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News-on-the-Go

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ABSTRACT

In this paper, we describe a prototype that allows users to receive news on his NFC enabled mobile phone by touching a poster on the go.

Categories and Subject Descriptors

J.7 [Publishing]: content distribution channels, NFC, mobile HCI

General Terms

Design

Keywords

Content distribution, haptic user interfaces, NFC

1. IDEA

This paper describes a prototype that allows users to pick up news content for their mobile phone by shortly touching an information poster on the go. Such posters may be placed in public spaces, for example at train stations, where people are passing by and can pick up up-to-date information from their favorite newspaper without having to stop.

In our prototype we use Near Field Communication (NFC) enabled mobile phones. NFC is a standard closely related to

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Radio Frequency Identification (RFID) [1]. An NFC system consists of two components: first, there are small, cheap tags that can be placed on objects, for example products or posters. Second, there is a NFC reader in the mobile phone. As soon as the user touches a tag with his phone, data such as an identification number or an URI is transmitted wireless to the phone.

2. DEMONSTRATOR SETUP

We have created a poster that shows the logos of several online news sites. The poster was placed in the hallway of our institute as a semi-public space (see figure 1).

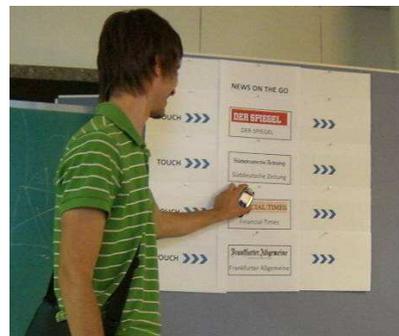


Figure 1: User requesting news on the go

A user can touch the logo of an online newspaper with his NFC enabled mobile phone while passing by and immediately receives news content displayed on the phone's browser (see figure 2).



Figure 2: News content on the NFC enabled mobile phone

On the reverse side of the poster several NFC tags are placed that identify the corresponding newspaper on the front of the poster (see figure 3).

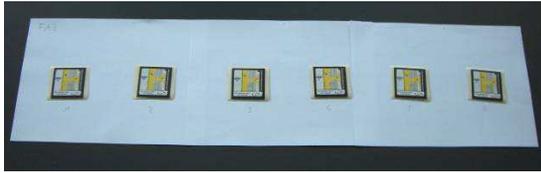


Figure 3: Multiple NFC tags at the reverse side of the poster are assigned to each newspaper

For each newspaper multiple tags are used to increase the reliability of the reading process. The time needed for the mobile phone to identify the tag is about 2 seconds. Tests showed that the user can keep on walking during the identification process.

3. APPLICATION DEVELOPMENT USING INTERACTION DESIGN

Our ubiquitous computing application works with technology (the NFC tags) that is woven into the background of the user's environment (the poster at a train station)[2]. It supports an everyday activity such as reading news. The activity of touching a poster while walking by is extremely simple to understand for users[3]. Touching is considered a natural action, although it isn't necessarily considered a socially acceptable way to use mobile phones[4].

Norman states classic design principles that make everyday design understandable [5]. These principles guided the development of our prototype.

- **Visibility:** The user can immediately tell the state of the device and the alternatives for action.
- **Conceptual model:** Consistency in the presentation of operations and a coherent system image.
- **Mappings:** The relationship between system state and what is visible, between controls and their effects, and between actions and actual results must be clear and easy to determine. This is clearly the case since there is only one action (touching) the poster and the choices (selection one out of several newspapers) are depicted on the poster. The result (receiving news content) is immediately shown on the phone's browser.
- **Feedback:** Full and continuous feedback about every action. The phone vibrates as soon as a tag is detected and uses the browser for further interaction.

The mobile device can be considered as an everyday object since users are accustomed to using it almost automatically. NFC is integrated in mobile phones – devices that are everyday objects– therefore the usage use of NFC should be easy and understandable in everyday situations. Yet the idea of touching an object with a phone to get information is not common for most people. It is a challenge to shape the affordance right and to make interfaces intuitive, for example with graphical symbols [6].

