Mobile GIS strategies for disseminating thematic tourist information: Examples of spatial narratives

Lasse Møller-Jensen
Department of Geography and Geology, University of Copenhagen, Denmark
Øster Voldgade 10, 1350 Copenhagen
lmj@geogr.ku.dk

Abstract. The paper discusses the concept of spatial narratives based on so-called narrative links and their potential role within the implementation of flexible and thematic tourist information systems on mobile gps-enabled devices. References are made to two examples of specific application areas: one from a European city and one from an African urban region.

1 Introduction

Portable gps-enabled devices such as PDAs and mobile phones have the potential of acting as flexible tourist guides that provide deeper insight into sites of specific interest to the traveler. The role of the devices is basically to present stored object attribute information about nearby sites, according to specified user preferences and interests, be it for architecture, historic landmarks or famous literature. Egenhofer [1], Frank et.al [2], IST [4] and Jiang et.al [5] provide interesting examples, but in general the subject is still relatively unexplored. There is, however, a growing interest within a tourist and museum context for exploring the potentials of the mobile devices as facilitators of new types of visitor interaction.

The presented work builds upon experiences from a prototype gps/gis-based software system described by Møller-Jensen [8]. This paper addresses the problems of scope of information relevance as well as how the presentation of information in some cases is constrained by the speed and direction of the user. Being able to match the timing of the information with the spatial scope of the information relevance while moving is seen as an important aspect of such systems.

It is evident that a distinction exists between providing knowledge concerning (a) sites that attract the attention and curiosity of the traveler due to their visible appearance, and (b) sites that do not have any physical manifestation that reveal their interesting properties. Table 1 provides examples of objects that fall into the two categories.
Table 1. Examples of surrounding objects with different characteristics concerning attraction

<table>
<thead>
<tr>
<th>Object characteristics:</th>
<th>Examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visibly interesting (due to appearance)</td>
<td>monuments, churches, towers, castles, vegetation species with distinctive features,</td>
</tr>
</tbody>
</table>
| Invisibly interesting (due to history connected with object) | - buildings previously occupied by a famous person,  
- places of historic events, e.g. battlefields, squares,  
- historic locations with no landmarks: 'this is where the old gate of the city was located’  
- other special points, e.g. the geometric center of gravity of a municipality or country  
- properties of an urban area (e.g. building period) |

While the traveler in situation (a) can actively search for more information, situation (b) requires a system that ‘triggers’ automatically based on the location of the traveler.

Møller-Jensen & Hansen [8] addresses the issue of visible versus invisible physical objects surrounding the travel path and argues that the gps-supported mobile information systems may be specifically well suited to provide the traveler with historical information related to objects that are presently either removed or do not visually indicate that they are of any interest. It is reasonable to assume that a system capable of this could ‘open up a new world’ of spatially-related information within specific domains specified by the traveler and thereby provide new insight and interests in sites and areas that would otherwise have been perceived as uninteresting.

Insight into the history and previous appearance of such sites can be provided on-site by text, photos and drawings on the display, thereby fuelling the imagination and learning process of the traveler. Exploring such sites may be further assisted by the display of detailed orthophotographs of the area surrounding a site, providing both spatial context and assistance in navigating to the more obscure, possibly hidden, locations.

2 Spatial narratives

The specific focus of the current paper is the concept of spatial narratives within mobile gis. The overall goal is to establish a framework for the creation of computer-assisted flexible ‘guided tours’ based on the thematically and narrative linking of a set of locations.
within an area into a ‘spatial narrative’. This is seen as closely related to the experience of being guided by a person with a high degree of knowledge within a specific domain.

Spatial narratives are defined here relatively loosely as collections of information describing a sequence of events that each are associated with specific locations. To be included in a spatial narrative the events must be related to each other and the collection of information from all events in a proper sequence must provide certain benefits, e.g.

- more complete and less fragmented information which is therefore more exciting and improves learning by providing a better basis for understanding information regarding each event,
- a better understanding of the spatial distribution of the phenomenon,
- a better understanding of historic periods and processes.

In many cases a traveler may have to make a compromise between following the spatial narrative path and minimizing total travel length by visiting sites out of the narrative sequence because they are physically close. To facilitate this choice, the guiding device should provide information about distances and routes to all other sites in the narrative – not only the next sites in the optimal sequence. This flexibility in providing other entry points to the spatial narrative is considered important for the practical use of such a system. Moreover, the use of salient objects for the provision of navigation support as explored by Klippel & Winter [5] and Nothegger et al. [9] would be appropriate within this context.

It is argued in Møller-Jensen [10] that flexible systems are preferable that respond adeptly to any travel path chosen by a user by suggesting “explorative de-tours” without the user having to submit to the time and distance constraints set by a pre-defined tourist route. The paper focuses specifically on how a system may respond in a flexible way to the de-facto travel path taken by the traveller while still – through the use of so-called narrative links – being able to provide suggestions for new locations to visit as a relevant continuation of the information obtained at the current location. This would enable an enhanced travel experience for someone heading for a specific destination while still provide the basis for ‘explorative detours’ if the user so desires.

