Mobile Applications and Tourist Information *In Situ*

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Abstract

Today's mobile phones are like small computers. With the phone the user has access to information similar to a PC user. Some of the phones have GPS embedded. When this is not the case alternative positioning options are available. In this paper purposive sampling is used to select 25 mobile applications for travelers in situ. The purpose of the paper is to gain insight in whether or not spatiotemporal tourist information is integrated in the apps for the iPhone and Nokia N97. Based on these two parameters spatial and temporal, an application can present a customized content to the user based on where he or she is, and what the person can do now and in the near future. The findings, based on this initial study on iPhone apps and Nokia apps, show a difference between the two parts of the spatio-temporal concept. While geotagging is build into most of the applications quite few applications take into account date and time.

Keywords: mobile guides, mobile applications, spatiotemporal data, location based services and city tourism

1   Introduction

In Western Europe the mobile phone penetration is very high. Also in the US, the penetration of wireless phones is approaching saturation. Travellers are carrying their mobile phones and more and more often they are willing to use it when travelling abroad. For some the higher price due to roaming is a show-stopper, but trend is up and regulation in Europe will make the roaming less expensive in the future. With new and better phones a higher percentage of the travellers now have at least some experience with other applications or services than phone calls and text-messaging. The fact is that the mobile phone has become a powerful information device and *"after years of hype, location based services are at least becoming feasible due to improvements in technology, data provision, and user understanding."* Bamford et al. (2007). For the travel and tourism industry, new opportunities and challenges are emerging due to this trend. The location aspect is particularly relevant in a travel context. How and why should the industry provide location based content for mobile devices? The purpose of all these applications is to assist the visitor in creating a better and more useful tourism experience given the time the visitor has and interests. The spatial temporal nature of tourist activities can be facilitated by mobile applications. Some travellers are spontaneous and would like to make choices there and then (McCabe 2000). The location aspect can be handled by integrating maps or downloading maps to the mobile device together with geotagged information. Events and similar type of *what's on* information can be timed-stamped. The purpose of this paper is to present a study of mobile apps that can categorised as guides or apps for

travellers in situ with emphasis on the two aspects location and time-stamp information.

2 Literature Review and Methodological Approach

Brown & Chalmers (2003) write that *"tourists deliberately make plans that are not highly structured and specific, so that they can take advantage of changing circumstances."* Although the planning behaviour among travellers vary this is highly relevant for mobile travel applications. A traveller that makes detailed plans has a lesser need for information "here and now" compared to travellers that do some planning or almost no planning regarding what to do while they are at the destination. The paper by Echtibi et al (2009) which describes the system and architecture of Murshid, a mobile guide for the United Arab Emirates. This is a recent paper, but most of the literature on the use of mobile guides is not new because they were written in research projects such as EU-projects 5 to 10 years ago (Cheverst et al. 2000a, 2000b), Baus et al. (2005). However, there is an extensive literature on travellers in the planning stage for instance their use of information sources (Snepenger & Snepenger, 1993), (Fodness & Murray, 1998), (Pan & Fesenmaier, 2006). In general the literature on traveller information needs and use of mobile applications and devices in situ is scattered and fragmented. However, some if the research on information sources in the planning stage is also useful *in situ*. In the planning stage some of the information search relates the choice of destination, how to get there and accommodation. Although some travellers do not book accommodations in advance, for the waste majority of travellers the information needs in situ are not related to these issue such as how to get there and accommodation. Fodness & Murray (1997) state that: *"Leisure tourists differ in their information search behavior such that homogenous groups can be formed on the direction of their search, defined by the specific source(s) used."* Vogt & Fesenmaier (1998) distinguish the information sources into several categories: social, personal, marketing, and editorial. Content on a mobile device could be of all these types. It is particularly relevant to provide content for spontaneous travellers, travellers that do little detailed planning regarding what to do before the trip. A guide on mobile device has some features that distinguish it from a guide on a laptop or stationary PC. The screen is much smaller and typing cannot be done on a full qwerty keyboard. Therefore usability is a challenge. Kjeldskov et al. (2005) discuss some of these issues in their paper on mobile guides and map applications. What is the purpose of a mobile guide or mobile application made for travellers *in situ*? There is not a simple answer to this question, but one approach is to ask *what, how, when* and *where* Brown & Chalmers (2003). In the following these four keywords are used as a backdrop for the next section on requirements for mobile applications.