4. SOFTWARE ARCHITECTURE

The system consists of three major components (see figure 4): software on the mobile phone, a core NFC application server in the backend, and several client news/advertisement application servers.

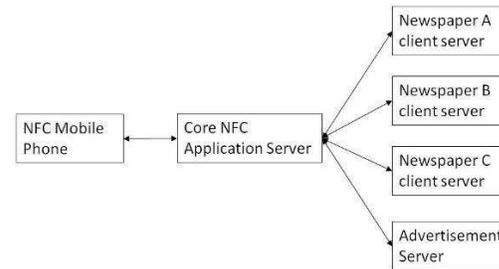


Figure 4: Several newspapers can serve as content source. The core server sends requests to the client servers and receives news content.

The software on the mobile phone reads the NFC tags and displays the information to the user. For both tasks standard software that is preinstalled on the mobile phone by the manufacturer is used. In our setup we use a Nokia 3220 and a Nokia 6131 with NFC capabilities. The preinstalled Service Discovery application detects the tag and reads an URL that is stored on the tag. The URL includes the address of the core NFC server and a unique identifier (UID) containing the newspaper and the location of the poster. This URL is opened in the web browser of the mobile phone which sends an HTTP request to the core server.

The core NFC server uses JBoss AS as J2EE container. When the core NFC application server receives a request it extracts the UID and performs an internal database lookup. As database we use Apache Jackrabbit which is an implementation of JSR 170 (Content Repository for Java Technology API). Depending on the name of the newspaper a request is sent to one of several news application servers and to an advertisement server.

Each implementation of a news application server is running independently from the other servers. The communication between core server and news servers is based on XFire, a Java SOAP framework. It serves as a connector to the online news site of a singular newspaper. In our prototype we use RSS feeds but other technologies for content syndication such as APIs or direct access to content repositories may also be feasible. The news content is sent back to the core NFC server in a standardized format. In our prototype we use standard text and images, but rich content such as podcast could be implemented.

Additionally the location information is sent to an advertisement server which generates ads that are related to the current location of the user. The core NFC application server collects the output both from the news server and the advertisement server and combines the results into one HTML page. This result is sent back to the mobile phone as HTTP response.

5. BUSINESS CASE

The idea presented in this prototype can serve as a new distribution channel for mobile news content. It allows users to access content with extreme ease at a point of time and location where it fits into everyday activities. Costs for printing posters with tags should become fairly cheap in the next 3 to 5 years and the penetration of NFC enabled phones will increase. We think that the news-on-the go service may initially generate revenues by adding location based advertisement to the news. This could also increase the efficiency of mobile marketing since the user is actively and explicitly requesting information (news content). Therefore advertisement that is tailored towards his current situation may be accepted as a value added service and not as unsolicited and disturbing. Nevertheless, other business models should be examined such as pay per use models, e.g. using NFC for services with micro-payments with direct charging to the user's phone bill, or integration with a an existing newspaper subscription.

6. OUTLOOK

Until now there was no rigorous evaluation of our prototype. We give only anecdotic report that the concept and the prototype were easily to understand for early testers and that the interaction was considered as fun. Curiosity was a major driver in trying the several news services.

The prototype will be the starting point for further research. From an HCI perspective several questions arise: First, how can

the design look like if there are more news sources to choose from than now, either by adding more newspapers or subcategories of a single newspaper (business news, sport news, politics, etc)? The space on a poster is limited and when making the area for one news source smaller it may become more difficult for the user to touch the right sport on the poster while walking by. Second, which issues arise when we add personalized content? How can users customize their profiles? And third, which places are best for posters and should different posters at different locations show different services?

The News-On-The-Go prototype shows the feasibility and good usability of a news content access service. It may be useful as an instrument for studying HCI based on NFC in more detail.

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