



**AALBORG UNIVERSITY**  
DENMARK

**Aalborg Universitet**

## **Augmenting the City with Fiction: Fictional Requirements for Mobile Guides**

Kjeldskov, Jesper; Paay, Jeni

*Published in:*  
Proceedings of HCI in Mobile Guides, Mobile HCI 2007

*Publication date:*  
2007

*Document Version*  
Early version, also known as pre-print

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Kjeldskov, J., & Paay, J. (2007). Augmenting the City with Fiction: Fictional Requirements for Mobile Guides. In K. Cheverst (Ed.), *Proceedings of HCI in Mobile Guides, Mobile HCI 2007* (pp. 1-6). University of Lancaster. <http://people.cs.aau.dk/~jesper/pdf/conferences/Kjeldskov-C45.pdf>

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

### **Take down policy**

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

# Augmenting the City with Fiction: Fictional Requirements for Mobile Guides

Jesper Kjeldskov and Jeni Paay  
Aalborg University  
Department of Computer Science  
Fredrik Bajers Vej 7E  
DK-9220 Aalborg East, Denmark  
{jesper, jeni}@cs.aau.dk

## ABSTRACT

In this position paper, we discuss the user experience of a new genre of mobile guide services, which augments the users' physical surroundings with *fiction* rather than with facts. First, we outline sources of inspiration from fiction, storytelling in place and on the move, and related research within the area of interactive narratives and location-based games. We then present and discuss five overall types of fictional mobile guides embodied by the metaphors of 1) treasure hunts, 2) jig-saw puzzles, 3) playing dominos, 4) playing scrabble, and 5) collecting butterflies. Finally, we describe a preliminary design idea for a prototype system intended to explore the design, implementation, and user experience of fictional mobile guides.

## Categories and Subject Descriptors

H5.2. [Information interfaces and presentation (e.g., HCI)]: User Interfaces - *User-centred design, Graphical user interfaces.*

## General Terms

Design, Human Factors.

## Keywords

Location-Based Services, Interactive Narratives, Fiction

## 1. BACKGROUND

In our recent research, we have been exploring the design, implementation, and user experience of context-aware and location-based mobile information services, which “augment the city” with a digital layer of information about, for example, people, places and the users' physical surroundings [14]. Common for our research has been that the systems and services explored have provided users with factual information, that would sometimes otherwise be invisible, from which people could then decide what to do while socialising out on the town; where to go, how to get there, what to do there, who to meet up with etc. In many ways, this matches the majority of research and design being done within the area of mobile guides: providing users on

the move with facts about the reality that they are in. However, let's face it, people cannot live by reality alone! Reality is everywhere. It is right there in our face when we wake up in the morning, and it continues to sneak up on us throughout our day, in the car, in our offices, in the tearoom, and at the dinner table. In recent years it has even invaded our TVs; not only through eternal streams of live news from wherever, but also through endlessly boring reality TV shows documenting minute-by-minute details of peoples' mundane lives. Perhaps this is why we spend quite a lot of effort (and money) on escaping reality. People need wonderment [19]. We daydream, we go to the cinema, we rent a video, or we read or listen to a book. We like to immerse ourselves in imaginary worlds and stories as way of escaping every day life. We like to immerse ourselves in *fiction*.

So why not let mobile guides provide people with fiction about their physical surroundings rather than just facts? Inspired by this question, we have engaged with a stream of research exploring the user experiences achieved by “augmenting the city with fiction” and looking at some fundamental questions related to doing this. How can mobile guides provide for peoples' desire for fictional content? How can quality storytelling benefit from its listeners being on the move or located in a particular place? How can we characterise different types of context-aware or location-based stories? How can we narrate engaging stories, which take into consideration the listener's location, movements over time, and perhaps even social context? How can we design and implement useable media for this genre of storytelling? In short, what are the fictional requirements of a mobile guide?

## 2. INSPIRATION AND RELATED WORK

Making interactive narratives and relating stories to locations are not new ideas on their own. However, combining the two into dynamic narratives that respond to the users/receiver's location and interactions in physical space over time is a relatively new phenomenon with key references in the research literature dating only a few years back.