2.1. The What to Do, How, When and Where

A visitor is at location and has a certain time available for tourism activities. Phrased differently it is about the what, where and when (Church & Karen, 2008). Brown & Chalmers 2003) write: *"The first, seemingly straightforward, problem which tourists*

face in an unfamiliar place is what to do. Unlike work, where tasks are often determined (in part) by an overall goal or by other people's plans, tourism is much more open-ended." At some destinations there are not much do, but this is the exception. In a city, the *what to do* is not only open-ended, but the number of options are very high. The second issue is the how to. "*Along with the question of what to do, tourists need to work out how they are going to do these different activities*" (Brown & Chalmers, 2003). Travellers have different preferences and therefore a one size fits all approach is not a good model. For instance, some do sightseeing by themselves without a guide while some prefer to have guide telling about what they see. Then there is the question of when. "*Tourists have to manage when they do different activities. Tourism is usually constrained in time, because of the need to return home. Time is also a problem in that tourists work with organisations that provide services; opening times must be co-ordinated with the times of public transport, such as trains or buses*" (Brown & Chalmers, 2003). The real-time element is therefore important. When a person is at the destination he or she would like to know is this place open this evening to avoid a waste of time. The *what*, *how* and *when* interact with the fourth the *where*, or more specifically finding where things are. *In visiting a city many of the attractions are distributed around the city. There is therefore a need to avoid spending too much time travelling between places, understand what one might see and do along the way, and group together attractions which are close together. In doing so tourists must also navigate public transport, often with limited information, or unfamiliar road systems* (Brown & Chalmers, 2003). Many tourists use maps. This is because they do not have detailed knowledge about the place. Given the time at their disposal they would like to know where A and B are, and the distance between A and B. It is also important to focus on the interplay of these issues. The *in situ* use of mobile application can be at least two-fold. Either the tourist has planned what to do and uses the application for a last minute update, or to get directions to the selected point of interest. In the second case the tourist has not planned in detail what to do, and uses the application to do short-term planning. In the later case, it can be assumed that the tourist wants to find a) an attraction of interest and b) not too far and c) that will happen soon. Often the emphasis is on receiving information from or by the use of the information device. The interactive element and the possibility of giving feedback or sharing information should also be taken into account. Today social media is playing a prevailing role. In a travel context sharing and staying connected is important and mobile applications cater to this need. Based on this we propose the following hypotheses:

- H1 Current applications for mobile phones with GPS make use of geotagging in order to present information on a map and "where I am"

- H2 Current applications for mobile phones make use of time-stamped information in order to present information of relevance to the time-period the traveller is visiting the destination

2.2 Requirements Corresponding to the What, How, When and Where

In the discussion above the unit of analysis has been the traveller. Corresponding to the user and the demand side is the supply side and the technical requirements. The

requirements of the application have to match the what, how, when and where. Hence, the requirements for in situ applications can then be summarised as having relevance to place, relevance to time and relevance for the individual. Relevance to place can be handled by e.g. by GPS navigation or by mobile phone triangulation. GPS receivers are inexpensive. Mobile device manufacturer integrate GPS in most high-end phones and sometimes in the low-end mobile phones. As the device "knows" where the tourist is, attractions need to be geo-tagged for the application to "find" points of interest relevant to the tourist's current position. Relevance to time can be handled by the device's clock, the time function. However, for the device to find and present the relevant attraction, the attraction has to be time-tagged. Relevance to the individual tourist's interests has to be made by the matching the tourist's profile to metadata describing the features covered by the point of interest. Whereas the two first requirements technically speaking are fairly simple, the third requirement is more complex. In this regard there is a need for semantic technologies. A core element is the ontology necessary for the purpose of matching and solving the interoperability problem.

2.3. Parameters for evaluating a mobile application for travellers in situ

It is possible to distinguish between two main methods or approaches in evaluating applications. The first method is evaluations done by researchers or developers. The second methodological approach is user evaluation (surveys), for instance user observations and user-feedback. The chosen method in this study is an evaluation by researchers. The two authors reviewed the applications based on a list of parameters. There is a subjective element in the evaluation. However, the evaluation has only the two alternatives "has" or "has not" together with a basic description. The parameters evaluated are presented in the tables 1 to 4.

