

15th International Conference on Spatial Information Theory

COSIT 2022, September 5–9, 2022, Kobe, Japan

Edited by

**Toru Ishikawa
Sara Irina Fabrikant
Stephan Winter**



Editors

Toru Ishikawa 

Toyo University, Tokyo, Japan
toru.ishikawa@iniad.org

Sara Irina Fabrikant 

University of Zurich, Switzerland
sara.fabrikant@geo.uzh.ch

Stephan Winter 

University of Melbourne, Australia
winter@unimelb.edu.au

ACM Classification 2012

Information systems → Geographic information systems; Applied computing → Transportation

ISBN 978-3-95977-257-0

PRINT ISBN 978-1-7138-5954-3

Published online and open access by

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <https://www.dagstuhl.de/dagpub/978-3-95977-257-0>.

Publication date

September, 2022

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <https://portal.dnb.de>.

License

This work is licensed under a Creative Commons Attribution 4.0 International license (CC-BY 4.0):
<https://creativecommons.org/licenses/by/4.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

■ Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/LIPIcs.COSIT.2022.0

ISBN 978-3-95977-257-0

ISSN 1868-8969

<https://www.dagstuhl.de/lipics>

Contents

Preface

Toru Ishikawa, Sara Irina Fabrikant, and Stephan Winter	0:ix
---	------

Regular Papers

What Do You Mean You're <i>in</i> Trafalgar Square? Comparing Distance Thresholds for Geospatial Prepositions <i>Niloofer Aflaki, Kristin Stock, Christopher B. Jones, Hans Guesgen, Jeremy Morley, and Yukio Fukuzawa</i>	1:1–1:14
I Can Tell by Your Eyes! Continuous Gaze-Based Turn-Activity Prediction Reveals Spatial Familiarity <i>Negar Alinaghi, Markus Kattenbeck, and Ioannis Giannopoulos</i>	2:1–2:13
Automatically Discovering Conceptual Neighborhoods Using Machine Learning Methods <i>Ling Cai, Krzysztof Janowicz, and Rui Zhu</i>	3:1–3:14
Predicting Distance and Direction from Text Locality Descriptions for Biological Specimen Collections <i>Ruoxuan Liao, Pragyan P. Das, Christopher B. Jones, Niloofer Aflaki, and Kristin Stock</i>	4:1–4:15
An Incremental Algorithm for Handling Qualitative Spatio-Temporal Information <i>Zhiguo Long, Qiyuan Hu, Hua Meng, and Michael Sioutis</i>	5:1–5:13
Rethinking Route Choices! On the Importance of Route Selection in Wayfinding Experiments <i>Bartosz Mazurkiewicz, Markus Kattenbeck, and Ioannis Giannopoulos</i>	6:1–6:13
Empirical Evidence for Concepts of Spatial Information as Cognitive Means for Interpreting and Using Maps <i>Enkhbold Nyamsuren, Eric J. Top, Haiqi Xu, Niels Steenbergen, and Simon Scheider</i>	7:1–7:14
Generalized, Inaccurate, Incomplete: How to Comprehensively Analyze Sketch Maps Beyond Their Metric Correctness <i>Angela Schwering, Jakub Krukar, Charu Manivannan, Malumbo Chipofya, and Sahib Jan</i>	8:1–8:15
Perceptions of Qualitative Spatial Arrangements of Three Objects <i>Ningran Xu, Ivan Majic, and Martin Tomko</i>	9:1–9:14

Vision Papers

Are Psychological Variables Relevant to Evaluating Geoinformatics Applications? The Case of Landmarks (Vision Paper) <i>Jakub Krukar and Angela Schwering</i>	10:1–10:13
---	------------

15th International Conference on Spatial Information Theory (COSIT 2022).

