MyState: Using NFC to Share Social and Contextual Information in a Quick and Personalized Way

Robert Hardy[1], Enrico Rukzio[2/1], Paul Holleis[3], Gregor Broll[3], Matthias Wagner[3]
[1] Computing Department, Lancaster University, UK, {hardyr, rukzio}@comp.lancs.ac.uk
[2]University of Duisburg-Essen, Germany, enrico.rukzio@uni-due.de
[3]DOCOMO Euro-Labs, Germany, {holleis, broll, wagner}@docomolab-euro.com

ABSTRACT
Sharing social or contextual information on a social networking site is typically a quick and easy process using a laptop or desktop. However, on many occasions, the need to share this information will occur away from a computer. As an alternative, a mobile phone could be used. However, inputting the information via the phone can be time-consuming and even intrude on the user's other tasks. This will increase the likelihood that the information is lost or retrospective. By tagging physical objects using Near-Field Communication (NFC) technology, MyState provides a way for users to make the environment (to which the information is associated) interactive. By simply touching these objects with their NFC phone, they can quickly and conveniently publish this information to the virtual world. A Facebook application was used to exemplify the concept and explore the different ways in which users personalize these tagged interfaces to address their own needs.

Author Keywords
NFC, context, social, touch.

ACM Classification Keywords
H5.2 [Information interfaces and presentation]: User Interfaces. - Graphical user interfaces.

General Terms
Experimentation, Human Factors

INTRODUCTION

There is a wealth of work that explores the ways in which people can share their current context. However, we find that the majority of these approaches are implicit, for example, using tracking technologies (such as GPS). In contrast, this work focuses on explicit touch-based interaction. This provides the user with complete control over when they share social or contextual information – in particular, their location. Furthermore, Near-Field Communication (NFC) technology allows users to avoid the significant amount of time required to input messages as they can be sent via a single touch of the phone.

NFC is a short-range radio frequency communication technology suitable for touch-based interaction between these devices due to limited range. In recent years, we have seen the integration of these technologies into mobile phones. NFC is a subset of RFID (Radio Frequency Identification) with a limit on the communication range of 10cm. Powerless NFC tags can be read by the NFC-equipped phone and are capable of storing a few kilobytes of data. We use NFC technology instead of 2D barcodes due to its interaction benefits for close-range interaction. A comparison of interaction between NFC and 2D barcodes by Reischach et al.[1] showed that NFC was both faster and easier to read based on a product identification study. Similarly, a study by Mäkelä et al. [2] presented significantly greater preference results for NFC over 2D barcodes based on speed, effort and intuitiveness.

MyState is designed with user creation and personalization in mind and the focus is on the user as the person responsible for making their environment interactive. The next section describes the process by which users are able to obtain, deploy and use MyState.

MYSTATE: DISTRIBUTION, DEPLOYMENT AND USAGE

There are three main parts to the MyState prototype: a phone (equipped with an NFC reader and the MyState phone application), the MyState NFC tags, and the MyState Facebook application. The phone is used to read/write any textual message to the NFC tags. These are then placed in meaningful locations. For example, the message "I'm having a coffee" could be written to a tag that is placed on a user's coffee mug. Subsequent touches between the tag and phone will send the message as a MyState post (indicating to friends that the user may be open to socializing) to the MyState Facebook application. The phone application was developed in Java ME with JSR 257 for NFC capability.

Distribution

A distribution scenario for the MyState would involve two processes: a software distribution for the Facebook application and the mobile client, and a hardware distribution for the physical NFC tags. The Facebook application could be distributed as a verified application on Facebook. The mobile application could be distributed via a mobile application store. Alternately, when the Facebook application is installed, it could supply a download link for the mobile application. In either case, a postal address should be supplied to allow the second process: the distribution of the NFC tags via the postal service.

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Deployment and Usage

Using a simple example, we will now explain three main procedures: placing the tags in the environment, writing to the tags, and reading the tags in order to send a post. In Figure 1 (left), a tag has been labeled "In office" and attached on an office door at the user's workplace. Using the phone's keypad, the MyState post "I'm in the office" is input using the phone keypad (Figure 1 centre). Once the post is input, the user then touches the tag in order to write this information on the tag (Figure 1 right). The phone vibrates and provides visual feedback to indicate the tag is being written to.

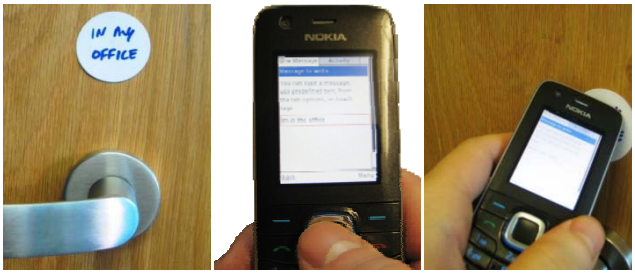

Figure 1: MyState tag setup: (left) tag placement (centre) creating a post (right) writing the post to the NFC tag.

All subsequent reads from the tag (Figure 2) will send the post to the MyState Facebook application. In this example, each time the user enters their office, they can touch the tag on the door. This is also true for any other MyState user who shares the office. Once the phone indicates that the tag has been detected, the user places the phone on their desk and is able to concentrate on other tasks. Meanwhile, the application starts automatically, and, after a short period of time, the phone emits an audio alert to signal that the post was sent successfully. On completion, the application closes automatically.

Figure 2: Touching the tag with the phone to send a post

The post can then be viewed on the MyState wall. The MyState wall is similar to the Facebook wall, but tailored to short social and contextual messages formed from the information trails left by users. We considered the MyState wall necessary for two reasons. Firstly, posts oriented towards daily routine are likely to have high repetition and could flood the Facebook walls. Secondly, posts may only be relevant to smaller groups, especially when they relate to your daily state; for example, sharing when you are awake or at work. The MyState wall can be seen in Figure 3. As with the Facebook wall, the MyState wall merges all the MyState user posts who are currently Facebook friends. Again, in keeping with the Facebook wall, posts can be selected for removal or to add further comments.

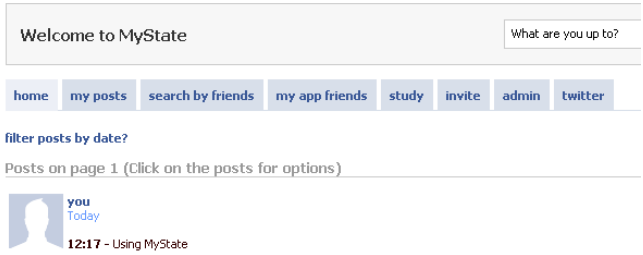

Figure 3: The MyState Facebook application wall

Returning to the usage example, a MyState friend may wish to visit several MyState users from a nearby building. Using the search tool in MyState, they can check the latest state of their friends and avoid a wasted trip or several phone calls. We also ensure that non-MyState users can view recent MyState posts using an expandable profile box located on a MyState users profile page. If the user needs to use the physical tag for another purpose, they can simply peel the tag off the door, place it onto another object, attach a new label, and replace the message data on the tag with a further NFC write.

SUMMARY

We described a prototype that enables users to create personalized physical interfaces that can be used to share information with the social community through quick, intuitive touch interactions whilst providing complete control over when this information is shared. Use cases are targeted at personal use, such as retracing steps and activity history, and social use, such as synchronizing activities, expressing moods, games and tracking shared items. We also explore new NFC interaction concepts, such as concatenating tag reads to combine message data and editing messages read from a tag by the phone prior to sending.

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