3   Data Collection Method and Test Design

The mobile applications were downloaded from Apples apps store and from the store ovi.com. The applications were chosen based on search terms such as guide, city and/or travel. In table 1 to 4 the results from the review are presented. Overall the review-task was straightforward, i.e. to decide yes it has this feature and no it does not have this feature. The applications in table 1 and 2 (Appendix) were both tested and reviewed while the applications in table 3 and 4 (Appendix) were reviewed based on the online description. All in all 25 apps were reviewed. When choosing applications to be included in this study we paid attention to the following criteria: 1) The application were designed so it could be used in a tourist in situ scenario; 2) The application had to cover different areas of the tourist's needs with the exception of food and dinning; 3) Pure audio guides were excluded; 4) The number of tourist applets available for mobile devices are increasing daily. For instance by late September 2009, with the word travel we had 9000 hits on the website apptism.com.

4   Results

There are several interesting observations that can be made based on this expert review. First, there seems to be a significant difference between relevance to place and relevance to time. The first hypothesis stated that current applications for mobile phones with GPS make use of geo-tagging in order to present information on a map and "where I am." Only 3 of the 25 apps did not have this feature. Based on this finding the conclusion is that first hypothesis H1 was supported. The GPS on the iPhone works well, the screen is good and the map application also works well. This might be one explanation why there are many travel apps for the iPhone in the marketplace. The second hypothesis H2 stated that current applications for mobile phones make use of time-stamped information in order to present information of relevance to the time-period the traveller is visiting the destination. Of the 25 apps only 5 made use of the temporal information. Hence, we conclude that the second hypothesis was not supported. There are challenges related to the user interface, small screen etc as discussed by Wu et al (2007). However, with the new range of phones with iPhone as the most prominent, there is a growing interest in developing applications for mobile phones. Similarly there is growing demand for apps. In a travel context it is somewhat surprising that the temporal information is not used in the apps since travelers only have a number of days at their disposal. There are differences with regard to information devices; some prefer guide books while others prefer mobile guides (Tjostheim & Fesenmaier 2008). Today most travelers have mobile phone on their vacation or business trip. Still date-roaming is not regulated and expensive. However, with better phones and more apps, travelers will begin using and exploring travel apps in situ. The promise of the semantic web is that machines and applications can find, share, and combine data in such way that it is meaningful and useful for, in this case, the traveler. Some of the apps that we reviewed are using Wikipedia. The paper by Millard et al (2008) describes LBWiki, a prototype location-based Wiki that allows users with a mobile device to create Wiki pages based on GPS co-ordinates. It is likely that many of the tested apps used Wikipedia to find what and present what is close to the location of the user of the app. Whereas the push metaphor is used in other areas, most commonly e-mails and SMS / MMS messages, all the applications tested used a pull metaphor. We would assume that many traveler in-situ might want, and indeed be willing to pay for, relevant push messages about nearby, soon to happen, interesting to me events.

5   Conclusion

This study contributes to the practical and theoretical development of mobile applications for travellers in two ways. First, the study shows that there is a gap between the promises of the guide (real time information + location based content + how to get there) and what most mobile guides actually offer. This is particularly relevant for a visitor that has time for a spontaneous not planned activity or the type of traveller that prefer to make decision in situ without detailed planning in the pre-trip stage. Secondly, this study shows opportunities for semantic web technologies in an area that is not well structured and very dynamic. Travel information in situ is like

fresh food, it is perishable. Written guide books contain a lot of information, but they cannot have the same type of real-time information that a mobile guide can have, and should have. A good application for travellers *in situ* is enriched with real time, location-based and context-based information. Also it is relevant to whether or not there should be a push or pull option for the user. There is a difference between being in a home environment and in an unfamiliar place. In this second incident, proactive travel tips or the push option might be an alternative the some traveller would prefer. Whereas unsolicited messages might be perceived as spamming mobile phone users are paying for push messages in other areas, e.g. sports results and "goal-notification" from matches. When users give consent to receive for instance "what's on" type of information, it means that the travellers have available time to fill based on interest. In this paper we have reviewed a limited number of applications for travellers in situ. There are many possibilities in this area with opportunities for the travel industry as well as developers of applications. Based on the findings from the review it seems particularly relevant to pay attention the temporal aspects.

