the downloaded HTML-pages with each unique encounter. Hence Hocman provided support in *handling traffic encounters in retrospect*. In one case an entry, and the associated web page, was helpful in recognizing an acquaintance.
- Most bikers claimed that they took an interest in which bikers they ride together with. They found it plausible that they could contact somebody on the pretext of reading a page someone shared. Moreover, a few users recognized that Hocman also could be used for a variety of other purposes, such as advertisements or dating. This tells us that Hocman may be an important part of the *arrangements to increase social interaction*.
- Apart from discussing the reasons for contacting somebody, the bikers commented on how this possibly could take place. For example, one biker found it appropriate to supply a URL or email address. He thought that following up a joint meeting through postings to bulletin boards on the Internet, or sending e-mail messages would be an unaffected way of approaching somebody. On the other hand, another user did not think he would contact somebody on the basis of having a persons' page only. However, it seemed like the prototype supported the possibilities for further contact, for example when *planning a joint ride*.

To summarize, we are confident that Hocman complies with the findings from the fieldwork, and that the hypothesis of the importance of traffic encounters in the bikers practice is valid. However some details could be improved. Lowering the volume of the sound icon playback, a less bulky device, and more comfortable earphones perhaps integrated with the helmets, would have been appreciated.

Conclusion

Truly mobile activities, such as transient social interaction occurring in vast areas, constitute new challenges for mobile HCI. This project increases our

understanding both of technical and social issues as well as applicable methods to generate new services that exploit this form of mobility. Although traffic encounters play a central role in biking they are hard to document, and we had to associate the analysis with the design itself to make a convincing argument. However, despite its limitations the fieldwork uncovers many interesting habits of a community concerning mobile technology use as well as road use, for instance, their appreciation of driving. The limitations were handled through integration in associative design, which requires a commitment to close work between ethnographers and designers, in order to make different phases of the project associate with each other.

The service generated, i.e. Hocman, accomplishes enhanced interaction in traffic encounters between bikers and also the exchange of personal HTML pages. The pages could be used as a reference to these encounters in other situations. Hocman is a peer-to-peer mobile wireless ad hoc networking application for PDAs. For instance, it uses WLAN networking technology in a non-traditional setting i.e. traffic. Finally, we have performed field trials to evaluate the prototype with bikers. This method accommodates for the particular difficulties of performing observational studies of unacquainted users in this context. The field trial showed that the Hocman concept was appreciated.

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