Example 1: H.C. Andersen in Copenhagen 1819-1875.

The potential use of narrative links is illustrated in two examples. The first example concerns the many sites related to the writer H.C. Andersen’s life in Copenhagen. It is currently implemented as an experimental system on a standard laptop computer with gps and based on the ArcMap software from ESRI.

Several themes or narratives have been created from the total amount of more than 50 sites that have been included in the database, e.g. ‘residences’, ‘friends and supporters’ and ‘settings for fairy tales’. A tourist visiting Copenhagen and strolling in the central areas with a gps-enabled device will almost certainly ‘trigger’ an H.C.Andersen-related site presentation within a short time. The information provided at each site include pointers or links to sites within the narrative that the tourist may choose to visit next in order to get a more
complete ‘picture’. The link information consists of name and type of the suggested goal site, the travel distance to the site and a least-cost route map. These narrative links are currently defined on the basis of chronology and nearness. In the first case, the suggestion includes the next or previous site in the chronological sequence as well as the first site in the sequence. In the latter case the suggestion is the nearest object belonging to the theme in question that has not previously been visited. The system maintains a log of visited objects to avoid loops.

Figure 1 shows an example of an ‘explorative de-tour’ resulting from following a narrative link. A tourist is walking towards an initial goal (solid line). While passing a H.C. Andersen related spot the system triggers, presents information and suggests visiting another site related to the narrative. The tourist accepts and is guided to the site (dotted line), before continuing towards the original goal (dashed line).

Figure 1. An ‘explorative de-tour’ resulting from following a narrative link.
Example 2: Danish Reminiscences in Ghana dating from the period 1650-1850.

The second example concerns the reminiscences of old Danish plantations in the Accra region of Ghana. Many of the sites are almost invisible in the landscape. Nevertheless tourists with a historical interest may find it interesting to visit their locations.

The distance between sites is much higher than in the Copenhagen example and the accessibility of most of the sites is very low. There is very little likelihood of hitting a site by chance. Many of the sites are not located near the major road network and gps-based guidance is essential, since there are no posted signs indicating location or direction. The narrative sequence in the Accra example is based purely on chronology, i.e. the year of establishment. The site information comprises text and pictures that are displayed when the place mark is activated.

Currently, the spatial narrative has been visualized through a software generated kml file for display in Google Earth (GE). This file includes tools for navigation between the sites of the narrative using spatial hyper links, (see figure 2). The links are implemented through the “#fragment_URL;flyto”-function included in kml ver. 2.2 [3]. Furthermore, the Python script creates a set of line objects within the kml file that visually indicates the sequence of the narrative.

The role of GE in this context is to provide a web-accessible, interactive environment for disseminating the narrative. This interactivity is relevant for examining the narrative in question, but also for examining the present spatial context of the sites using the supplied satellite images. GE is seen here mainly as a tool that facilitates the design and implementation of spatial narratives before implementation within portable gsp-enabled devices. Future consideration may involve data handling including whether data should be pre-stored on the device or could be transferred real-time based on the GPRS technology or future wide area wireless ADSL, as discussed by Kwan & Shi [7].

3 Discussion and perspectives

What are the benefits and limitations of the spatial narrative approach in the two examples? The objective of the approach is to enable the dissemination of a suggestion for a suitable site visiting sequence that may help the user experience a more complete and coherent ‘picture’ compared to a more random site selection.
The mobile device is well suited for handling sites that are not immediately recognized as interesting when passing. This is an advantage in the Copenhagen example since it enables the provision of location-dependent information to casual strollers within the city area. In the Accra example, navigation support to an entry point for the narrative would have to be provided to the user by the system, due to the much more dispersed pattern of sites. It is reasonable to assume that the mobile device strategy in the Accra case is a precondition for opening up this kind of sites for tourist visits, due to their remote location.

The visitor has the choice of following the narrative rigidly, in which case some back and forth travels are likely that may not be worth while. In some cases, it would make sense...
to visit all sites within an area before moving on – even if they are out of sequence or belong to different narratives. It is considered important that a mobile information system supports flexible use by providing relevant information that enables an individual choice of sequence and route. The narrative links are seen as very helpful in this respect. They represent the sequence of an ‘ideal’ tour that may be followed to the extent that it fits the visitor’s purpose. Other – possibly conflicting – tourist strategies may involve ‘visiting most sites per traveled kilometer’ or following an overall direction of movement to end up at a specific place.

A number of additional features of a narrative-based guiding system may be considered. Time or distance constraints provided by the user may be acknowledged by suggesting tours that cover only a subset of the narrative sequence. Integration with standard routing algorithms will support this and assist the user in creating individualized tours under specific conditions.

References