

Push!Photo: Informal Photo Sharing in Ad-Hoc Networks

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ABSTRACT

As mobile camera phones become ubiquitous the practice of photography changes. Camera phone pictures are usually taken with sharing in mind. Meanwhile, publicly sharing photographs online has become increasingly popular with websites such as Flickr. Push!Photo is a mobile photo sharing application where photos can be made public and immediately accessed by anyone nearby. The application also automatically searches for photos on nearby devices to find interesting and relevant photos. Push!Photo shows how it is possible to share digital photos just as easy as paper photos.

Keywords

Mobile, Photography, Sharing, Peer-To-Peer, Context awareness, Distributed system

INTRODUCTION

As mobile camera phones become ubiquitous the practice of photography changes. Today, many mobile phones come equipped with built-in cameras, and some phone manufacturers even claim that camera phones will soon erase the need for standalone digital cameras. The majority of camera phone pictures are taken with the intention to share them with others [3]. This is easily done on the Internet in e.g. blogs and photo sharing websites such as Flickr (www.flickr.com). The common ways to share photos in a mobile setting include using MMS, Bluetooth, IR, or getting the pictures off the phone and share them on the Internet. However these methods are quite cumbersome and require a certain threshold before they can be used with ease. Furthermore, they do not allow the kind of spontaneous informal sharing that e.g. a paper photo does. We want to address this by making the sharing and discovery of photos in mobile settings easier and a natural part of camera phone photography.

The *Push!Photo* application uses wireless ad-hoc networking to let users share photos easily in informal and social settings. Users can make photographs on their devices public, which means that they are immediately accessible to anyone nearby. Furthermore, photographs are automatically tagged as they are shot with information



Figure 1. (Left) *Push!Photo* can be used to informally share photographs. (Right) Two screenshots of the interface.

about when it was taken, who took the picture, and who else was present at that time. This lets Push!Photo automatically find photos from events at which you were present. For instance, at a party you would easily find photos of yourself taken by others, and on the following day you could meet your friends and look at each other's party photos.

RELATED WORK

In previous work with Push!Music [2] music files were replaced with so called *media agents* which were enabled to autonomously copy themselves between devices over a wireless ad hoc network. The media agents try to find their way to potential listeners as users meet, and as a song is copied it automatically enters the playlist. In this way the users discover new music while passively listening.

Other projects have looked at mobile photo sharing. Davis et al. in MM2 uses the notion of co-presence to simplify the decision of with whom to share [1]. Photos are then uploaded automatically to a central web server where the sharing recipients can access the photos. Kohno and Rekimoto instead use GPS information and time stamps to decide if pictures are from the same event or not [4]. This is used to let users easily browse each others photos when standing in a group to serve as a topic of discussion. The system also let users drag and drop pictures between your own and other's devices. As a contrast, Push!Photo aims to look into how mobile sharing can be simplified by allowing seamless sharing, and using context and tagging to automatically find interesting and relevant photographs.

THE PUSH!PHOTO PROTOTYPE

The current prototype of Push!Photo allows photos to be made public, and users can browse their own photo collection as well as those of others nearby. When devices are in proximity of one another, they will automatically start to search each other's public photo collections for photographs relevant to one self. These photos are shown as a multi-picture slideshow, which is extended as new photos are found. To browse photos from an event shown in a particular photo the user can click on that picture in the slideshow. The application will then download all photos from nearby devices taken at that event. In this way, if a user spots an interesting picture in the slideshow, she can easily find more photos from the same occasion. To decide whether two photos are from the same event, information about whom else was around and the time of shooting is used.

The application implements a discovery service to find other devices when they are within WiFi-range. Thus the application is always aware of who else (using Push!Photo) is around at a particular time. As a photograph is taken, the resulting picture is tagged with this information together with the time and the identity of the photographer.

The current prototype is an application running on PocketPCs with WiFi-cards and external SD-cameras. It was written in C++ using GapiDraw (<http://www.develant.com>) for graphics. GapiDraw is a cross platform graphics library, which makes the application easy to port to other mobile devices, including mobile phones. The application implements the discovery service over WiFi. Communication is based on making HTTP requests to an HTTP server and getting XML formatted data in response.

Scenario

The following scenario illustrates a possible situation where Push!Photo might be used:

Anna and her friends are at the Roskilde festival. Yesterday their favorite rock group were playing and they all shot a lot of photographs. With their Push!Photo devices they have managed to document much of the event with their joint photo collection, and they can individually browse

these photos easily and discuss them. From this mutual collection of photos they can get pictures from more angles and pictures of themselves, in ways otherwise not possible. The group also made new friends at the camp site as a result from discovering interesting photos from strangers on their devices.

CONCLUSIONS AND FUTURE WORK

The desire to share media can be seen on the web in blogs and photo sharing web sites such as Flickr. We would like to explore how mobile media can create new practices around media use.

With Push!Photo, we show how it is possible to make sharing photos in social settings as easy as passing around old-fashioned photographs, but with the added advantage of digital storage and searching. Furthermore, by having access to anyone's photo collection, it creates a local mobile community where you can meet potentially new friends.

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