Editors: Toru Ishikawa, Sara Irina Fabrikant, and Stephan Winter

Leibniz International Proceedings in Informatics

LIPICS Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

New Human Dynamics in the Emerging Metaverse: Towards a Quantum Phygital Approach by Integrating Space and Place <i>Daniel Sui and Shih-Lung Shaw</i>	11:1–11:13
--	------------

Short Papers

Large-Scale Spatial Prediction by Scalable Geographically Weighted Regression: Comparative Study <i>Daisuke Murakami, Narumasa Tsutsumida, Takahiro Yoshida, and Tomoki Nakaya</i>	12:1–12:5
Geographically Varying Coefficient Regression: GWR-Exit and GAM-On? <i>Alexis Comber, Paul Harris, Daisuke Murakami, Narumasa Tsutsumida, and Chris Brunsdon</i>	13:1–13:10
3D Sketch Maps: Concept, Potential Benefits, and Challenges <i>Kevin Gonyop Kim, Jakub Krukar, Panagiotis Mavros, Jiayan Zhao, Peter Kiefer, Angela Schwering, Christoph Hölscher, and Martin Raubal</i>	14:1–14:7
The Effect of Abstract vs. Realistic 3D Visualization on Landmark and Route Knowledge Acquisition <i>Armand Kapaj, Enru Lin, and Sara Lanini-Maggi</i>	15:1–15:8
Smart Crowd Management: The Data, the Users and the Solution <i>Laure De Cock, Steven Verstockt, Christophe Vandeviver, and Nico Van de Weghe</i>	16:1–16:7
A Weather-Aware Framework for Population Mobility Modelling <i>Vanessa Brum-Bastos, Kamil Smolak, Witold Rohm, and Katarzyna Sila-Nowicka</i>	17:1–17:9
Qualitative Spatial Reasoning over Questions <i>Mohammad Kazemi Beydokhti, Matt Duckham, Yaguang Tao, Maria Vasardani, and Amy Griffin</i>	18:1–18:7
Transcepts: Connecting Entity Representations Across Conceptual Views on Spatial Information <i>Eric J. Top and Simon Scheider</i>	19:1–19:7
A Computational Method for the Classification of Mental Representations of Objects in 3D Space <i>Samuel S. Sohn, Panagiotis Mavros, Mubbashir Kapadia, and Christoph Hölscher</i>	20:1–20:8
A Comparison of Geographically Weighted Principal Components Analysis Methodologies <i>Narumasa Tsutsumida, Daisuke Murakami, Takahiro Yoshida, Tomoki Nakaya, Binbin Lu, Paul Harris, and Alexis Comber</i>	21:1–21:6
Abnormal Situation Simulation and Dynamic Causality Discovery in Urban Traffic Networks <i>Yadi Wang, Yicheng Pan, Meng Ma, and Ping Wang</i>	22:1–22:7
Spatial and Spatiotemporal Matching Framework for Causal Inference <i>Kamal Akbari and Martin Tomko</i>	23:1–23:7
An Entropy-Based Model for Indoor Self-Localization Through Dialogue <i>Kimia Amoozandeh, Ehsan Hamzei, and Martin Tomko</i>	24:1–24:7

Collaborative Wayfinding Under Distributed Spatial Knowledge <i>Panagiotis Mavros, Saskia Kuliga, Ed Manley, Hilal Rohaidi Fitri, Michael Joos, and Christoph Hölscher</i>	25:1–25:10
Abnormal Trajectory-Gap Detection: A Summary <i>Arun Sharma, Jayant Gupta, and Shashi Shekhar</i>	26:1–26:10
Improving Pedestrians Traffic Priority via Grouping and Virtual Lanes in Shared Spaces <i>Yao Li, Vinu Kamalasanan, Mariana Batista, and Monika Sester</i>	27:1–27:8
Eye Blink-Related Brain Potentials During Landmark-Based Navigation in Virtual Reality <i>Bingjie Cheng, Enru Lin, Klaus Gramann, and Anna Wunderlich</i>	28:1–28:8
Representing Computational Relations in Knowledge Graphs Using Functional Languages <i>Yanmin Qi, Heshan Du, Amin Farjudian, and Yunqiang Zhu</i>	29:1–29:7