Early context-aware mobile guides such as *Cyberguide* [1], the Lancaster *GUIDE* [7] and *Hippie* [18] provided visitors, city travellers and museum tourists with location-based experiences which included pertinent information and guidance about their current location, but did not focus on narrative issues. However they act as useful vehicles for exploring and understanding important interaction and technical issues about designing mobile guides. Location-based mobile games such as *Pirates!* [4], *ARQuake* [20], *Mindwarping* [21] and *Can You See Me Now?* [2] offer inspiration for potential new applications for location-based technologies, and offer us additional vehicles for studying

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

*MobileHCI '07*, September, 2007, Singapore.

Copyright 2004 ACM 1-58113-000-0/00/0004...\$5.00.

important aspects of interaction design for emerging context-aware technologies designed to operate ‘in the wild’. In particular, *Can You See Me Now?*, with its engaging artistic experience of seamlessly connecting online players in a virtual world to play against real players in the actual city, demonstrates new potentials for human interaction with computers and with each other.

Beyond these applications that provide users with a straightforward gaming experience, is the emerging area of location-based games, which incorporate stories into the mix to enhance the user experience with fiction. *Backseat Playground* [12] provides a narrated experience interweaving a crime mystery, visible physical elements of the environment and gaming for children sitting in the back seat of a car, while on a journey. *Uncle Roy All Around You* [3] is a programmed game that involves the surrounding city, live actors, online and street players to follow a set of pre-scripted clues to find Uncle Roy’s office.

The delivery of location-based stories using mobile technology is a new area of research, which includes applications such as *Urban Tapestries* [13], *Riot!* [5], *Hopstory* [17] and *Geist* [15]. *Urban Tapestries* is a collection of stories, histories, experiences and events of a community linked to familiar and related locations. *Riot!* delivers authored episodes triggered by specific locations about an historical riot that happened in and around Queens Square where the installation operates. *Hopstory* allows visitors to an historic brewery to collect location related video vignettes as they navigate the building, and then view their collected story at the end of the visit. *Geist* provides an augmented reality experience for visitors to the city of Heidelberg, which combines history and fiction to allow the viewer to experience how it felt to be in that city during the 30 Years’ War in the 17<sup>th</sup> century. These applications are the most inspiring for our current research as they provide experience and understanding of peoples responses to a city augmented with fiction.

Anecdotally, people’s desire for storytelling and important aspects of that fiction can be seen in popular stories of our time. Many best-selling novels illustrate the appeal of blurring of boundaries between fact and fiction, supporting the need for the “suspension of disbelief” in story telling. The *Da Vinci Code* [6] sold over 60.5 million copies, was translated into 44 languages world-wide, is the thirteenth best selling book of all time, and inspired a feature-length movie which was the second highest grossing movie of 2006, world-wide. The *Da Vinci Code* establishes its sense of intrigue and allurement from a clever interweaving of things that we know to be historical facts and real places with “believable” stories involving these elements. Crime fiction becomes all the more evocative when it locates its scenes in places that we are familiar with, and invites us to believe that this has happened in that location. For example, crime stories by the prolific Melbourne writer, Kerry Greenwood, about a Melbourne baker [9][10][11] walks us through the streets of Melbourne and possibilities of dark happenings that we are unaware might be occurring in the city we think we know so well. This technique is also brought into play in several location-based storytelling applications, for example, *Riot!* [5] *Hopstory* [17] and *Geist* [15], all bring this technique into play.

Further supporting our understanding that people are looking for aural input while on the move is the meteoric rise in popularity of the iPod, mp3 players generally, and now mobile phones with audio listening capabilities to supplement and even disconnect people from their daily realities. This has recently been extended beyond music to the downloading of pod-casts and e-books to add

an element of storytelling to our lives in situations where we have previously had to resort to the printed word (i.e. on the way to work in the train) or broadcast media and narratives, and therefore centrally controlled (i.e. listening to the radio while driving). Now we can decide what we want to listen to and where – so why not take this further and incorporate our surrounding environment into the story.

