Tourist Mobility And Advanced Tracking Technologies

Nielsen, Niels Christian

Published in:
Tourism Management

DOI:
10.1016/j.tourman.2010.02.004

Publication date:
2011

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):

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 providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 01. nov., 2018
Dear Author,

Any queries or remarks that have arisen during the processing of your manuscript are listed below and highlighted by flags in the proof. Please check your proof carefully and mark all corrections at the appropriate place in the proof (e.g., by using on-screen annotation in the PDF file) or compile them in a separate list.

For correction or revision of any artwork, please consult [http://www.elsevier.com/artworkinstructions](http://www.elsevier.com/artworkinstructions).

**Articles in Special Issues:** Please ensure that the words ‘this issue’ are added (in the list and text) to any references to other articles in this Special Issue.

<table>
<thead>
<tr>
<th>Location in article</th>
<th>Query / remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are no queries in this article</td>
<td></td>
</tr>
</tbody>
</table>

**Electronic file usage**

Sometimes we are unable to process the electronic file of your article and/or artwork. If this is the case, we have proceeded by:

- [ ] Scanning (parts of) your article
- [ ] Rekeying (parts of) your article
- [ ] Scanning the artwork

Thank you for your assistance.
New technologies, in particular mobile telecommunication, the Global Positioning System (GPS) and Geographical Information System (GIS) software offer unprecedented opportunities in relation to tourist activities at the destination. Electronic positioning, navigation and tracking technologies are new to tourism research, but are already showing great potential in this field, especially when applied together. Destination managers could also benefit from more detailed knowledge about visitors' movement patterns and decision making processes involving the question “Where should we go now?” The technologies are already very sophisticated and still advancing. For example, devices are getting smaller and smarter and the data processing chain getting more and more automated. However the technological development has taken place so rapidly and to such an extent that theoretical and methodological developments are lagging behind, and tourism literature about research and using tracking technologies has thus far been scarce.

Therefore this book is very useful. It has surely been a challenge to compile a book that provides background information and outlines the development of the technologies, without getting lost in detail, and shows the reader a path to setting up their own research. This challenge has been taken on by Noam Shoval and Michael Isaacson of the Hebrew University of Jerusalem. Here the technology has been studied and applied for almost a decade (Shoval & Isaacson, 2007). The wide range of experiences with different tracking technologies have enabled to authors to select a number of examples from their own research, mostly carried out in urban environments around Israel.

The book has a clear and reader-friendly structure. It progresses from theoretical and methodological issues, via an assessment of available technologies to a broad discussion of applications and implications, supported by a range of relevant real world examples. In the background section, the authors draw on the Swedish cultural geographer Torsten Hägerstrand, who was the first to demonstrate use of space–time path models and show daily movement patterns using the space–time cube as framework. Recently Hägerstrand’s work has been experiencing a revival with the advent of tracking and visualisation technologies; for one of the first examples see Ettema and Timmermans (1997, chap. 1).

In the review of available tracking technologies (part II of the book), some older and rather obsolete technologies are described in detail, perhaps too much, given that they will probably only find little application in tourism studies. The two basic technological approaches to tracking, namely land-based and satellite-based, are given a chapter each. Much of the emphasis is on the most popular and useful satellite system: the US Global Positioning System (GPS), a subset of the more generic or correct term Global Navigation Satellite Systems (GNSS). The cell phone tracking studies show plenty of scope for improvement, as they are less spatially accurate than methods involving GPS receivers. The two basic ways to survey tourist movements are presented and discussed in an instructive way. First: the tracking of individuals in a case-oriented way, mostly with GPS-units or — in more restricted spaces — Bluetooth enabled mobile phones or RFID chips. Second: statistical description of groups of visitor within a given area, with either GPS or cell phone data. The pros and cons of the two approaches are made clear and nicely summarised in tabular form. Of particular use is the discussion of the different tracking techniques in relation to different research environments and places of sampling.

Mathematical methods and algorithms, in particular sequence analysis and clustering methods are described in detail and well explained, with illustrative numerical examples. Comparison between individual tourists’ sequences and patterns of stays and movements through the building of “distance matrices” seems to be a useful approach. Sequence alignment is presented as a promising new computational tool, but the description and explanation could have been condensed, as not all examples are necessary or contribute to understanding the tracking technology. Still, as noted (p. 127): Sequence is an important dimension of spatial behaviour and has a strong connection to the way people read and experience space in general and urban space in particular. The analytical approach using division of towns and destinations into polygons, each representing a “location” is familiar to geographers and spatial planning, but should prove useful for almost any kind of survey at destination level. For instance, scenario models, as described in Liburd (2005), describing typical behavioural patterns can be confirmed or rejected — but only through clever application of these. Visualisation in 2 and 3D, including the time dimension, allows interaction with data in hitherto unknown ways. The links with transport research are well explained, and the authors demonstrate great knowledge of that field as well.

Important ethical issues related to the various technological approaches are carefully clarified and discussed. The entire last chapter of the Application part (III) is devoted to a discussion of the challenges related to privacy and monitoring of digital identities. Ethical concerns are often related to capture of cell phone data — for instance to what extent can they be used without the consent of the users, and what does it take to “anonymise” data? However, ethical issues must also be considered when researchers use (logged and archived) GPS data. Here the individual tourists have agreed to be tracked, but may not be aware just how precise his or her behaviour can be monitored or mapped. For those readers who wish to use the technologies in their own research, the book has an Appendix with detailed and instructive descriptions of how data from tracking devices can be integrated with a GIS, for visualisation and spatial analysis. The alternative or
supplementary approach with mash-up like integration with
internet mapping services like Google Earth and Open Street Map
(see for example Harder, Nielsen, Bro, & Tradisauskas, 2008), are
particularly useful for real-time monitoring including generation
of context-dependent questions, as discussed in the section Under-
standing the Tourist.

To conclude, this volume of Advances in Tourism (here the series
title is really precise) reflects a rapidly developing field within
tourism research, in the sense that it reports to a great extent on
work-in-progress. It further provides descriptions of data collec-
tion/reporting and visualisation techniques not tried before, simply
because such types and amounts of data have not until now been
available, at least not to academics. The book is thus a must-read,
not only for those planning surveys and monitoring or tracking
schemes, but also for those involved in theory development or setting
up general or place-specific hypotheses about tourist mobility.

References

patterns. In Ettema, & Timmermans. (Eds.), Activity-based approaches to travel

from GPS tracking of visitors in Public Parks in Denmark based on GPS
technologies. In van Schaick., & van der Spek. (Eds.), Urbanism on track:
Application of tracking technologies in urbanism (pp. 65–78). Amsterdam:
IOS Press.


Tourism Research, 34 (no. 1), 141–159.

Niels Christian Nielsen
University of Southern Denmark, Center for Tourism,
Innovation and Culture, Institute of History and Civilization,
Esbjerg DK-6700, Denmark
E-mail address: ncn@hist.sdu.dk