

# Intermediate Interaction in Traffic

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**Abstract.** Based on an ethnographic study of community road signs, we argue that mobile location aware systems fit somewhat with an abundant practice where private persons make and post signs along the roads. People who live along roads have various reasons, and investigate in various ways, to communicate with passing drivers. Even though these road signs are mostly used for interaction outside of the neighborhood community, they fill an important role to sustain those communities. Our fieldwork reveals that the available mobile location based systems need to be adapted both for such communication, as well as for the particularities of reading signs when moving along a road at high speed.

## Introduction

There is a long tradition of tracking and positioning devices in traffic, e.g. the Black Box, that track the movements of trucks, was first implemented 1913 (Hay & Packer, 2004). Since then the development has escalated in e.g. Intelligent Transportation Systems (ITS) research to develop and use real-world tracking and positioning technologies primarily to monitor, supervise and control traffic. This appropriation of positioning and tracking systems differs considerably from the location aware community systems presented in CHI research. However, the setting (traffic) is still relevant as a special case for CHI research especially since location aware community systems are common in this setting, not high-tech electronic systems, but as simple cardboard signs. These low-tech community systems are created by private people posting messages along the road using, what we refer to as, community road signs.

We have conducted ethnographic studies to understand the motivation and use of community road signs. We focused on the perspective of those that post signs and

the people who are responsible for cleaning the roadside.<sup>1</sup> Based on the ways in which people post road signs we argue for a set of requirements on location aware community systems. Public electronic road signs would fit better with current practice of *making messages* if they would allow adjustments towards drivers' hurried reading in relation to the *indexicality of the message*. Then the electronic version of the community road sign could be an alternative way that increased the possibilities for expressing the identity of the community beside the road.

Further, our analysis address how messages should be handled once posted. A critical issue in the design of public systems is to prevent them from cluttering. Some technical solutions have been presented drawing on filtering techniques. However, current community signs depend on a practice where the sorting out and removal of signs occur manually by road inspectors. They follow a set of formal and informal rules that describe what should be removed and what should be allowed. It is not evident that this practice could be automated without loss of meaningful messages.

## Intermediate Interaction and Community Road Signs

A community is groups of individuals whose sense of belonging, social identity, culture and shared knowledge (common sense), are held together by different modes of interaction. These interactions are mediated through technical objects, from buildings and phones to computer networks. Wellman (2001) argues that different modes of interaction facilitate or inhibit different *forms of communities*. These communities are distributed in a spectrum from geographically limited groups to the people whose communities are totally independent of place.

By community signs we refer to road signs that are made and posted by private persons, in comparison to official road signs that are handled by a road authority (Krampen, 1983). While some signs are used to interact within members of a community, road signs along the road are predominantly used in what we term intermediate modes of interaction, which occurs in between members of different forms of communities. In general, the signs are made to tell bypassing drivers something about the current location, to make them actively relate to the community that they pass through. For example to inform the driver that small kids live beside the road or to promote locally available products, events or establishments.

There is also a more subtle purpose that strongly relates to people's identity as members of communities. Several small villages mounted their own community road sign to display the name of their community. For village members these signs were

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<sup>1</sup> We have gathered more than 2000 pictures as a survey of around 4000 kilometers roadside in Sweden. Seventeen interviews with people posting signs where conducted during the journey trough Sweden. Additionally six interviews with road inspectors that remove signs where conducted, four in Sweden and two in Canada. These interviews provided additional footage from Sweden and Toronto.

important for two reasons. First, it was of importance to support navigation into commercial activities in the settlement and thus sustain the community economically. Second, the sign was important for the people to sustain a sense of neighborhood community. The signs can be seen as strengthening the community in itself by expressing this “we” to non-members. Mark Granovetter (1983) has argued for the importance of such interaction. He claims that “bridging” between communities provide critical resources also to tightly knit neighborhood communities. We use the term *intermediate interaction* for such signs, which are used to strengthen the identity of the neighborhood and to make it economically sustainable.

### The Practice of Making and Posting Signs

The detailed ways of *how* the signs are made and handled are as important as its relation to forms of communities. Our interviews reveal that when people use road signs to communicate they account for three basic issues. First, they account for the meaning they want to convey to passing drivers. Commonly, the messages are as brief as possible. Second they have to account for the situation in which the driver will read the message. This includes accounting for the location where the drivers read the signs as they pass by, and the time available for reading, which depends on the speed of the car. Third, they have to ensure that the sign will stay in place as long as the message is valid. Road-inspectors can remove signs and their presence discipline posters in their turn to adopt several tactics to keep the sign up as long as possible. These intentions then affect posters elaboration of the form and style of the sign, its location as well as the choice of numbers of signs.

Community road signs get some of their meaning from the general area in which they are posted e.g. a village or a work site. There are also other ways by which the signs become indexical. A vast number of posters extend the index of a sign by shaping the sign into an arrow or painting arrows on the sign, whereas other posters carefully mount the sign so that the location of the sign also provide direction and navigation to readers traveling in specific directions. For example an informant placed a large metal sign beside an off-way. By placing the sign there he directed the traffic towards the gravel road instead of an asphalt road at the same crossing as the off-way.