### 3. AUGMENTING THE CITY w. FICTION

Inspired by the works and research described above, we have explored conceptual ideas for mobile guide systems that augment the city with fiction related to the users’ location and immediate surroundings. So far, our work has consisted of literature research and a series of open-ended brainstorming sessions and design workshops during the first half of 2007. In these sessions and workshops we have particularly focussed on the interplay between stories, locations, time, and people’s social context, as well as exploring the interplay between interactivity and narrative structure. From this preliminary work, we have produced five metaphors for different types of fictional mobile guides:

- 1) Treasure hunts
- 2) Jig-saw puzzles
- 3) Dominos
- 4) Scrabble
- 5) Collecting butterflies

These are described in detail below.

#### 3.1 Five Metaphors for Fictional Guides

##### 3.1.1 Treasure hunts

“Treasure hunts” are linear stories characterized by a fixed series of parts or chapters, which the receiver has to read or listen to in correct sequence, as prescribed by the author, in order to get to the end. As when finding a hidden treasure from a map, they have to follow the correct path on the treasure map to get from a designated starting point to the place marked by the red X.



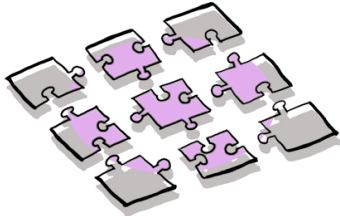
Applying the “treasure hunt” metaphor to the user experience of a fictional mobile guide, this means that users have to move physically from place to place, in the correct sequence, in order to get through the story as envisioned by the author. The story has a fixed starting location as well as a fixed end location. This provides the author with a large degree of control over the narrative in terms of classic principles of storytelling such as creating a plot, building up tension, deciding, introducing key characters at key times, etc. However, because each fragment of the “treasure hunt” story is linked to a specific physical location, the author furthermore gains an opportunity to use features of this location as a powerful backdrop for their story (e.g. visuals, sounds, smells, buildings, typical people etc.). At the same time, of course, this also makes the story sensitive to the dynamics of physical space, for example, throughout the day and the night and across the different seasons of the year. From a user experience point of view, “treasure hunt” types of fiction in the city require a

high level of mobility and interaction in the physical world, but provide a low level of interactivity with the actual narrative both in terms of its content and in terms of its composition.

*Uncle Roy All Around You* [3] is an example of this type of fictional mobile guide, where you need to follow pre-scripted clues to get to a specific end point, with clues attached to specific locations.

### 3.1.2 Jig-saw puzzles

“Jig-saw puzzles” are non-linear stories characterized by consisting of a number of parts or chapters that the receiver may read or listen to in any order they like in order to create the whole story. Just like assembling a jigsaw puzzle, the user has to work out which pieces fit together in order to create a meaningful whole. Any piece can be picked up at any time, but each piece only makes sense in relation to particular other pieces. The sequence of assembly does not affect the outcome in itself but may influence peoples’ experience of the story. All pieces have to be considered in order to complete the picture.



Applying the “jigsaw puzzle” metaphor to a fictional mobile guide, users are free to pick up the different pieces of a story located around the city in any sequence they like, but have to find all the pieces, and put them together themselves, in order to complete the story as thought of by the author. The story has no fixed starting location and no fixed end location. Obviously, this takes some of the author’s control away in respect to the flow of the narrative, and requires the author to create meaningful fragments that can be read or listened to individually and in random order. However, from a user experience point of view, “jigsaw puzzle” types of fiction in the city increase the level of interactivity in terms of composition, and have a built-in quality for exploration in terms of finding the next piece as well as putting the pieces together. For example, one story fragment may inspire what pieces to look for next, and contain clues about where in the city to find them.

*Riot!* [5] can be regarded as fictional mobile guide of this type, as it uses a collection of separate vignettes, all about one central story, which can be collected at controlled locations and pieced together by the listener to create a cohesive picture of the entire drama.

