Contents

Introduction

Going Local—Evolution of Location-Based Services Jukka M. Krisp, Liqiu Meng	xxi
Location Matters: LBS 2030	xxv
Location-Based Services in 2030: From Sharing to Collective Action	xxix
Part I Spatio-Temporal Data Acquisition, Processing, and Analysis	
Extraction of Location-Based Emotions from Photo Platforms Eva Hauthal and Dirk Burghardt	3
Combining Float Car Data and Multispectral Satellite Images to Extract Road Features and Networks	29
Space-Time Mapping of Mass Event Data	45
Analyzing Human Activities Through Volunteered Geographic Information: Using Flickr to Analyze Spatial and Temporal Pattern of Tourist Accommodation	57

x Contents

Science and Community Mapping
Claire Ellul, Suneeta Gupta, Mordechai Muki Haklay and Kevin Bryson
A Framework for On-line Detection of Custom Group Movement Patterns
Colin Kuntzsch and Alexander Bohn
Mining Event-Related Knowledge from OpenStreetMap Khatereh Polous, Peter Mooney, Jukka M. Krisp and Liqiu Meng
Part II Positioning/Indoor Positioning
Evaluation of Bluetooth Properties for Indoor Localisation Khuong Nguyen and Zhiyuan Luo
Pedestrian Indoor Localization Using Foot Mounted Inertial Sensors in Combination with a Magnetometer, a Barometer and RFID Michailas Romanovas, Vadim Goridko, Lasse Klingbeil, Mohamed Bourouah, Ahmed Al-Jawad, Martin Traechtler and Yiannos Manoli
Quantitative and Spatial Evaluation of Distance-Based Localization Algorithms
Using the Magnetic Field for Indoor Localisation on a Mobile Phone
Part III Wayfinding/Navigation (Indoor/Outdoor) and Smart Mobile Phone Navigation and LBS Technologies
Indoor Route Planning with Volunteered Geographic Information on a (Mobile) Web-Based Platform
Indoor and Outdoor Mobile Navigation by Using a Combination
of Floor Plans and Street Maps

Augmented Maps with Route Sketches	251
High Precision 3D Indoor Routing on Reduced Visibility Graphs	265
Travel-Mode Classification for Optimizing Vehicular Travel Route Planning. Lijuan Zhang, Sagi Dalyot and Monika Sester	277
Taxonomy of Navigation for First Responders	297
Part IV Interactions, User Studies and Evaluations	
App-Free Zone: Paper Maps as Alternative to Electronic Indoor Navigation Aids and Their Empirical Evaluation with Large User Bases	319
Zooming In-Zooming Out Hierarchies in Place Descriptions Daniela Richter, Maria Vasardani, Lesley Stirlng, Kai-Florian Richter and Stephan Winter	339
Understanding the Roles of Communities in Volunteered Geographic Information Projects	357
A Conceptual Model for Analyzing Contribution Patterns in the Context of VGI	373
Part V Innovative LBS Systems and Applications	
People as Sensors and Collective Sensing-Contextual Observations Complementing Geo-Sensor Network Measurements	391

xii Contents

Design and Implementation of a Daily Activity Scheduler in the Context of a Personal Travel Information System	407
Map-Based Storytelling Tool for Real-World Walking Tour Min Lu and Masatoshi Arikawa	435
A 3D Indoor Routing Service with 2D Visualization Based on the Multi-Layered Space-Event Model	453
Adapting OSM-3D to the Mobile World: Challenges and Potentials	47]