

SpringerBriefs in Computer Science

More information about this series at <http://www.springer.com/series/10028>

Fabio Crestani · Stefano Mizzaro
Ivan Scagnetto

Mobile Information Retrieval

Fabio Crestani
Faculty of Informatics
Università della Svizzera Italiana (USI)
Lugano
Switzerland

Ivan Scagnetto
Department of Mathematics and Computer
Science
University of Udine
Udine
Italy

Stefano Mizzaro
Department of Mathematics and Computer
Science
University of Udine
Udine
Italy

ISSN 2191-5768 ISSN 2191-5776 (electronic)
SpringerBriefs in Computer Science
ISBN 978-3-319-60776-4 ISBN 978-3-319-60777-1 (eBook)
DOI 10.1007/978-3-319-60777-1

Library of Congress Control Number: 2017943254

This book was advertised with a copyright holder in the name of the publisher in error, whereas the author(s) holds the copyright.

© The Author(s) 2017

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Contents

1	Introduction	1
1.1	Information Retrieval with Mobile Devices	1
1.2	Motivations and Methodology	2
1.3	Outline	3
2	From IR to Mobile IR	5
2.1	Information Retrieval	5
2.1.1	Brief Introduction to Information Retrieval	5
2.1.2	Information Retrieval Evaluation	8
2.1.3	Interactive Information Retrieval	10
2.2	Mobile Information Retrieval	11
2.3	The Literature Landscape of Mobile IR	12
2.4	Conclusions	14
3	Foundations	15
3.1	The Mobile Phone Device	15
3.2	The Role of Technology and Society	17
3.3	The Concept of Relevance	18
3.4	Mobile IR Models	20
3.5	Conclusions	21
4	Documents	23
4.1	Text	23
4.2	Multimedia	24
4.3	Apps	25
4.4	Movement Data, POIs, and IoT	29
4.5	Conclusions	31
5	Users and Information Needs	33
5.1	Log Analysis	33
5.1.1	First Studies	33
5.1.2	Follow-Ups and More Complete Studies	35

5.1.3	Third Wave	38
5.1.4	Related Studies	40
5.2	User Studies, Surveys, Interviews, and Diary Studies	41
5.3	Conclusions	44
6	User Interface	45
6.1	A Different User Interface	45
6.2	Input	46
6.2.1	Text Based Input	47
6.2.2	Spoken Input	48
6.2.3	Mobile Phone Sensors	50
6.2.4	Zero-Term Queries	51
6.2.5	Intelligent Personal Assistants (IPAs)	53
6.3	Output	55
6.3.1	Text Based Presentation	55
6.3.2	Summarisation	56
6.3.3	Results Visualisation	58
6.4	Query Reformulation and Query Expansion	61
6.5	Conclusions	63
7	Context Awareness	65
7.1	Defining Context	65
7.2	Context Awareness Dimensions	70
7.2.1	Location Awareness	70
7.2.2	Time Awareness	75
7.2.3	Beyond Location and Time Awareness	77
7.2.4	Social Awareness	81
7.3	Conclusions	83
8	Evaluation	85
8.1	The Importance of Evaluation	85
8.2	User Studies	86
8.2.1	Evaluation of Mobile IR Systems	86
8.2.2	Evaluation of IPAs	87
8.3	Test Collections	88
8.3.1	Early Attempts	89
8.3.2	TREC and NTCIR	91
8.4	Conclusions	93
9	Conclusions and Outlook	95
9.1	Summary	95
9.2	Outlook: Mobile IR Trends	96
	References	97