### 3.1.3 Dominos

“Dominos” are selections of self-contained short stories related to physical locations where the next possible story depends on the current one. There is no overall storyline, and not necessarily an end (unless all the pieces have been used), and the sum of the pieces does not necessarily make up a greater whole (as with the jigsaw puzzle). However, each step of the way there a link from one story to the next by means of some similarity between them. The meaning lies in the transition. Similar to playing dominos, each piece is a separate entity, but



can be paired by means of similarity from one to another. The first piece limits the number of possible subsequent pieces, and only through specific other pieces can some others now be fitted.

Applying the “dominos” metaphor to the user experience of a fictional mobile guide, when people pick up a story in a place, the next story given to them will have some sort of link with this one. As an example, entering a café may trigger a story about a murder in this place, which could then trigger a story about a related murder on a ship when subsequently going to the docks. Starting at the docks, however, could trigger a story about a sailor discharging from his ship, which could then trigger a story about a love affair between a sailor and a barmaid when subsequently going to the café. Each story is loosely related to the previous one but the author does not predetermine pairing them. From the author’s point of view, this gives complete control over each short story in terms of storytelling, and each story can be tailored to match the backdrop of a particular physical location. Through careful selection of keywords for pairing of stories, the author can to some extent influence the possible sequences by which stories can be put together. From a user experience perspective, “dominos” types of fiction in the city have limited interactivity in terms of controlling what story is presented where, but at the same time each user interaction along the way has a large impact on future discourse. Associations between each specific story provide the thread through the overall experience.

*Hopstory* [17] with its linear plot, delivered from different character viewpoints, provides a collection of scenes, which are interesting entities in themselves. They are collected at specific locations but in any order, and can be strung together at the end of the experience to create an ordered story, which is loosely controlled by time thereby exhibiting the characteristics of a “dominos” type fictional mobile guide. *Backseat Playground* [12] can also be regarded as this type of guide as its linear plot allows user interaction with the system to influence the story to branch in different directions.

### 3.1.4 Scrabble

“Scrabble” describes stories that have a high interactive complexity and, for example, consists of many small fragments, which can be put together in a large number of ways (with and without meaning). Similar to playing scrabble, the user is offered a number of random pieces, which may be put together to a larger whole. Each piece has very limited meaning on its own, but together they can make up meaningful constellations. As an example, a “scrabble” type of fiction in the city could take place on board a tram or bus and not only respond to the precincts moving past the windows but also to the people getting on and off during the journey sensed through, for example, Bluetooth phones and personal profiles. Every time a new passenger boards the tram, information from his or her profile is used to give the stories offered to the other passengers a new possible direction.



From the authors’ point of view, applying the “scrabble” metaphor makes it highly challenging to create meaningful stories by traditional means of storytelling because most of the control is left either in the hands of the users or in the hands of the serendipity of events taking place around them. As with all highly



dynamic and interactive narratives, this, of course, also makes “scrabble” type of fictional mobile guides highly challenging to implement. At the same time, however, it also opens up for highly immersive and engaging user experiences with a high level of interactivity as well as intriguing uncertainty about what and who it is in their surroundings that influences the course of a story.

A mobile fictional guide experience that exemplifies this metaphor is *Geist* [15]. From an availability of many different story pieces, the player uses pieces of stories collected from different locations to put together their own, personally unique story by the end of the experience. They also collect pieces of history and information along the way that do not necessarily form part of that final story, but are interesting pieces themselves.