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APPENDIX

Table 1. City Guides

	1	2	3	4	5	6	7
Name	**Info** User initiated (pull) or application initiated (push)	**GPS to present information** Map and POI	**Social web content**	**Recommender system** Customized or editorial	**Input needed from user**	**Events** Real time or sorted based on time-stamp	**Price and Distributor**
AA London	Pull	Yes, point on map and distance to places/sights	No	Editorial	None	No	App store, Ovi store, free
Fodor	Pull	Text and picture, no use of GPS	No	Editorial	None	No	Ovi store Free
Amster dam Travel Guide,	Pull	Yes, point on map and distance to places/sights	No	Editorial	Partly, user can use the alternatives "want to visit" and "have visited"	No	AppStore $5.99
Lonely Planet Paris	Pull	Yes, point on map and distance to places/sights	No	Editorial	Make a list with favorites	No	AppStore $15.99
London City Slicker	Pull	Yes, point on map and distance to places/sights	No	Mostly editorial, but user has to set presentation format preference	None	No	AppStore $2.99
CityMa p2go London	Pull	Yes, point on map and distance to places/sights	No	Editorial	None	No	App store $1.99
WhenIn Rome	Pull	Yes, point on map and distance to places/sights	Yes, share with friends	Editorial (preset)	Only a search function	No	AppStore $4.99
GuideY ou Rome	Pull	Yes, point on map and distance to places/sights	No	Editorial content, user can send favorite spots to	Custom list function	No	AppStore $5.99
London DK Travel	Pull	No	No	Editorial	Make a list of favorites	No	Ovi store € 20

Table 2. Other Apps Relevant for Travellers in situ

Name	1 Info User initiated (pull) or application initiated (push)	2 GPS to present information Map and POI	3 Social web content	4 Recommender system Customized or editorial	5 Input needed from user	6 Events Real time or sorted based on time-stamp	7 Price and Distributor
Dopplr	Pull	Yes, point on map and distance to friends, places and sights. "route me"	Yes, "liked it" function and share	Editorial, user make choices from a preset list	Mark "my place" plus choice among listed categories	No	AppStore, OviStore Free
Happenr	Pull	Yes, events closets to you	No	Customized based on filter function plus editorial choices	Choice among listed categories	Yes	AppStore, Free
Fonefood	Pull	Yes, point on map, distance to restaurants	No	Editorial, user make choices from a preset list	Choice among listed categories	No	OviStore Free
NearHere	Pull	Yes, point on map and distance to places and sights	No	Editorial, user make choices from a preset list	Choice among listed categories	No	OviStore € 2.46
Michelin guide	Pull	Yes, distance to restaurants	Yes, reviews	Editorial, user make choices from a preset list	Choice among listed categories	No	AppStore $18.99
What's On (theatre)	Pull	No	No	Editorial, user make choices from a preset list	Choice among listed categories	yes	AppStore Free
What's On London	Pull	Yes, point on map and distance to places and sights	No	Editorial, top picks	Categories and search	Yes, sort by days	App store, Free

Table 3. City Guides (review based on information on the apps website)

Name	1 Info User initiated (pull) or application initiated (push)	2 GPS to present information Map and POI	3 Social web content	4 Recommender system Customized or editorial	5 Input needed from user	6 Events Real time or sorted based on time-stamp	7 Price and Distributor
Vienna Travel Guide (Cityscouter)	Pull	Yes, point on map and distance to places and sights.	No	Editorial	The user can mark "Want to Visit" or "Have Visited"	No	App store, $3.99
Amsterdam	Pull	Yes, point on map	No	Editorial	Specify when	No	App Store

Mobile Guide		and distance to sights and places			and how updates are made to the content		Free
Barcelona Unlikely City guide	Pull	Yes, point on map	No	Editorial	Bookmark "MyTour"	No	App store, $4.99
City Guide Munich, Marco Polo	Pull	No	No	Editorial	No	No	App store, $0.99
GuideYou Copenhagen	Pull	Yes, point on map	No	Editorial	Bookmark favorites	No	App store, $3.99

Table 4. Other apps relevant for travellers in situ

Name	1 Info User initiated (pull) or application initiated (push)	2 GPS to present information Map and POI	3 Social web content	4 Recommender system Customized or editorial	5 Input needed from user	6 Events Real time or sorted based on time-stamp	7 Price and Distributor
Train Search	Pull	Yes, point on map to the station from where you are	No	Editorial, user make choices from a preset list	No	Yes, live time-table of trains	App Store, Ovi Store
Rockspots LondonLite	Pull	Yes, point on map plus POI	No	Editorial plus let you search for spots in your vicinity	No	No	
Zagat toGo with OpenTable	Pull	Yes, point on map and distance to restaurants	No	Editorial and reviews	Make choices among categories	Yes, in the section OpenTable	AppStore $9.99
Drink. London bar guide	Pull	Yes, point on map. Get directions to nearest bar.	No	Editorial	No	No	App store, $3.99