### Road inspectors practice of removing signs

The life of a community road sign is also in the hands of the road authority and its inspectors. According a set of *formal rules* road inspectors are given authority to dismount community signs along the road. However, the administrators’ guidelines state that removal of signs should be handled with respect towards the owners of the signs in order to maintain “goodwill” and act service oriented (SNRA, 1999). It is then up to the road inspector to interpret if their actions will affect the “goodwill” of the road authority. The inspectors interpret the need to remove signs in terms of

where the signs are placed; how big they are; the material they are made of but also whether a sign is a direct or indirect threat to traffic safety. The former should be taken away immediately, whereas the second category is less urgent.

Finally, the decisions to remove signs are affected by content and meaning. Thus, road-inspectors also act as editors. Directional signs and signs that warn for hazards (e.g. children beside the street) seem to get a milder treatment. Signs that inform on various events is also occasionally accepted since the event is limited in time, the organizers are trusted to remove them afterwards, they are often fun and organizers of events have historically been allowed to post private signs. Commercial signs are occasionally accepted, when the removal of signs might ruin a small business e.g. a café. Political expressions are also allowed in conjunction to elections. Memorial signs that mark and honor a person killed in a traffic accident is seldom removed.

## Design Discussion

In the following we will provide an exploration on how the characteristics of roadside community signs fit with available prototype services. Prominent prototypes of Public Displays (see e.g. Snowden & Grasso, 2002; Churchill et al, 2003) are not considered here despite the physical similarities with community road signs, practical issues that make them less applicable as community road signs. First, digital displays are very expensive for the posters when compared to paper and cardboard. Second, digital displays require electricity that is not simply available along the roadside. Third, sunlight, rain, nights, criminality are all examples of the extreme conditions along the roadside, which could inflict on the use of digital displays.

Alternatively, we suggest an approach of considering location-based services made available on mobile devices. Public location aware community systems are particularly interesting (e.g. Burell & Gay, 2002; Burell et al, 2002; Espinoza et al, 2001; Persson et al, 2002; Rekimoto et al, 1998). These systems are so designed that they allow many persons to post and receive messages. Here the cost of the equipment is imaginably mostly on the readers' side, and indeed most of the technical resources are already available in most drivers' pockets. Further, the electricity is already supported by the batteries of the mobile devices or available through the cars. Finally, the car provides shelter to the hard conditions of road use. However, we do not claim that all technical issues are solved in this area. Rather, we raise some pragmatic issues, which guide us to take a closer look at available mobile systems and how they fit to this particular context of use.

### Indexicality in relation to drivers hurried reading

Drivers have very limited time to read a sign as they pass through the spot that provide specific meaning to a sign. At first sight, mobile technology could be used to overcome the geographical limits; the message could be available for reading as far

away as wanted. This would then provide the driver with much more time to read it. Paradoxically, they would then decrease their indexical reference i.e. the meaning given to the sign provided by its specific location. Thus, *readers of electronic signs will also be affected by a limited time for reading as they pass through the area of interest*. The importance of addressing this implication has been recognized in the evaluation of CampusAware. Researchers commented on the loss of messages due to users' movements as they walked around on the campus (Burell et al, 2002). However, no available prototype service accounts for this problem in its design.

Further, posters account for drivers momentary time to read by presenting their message brief and bold. The means provided through the user-interface of mobile devices offer other possibilities of presenting and exclaiming a message. CoolTown (Kindberg et al, 2000) provided the possibility to present messages through various media; audio, textual and multimedia presentations, while GeoNotes promoted a reduced media, only displaying short text messages (Espinoza et al, 2001; Persson et al, 2002). GeoNotes argues that shorter messages encourage frequent production of messages. However the compressed messages presented by posters accentuate the possibility of presenting brief messages in ways that not yet have been considered.

### Avoid cluttering

The overall impression of community road signs depends on removal of abundant signs. The roads we visited were remarkably uncluttered by community road signs, with some exceptional roads in Toronto. This is probably due to the work of the road authorities who clean the roadsides, but also on the posters restricting themselves as an adaptation to the authorities. A roadside without any restrictions would soon be overcrowded with signs. The concern for overflow and cluttering of mobile location-based systems has also been raised. Signs take up some physical space, which provide at least a minimal restriction, whereas computers provide the possibility of cataloguing and storing large quantities of information that can be presented at the same location. Rekimoto et al (1998) see the possibility of filtering information as an argument for using electronic messages instead of non-electronic equivalents such as post it notes. The researchers behind E-graffiti and CampusAware sees filtering only as a future issue – due to the limited use of posting notes electronically (Burell et al, 2002). HyperCampus promotes the use of “personal agents” that scout and filter the information available at the location depending on the users' preferences (Nagao & Katsuno, 1998). Filtering based users' preferences might improve interaction within communities however such filters would inhibit intermediate interaction. GeoNotes is the prototype that is made to address this specific problem. Their prototype was inspired by social navigation and proposed not only personal filters, but also filters based on popularity (Espinoza et al, 2001; Persson et al, 2002). We suggest that these automatic filtering techniques could miss out on the ways in which community road signs are made to work as a general media. Specifically, we think about the ways in which the road inspectors interpreted

the content of the signs in a sophisticated way. Their practice is best understood as a form of editing, rather than a mechanical routine process that could be automated without loss of important signs. Thus, an alternative way to avoid cluttering would be to develop tools that would support some form of manual editing.

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