### 3.1.5 Collecting Butterflies

“Collecting butterflies” are selections of self-contained short stories related to physical locations but with no predetermined relation to each other. Hence, as with “dominos”, there is not a greater storyline beyond the whole created by the receivers themselves. Similar to collecting butterflies, people are free to explore the physical space around them in pursuit of stories they like to collect. They may pick up an interesting story that they have spotted in their surroundings, take a closer look at it, keep it, let it go, or go looking for others of a



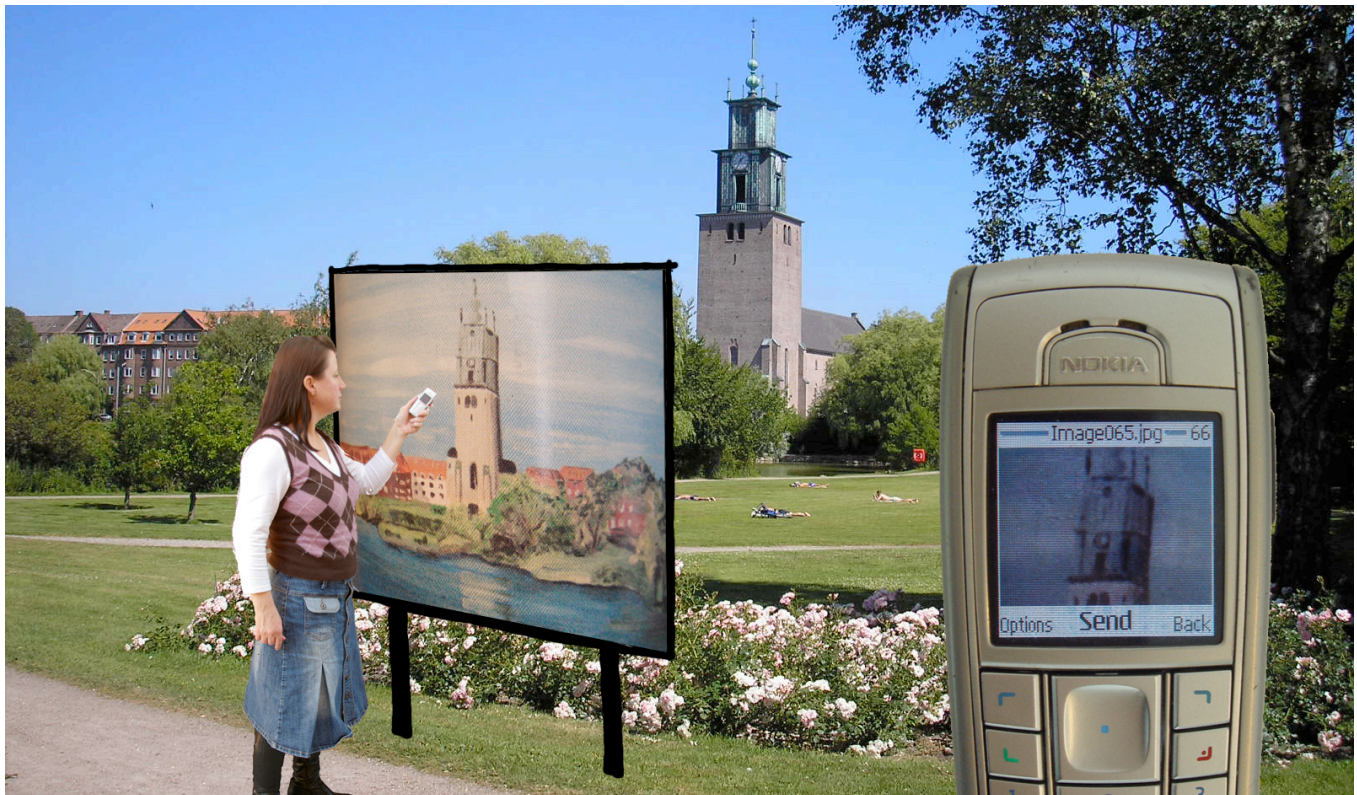
similar kind. The resulting collection is a highly individual patchwork of entities put together in a way that makes sense to each individual person.

The “collecting butterflies” metaphor provides a relatively simple approach to creating a fictional mobile guide. When a person enters a particular place, he or she is offered a number of stories that fit this location. When moving to another place, he or she is offered different stories. Staying at the same place for a longer period of time may cause more stories to appear or some stories to disappear. As for “dominos”, the “collecting butterflies” metaphor gives the author full narrative control over each short story in terms of sequence and relation to particular physical surroundings. However, control in terms of the creation of an overall picture is in the hands of the user. This results in a user experience that is highly interactive and exploratory on one side, but at the same time is also opaque and constrained.

