Columbus: Physically Exploring Geo-tagged Photos

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ABSTRACT

This paper presents Columbus – a mobile application for physically exploring the world of geo-tagged photos. Using GPS, users must go to a photo's physical location to discover it. This allows individuals and groups to explore the world around them and make the discovering of geo-tagged photos a fun and exciting endeavor.

Keywords

Mobile, photo, exploration, browsing, GPS, geo-tagging

INTRODUCTION

There is a tremendous amount of geo-tagged photographs on the Internet today, allowing us to browse pictures from all over the world at the computer. Geo-tagged photos are pictures that are tagged and presented with the geographical location where they were taken. The most obvious and common way to explore such photos is through maps, where small landmarks often indicate where uploaded photos can be found. At the same time as this huge amount of photos from all around the world can be both fun and useful, it can also be overwhelming. Even a search on the photo sharing site Flickr (www.flickr.com/map) for photos taken in a medium sized city in Sweden reveals tens of thousands of photos. Browsing a world map can be a nice way of looking at the world when at the computer, but when out and about you might be more interested in your most immediate surroundings. Therefore tools for finding photos taken in your current vicinity have been proposed for mobile terminals, e.g. [2]. We are interested in taking this one step further and enrich the experience of *geo-browsing*.

In this work, we argue that the sharing of online geo-tagged pictures has sometimes made "exploring" the world through pictures too effortless – even remote villages in a distant country can be viewed in details from home on e.g. Flickr. With the mobile photo application *Columbus* that we present here, our aim is to bring back a sense of discovering (or re-discovering) the world to the user, including the familiar places we pass by daily. The concept is inspired by adventurous journeys in the old times, or even computer games, where notions like "here be dragons" used to indicate unexplored territories. The exploration of photos in Columbus takes place in the physical world where the user must physically go to a place to be able to "discover" it, and thus "unlock it" to get access to already existing geo-tagged pictures. We believe that this deliberate design decision to restrict browsing can actually enhance the user experience.
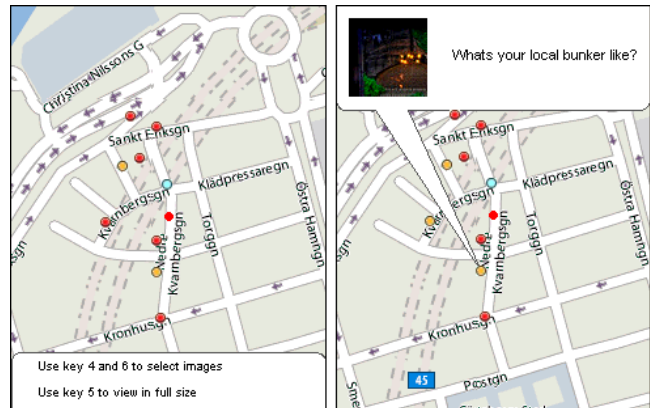

Figure 1. Two views when in explore mode. Found different groups of photos to the left, quickly going through their thumbnails on the right by switching through the marks on the map.

COLUMBUS

Columbus enables individuals and groups of people (a group of friends or a community) to collaboratively explore the world through browsing existing geo-tagged photos. Columbus is a Java Micro Edition application developed for mobile phones with GPS support. The application uses the user's current GPS-coordinates to find photos taken in the immediate surroundings and show them on the map interface (see Figure 1). It also allows you to take your own photos, which are uploaded and geo-tagged and automatically found on the map. Columbus can be used alone, but there is also support to form and join groups. When used in a group, the members collaboratively explore the world, implying that when one member discovers a photo, it is propagated to all group members.

Exploring and browsing

Like in old times where unexplored territories were indicated with "here be dragons", there are explored and unexplored territories in Columbus. Explored territories are areas that the user has visited and thus "discovered" existing pictures, or uploaded his/her own ones. You can navigate the world in two different ways: *exploring* and *browsing*. When exploring the world, your current GPS coordinates are used to center the map, and nothing else of the world can be seen. All available photos at this location are displayed as landmarks on the screen, and they are color-coded to denote if you have already viewed them, if they are newly found, or uploaded by yourself or by a group member. You can navigate between the landmarks to see a list of all photos at this landmark, and further select pictures to view in fullscreen. In Figure 1 the user is at a location when there are several photos around. On the left you can see the landmarks and on the right she is going through them, seeing one photo at the landmark marked. Viewing a photo in fullscreen makes the photo *explored* and enables other group members to find this photo when browsing.

In browsing mode, you can view the entire explored world. The explored world is the part of the world where you and the group have been and found photos. You are able to pan and zoom the map, however, you will only be able to look at photos that are explored. This means that although a group member might have been at a location where there are geo-tagged photos, if the user has not looked at the photos in fullscreen, the photos will not be seen in browsing mode. By sharing explored photos it informs other group members of the users activities, and it also encourages them to visit a location by them self for further exploration.

Comments

Columbus provides a simple tool for users to write comments on photos in order to remark on or discuss what they have seen. These comments are only visible to other group members. There is also a group wall where the group can have general discussions. This allows group members to more collaboratively participate in the exploration.

Implementation

The application is written in Java ME targeting MIDP 2.0 CLDC 1.1, using the Location API (JSR-179) and the Mobile Media API (JSR-135). The application requires an internet connection to communicate with a server for obtaining map data, and photo data. The client and server communicate with client-side HTTP POST requests and XML server-side responses, and the server is written in PHP using MySQL as database engine.

When in exploration mode, the application is continually updating its position from the GPS module. When receiving a new position, the position on the map is updated and rendered, and the server is queried for photos within the visible area of the screen. Photos appearing close to each other are grouped together to form clusters instead of making the view cluttered. The map is rendered using tiles, which are cached on the device to minimize data transfers, and increase rendering speed.

RELATED WORK

There are numerous photo-sharing sites for geo-tagged photographs. Flickr is one, as mentioned before and Panoramio (www.panoramio.com) by Google is another where the data is integrated with Google Earth. There are also mash-ups available such as loc.alize.us (http://loc.alize.us).

Using your current position to browse photos on a mobile device has also been done in the past. Yahoo! Research has two mobile applications: ZoneTag [1] and Zurfer [2]. ZoneTag is an application which automatically tags a photo with GPS coordinates and uploads to Flickr. Zurfer on the other hand uses your current position to show you photos taken near. Zurfer displays photos at your location, where location can be as broad as a city, as a photo stream commonly used by Flickr. Where Zurfer gives access to the world's photos from your phone, we instead want to encourage the user to explore local geo-tagged photos by having to physically go to their location.

There have also been other uses of position and photos. Pauty et al present a system where photos are used to virtually go to places and to see photos from this area [3]. For instance, instead of going into a building, the application allows you to virtually walk inside by looking at photos from inside.

CONCLUSIONS

We have presented Columbus – a mobile application that lets users physically explore the world of geo-tagged photos, individually and with a group of people. By connecting digital geo-tagged photos more tightly to locations where they were taken, and encouraging users to physically go there to explore them and the physical environment, we believe that Columbus open for a new and interesting photographic experience. Future work includes conducting studies with users in everyday life, where we want to learn how people use and experience this kind of photo sharing and browsing.

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