*Urban Tapestries* [13] is a mobile fictional guide where the user can “collect butterflies” by roaming the city and collecting autonomous individual stories and histories which are overlaying the city in pertinent places.

## 4. A PRELIMINARY DESIGN IDEA

As a preliminary study, we are exploring the “collecting butterflies” approach to fiction in the city through the design of a simple prototype application. The idea of the system is to provide the reader with audio short stories related to their physical location, but at the same time to also provide the listener with some means of interaction influencing what story they are given



**Figure 1.** An example of “collecting butterflies” type of fiction in the city combined with ambiguous user interaction. By taking a picture with her mobile phone camera of a particular part of a painting situated in the park, the user will receive an audio short story related to this location and the particular motive captured. It could, for example, involve the old clock tower.

in a way that is playful, ambiguous [8] and opaque rather than goal-oriented and transparent. Technically, we wanted the design to be lightweight, use off-the-shelf mobile technologies (i.e. mobile phones with a built-in camera, MMS, and audio playback capabilities), and not require dedicated software to be installed.

Firstly, a number of salient locations around the city area of Aalborg are selected, and classified by location keywords (e.g. “waterfront”, “inner city”, “park”, “backstreets” etc.). Secondly, each physical location is captured in a painting with strong colours, which is digitised, printed as a large poster, and installed in a visible position at the depicted location. Each poster installation is given a unique ID number visible on the front along with a phone number for the storytelling service. Thirdly, around a hundred selected short stories (5-10 min) are recorded digitally, and classified by the same keywords used for classifying locations. Each story is also colour coded in terms of its general “mood”, after Marcus [16] (e.g. in Western culture, black = fear, red = passion, blue = calm, green = safety, yellow = happiness, white = purity). Thus, stories are related to locations and are also indirectly linked to the colours of the paintings.

The envisioned user experience of the system is as follows. When people wander around, they identify fictionally augmented areas by spotting the painting installations set up around the city. They can then walk up to one of these installations, take a picture of a given part of the painting with their phone-camera, and send this picture along with the ID number as an MMS to the phone number specified. The service then sorts out the location of the listener, and also analyses the picture for prominent colours (or a predefined “hot spot” in the painting). In response, a short story is selected that matches the location of the reader, and the colours (or hot spot) of the posted picture. This is then returned to the listener as audio attachment to an MMS message, who can now take the story with them and listen to it through their headset. At any time, the listener can repeat the process; take another picture, send it to the storytelling service, and receive a new short story. By logging the phone numbers used to post MMS messages, the service makes sure that the same story is not returned to a listener more than once.

As an alternative to MMS over GPRS, file exchange could be done via Bluetooth through access points embedded into the installations around the city. Audio file download could also be done over the 3G network or through WiFi.

## 5. SUMMARY

We have proposed the concept of “augmenting the city with fiction” as an approach to mobile guide services that presents their users with stories related to their physical surroundings rather than with facts about it. In an attempt to characterise different types of possible fictional mobile guides, we have proposed five metaphors describing different levels of narrative structure and possible interactivity. Embodying one of these metaphors, the metaphor of “collecting butterflies”, we have described a preliminary design idea for a prototype installation, which offers a collage of audio short stories through mobile phones in response to the listeners’ location and their “opaque” interaction with the service through picture-taking with their mobile phones.

Our future work involves the detailed design and implementation of this idea into a solid service that allows for longitudinal use by a large number of people. Future work also involves the development of design ideas and prototype fictional mobile guide

systems embodying other metaphors described in order to investigate their strengths and weaknesses, we also wish to investigate which different types and genres of stories fit well with each of the described metaphors.

## REFERENCES

- [1] Abowd, G., Atkeson, C., Hong, J., Long, S., Kooper, R., and Pinkerton, M. Cyberguide: A mobile context-aware tour guide. *Wireless Networks*, 3 (1997), 421-433.
- [2] Benford, S., Crabtree, A., Flintham, M., Drozd, A., Anastasi, R., Paxton, M., Tandavanitj, N., Adams, M., and Row-Farr, J. Can You See Me Now? *ACM TOCHI*, 13, 1 (2006), 100-133.
- [3] Benford, S., Seager, W., Flintham, M., Anastasi, R., Rowland, D., Humble, J., Stanton, D., Bowers, J., Tandavanitj, N., Adams, M., Row-Farr, J., Oldroyd, A., and Sutton, J. (2004) The error of our ways: the experience of self-reported position in a location-based game, *Proceedings of UbiComp 2004*, Springer, London, 2004, 70–87.
- [4] Bjork, S., Falk, J., Hansson, R., Ljungstrand, P. Pirates! Using the Physical World as a Game Board. In *Proceedings of Interact 2001*. IOS Press, Netherlands, 2001.
- [5] Blythe, M., Reid, J., Wright, P., and Geelhoed, E. Interdisciplinary criticism: analysing the experience of riot! a location-sensitive digital narrative. *Behaviour & Information Technology*, 25, 2 (2006), 127-139.
- [6] Brown, D. *The Da Vinci Code*. Bantam Books, UK, 2003.
- [7] Cheverst, K., Davies, N., Mitchell, K., Friday, A., and Efstratiou, C. Developing a Context-aware Electronic Tourist Guide: Some Issues and Experiences. In *Proceedings of CHI 2000*. ACM Press, New York, 2000, 17-24.
- [8] Gaver, W., Beaver, J., and Benford, S. Ambiguity as a Resource for Design. In *Proceedings of CHI 2003*. ACM Press, New York, 233-240.
- [9] Greenwood, K. *Earthly Delights*. Allen & Unwin, Australia, 2004.
- [10] Greenwood, K. *Heavenly Pleasures*. Allen & Unwin, Australia, 2005.
- [11] Greenwood, K. *Devil's Food*. Allen & Unwin, Australia, 2006.
- [12] Gustafsson, A., Bichard, J., Brunnberg, L., Juhlin, O., and Combetto, M. Believeable environments – Generating interactive storytelling in vast location-based pervasive games. In *Proceedings of ACE 06*. ACM Press, New York, 2006, Article no. 24.
- [13] Jungnickel, K. Urban Tapestries: Sensing the City and other Stories. *Proboscis "Cultural Snapshot" no. 8*, available at <http://urbantapestries.net/> (2004).
- [14] Kjeldskov J. and Paay J. Public Pervasive Computing: Making the Invisible Visible. *IEEE Computer* 39, 9 (2006), 60-65.
- [15] Malaka, R., Schneider, K., and Kretschmer, U. Stage-Based Augmented Edutainment. In *LCNS 3031* (2004), 54-65.
- [16] Marcus, A. *Graphic Design for Electronic Documents and User Interfaces*. ACM Press, New York, 1991.

- [17] Nisi, V., Wood, A., Davenport, G., and Oakley, I. Hopstory: an Interactive, Location-based Narrative Distributed in Space and Time. In *Proceedings of TIDSE 2004*. Springer, Berlin, 2004, 132-141.
- [18] Oppermann, R. and Specht, M. A Context-sensitive Nomadic Information System as an Exhibition Guide. In *Proceedings of HUC2K*. Springer-Verlag, London, 2000, 127-142
- [19] Paulos, E and Beckman, C. Sashay: Designing for Wonderment. In *Proceedings of CHI 2006*. ACM Press, New York, 2006, 881-884.
- [20] Piekarski, W. and Thomas, B. ARQuake: The Outdoors Augmented Reality System. *Communications of the ACM*, 45, 1 (2002), 36-38.
- [21] Starner, T., Liebe, B., Singletary, B., and Pair, J. MIND-WARPING: Towards Creating a Compelling Collaborative Augmented Reality Game. In *Proceedings of IUI 2000*. ACM Press, New York, 2000, 256-259.