

Brief biographical sketch

Martin Raubal is an Assistant Professor at the Institute for Geoinformatics, University of Muenster. He earned a M.S. in Spatial Information Science and Engineering from the University of Maine (1997) and a Dipl.-Ing. in Surveying Engineering from the Technical University Vienna (1998). He received his Ph.D. from the Technical University Vienna in 2001 with a thesis on agent-based simulation of human wayfinding. His research interests are in semantic interoperability, action-based ontologies, spatial cognition, location based services, formal cognitive models of human activities, and agent-based modeling. He has authored or co-authored over 25 articles in journals, books, and conference proceedings relating to GIS, computer science, and cognitive science. Martin is also co-author of 4 books. He was an invited participant at the NCGIA I21 - Specialist Meeting "Formal Models of Common-Sense Geographic Worlds" in San Marcos, Texas (1996) and at the ACTOR workshop (NSF-sponsored research workshop on Action-Oriented Approaches in Geographic Information Science, Maine, 2002).

Reasons for wishing to participate and scope of contribution

Semantic geospatial interoperability is a central element of my past work and future research agenda. My current research focuses on the development of formal methods to solve the problem of semantic interoperability. I thereby strongly focus on the integration of cognitive science aspects. I believe that such integration is missing so far but urgently needed to ensure that people's interaction with geospatial information systems and web services is facilitated.

During the last years we have tried to integrate cognitive and engineering aspects for modeling and simulating various geospatial processes, especially in the area of human wayfinding and car navigation. Most of this work was done using an agent-based approach. Recently, my work has focused on the cognitively based formal representation of people's concepts and its utilization for task simulation and semantic similarity measurement. Case studies from the transportation domain were used to simulate various navigation tasks based on different levels of ontologies. Current work extends the representation of concepts to mappings between such representations, i.e., conceptual spaces, and the occurring loss of information.

I expect that the outcome of this workshop will be the basis for future work on the large area of geospatial webs including their interoperability problems. I also consider my previous and current work to be a useful contribution to future research ideas and would be excited to help identify and prioritize a research agenda.

Selected publications

M. Raubal (forthcoming 2004) Formalizing Conceptual Spaces. in: *Formal Ontology in Information Systems, FOIS 2004*, Torino, Italy.

M. Raubal, H. Miller, and S. Bridwell (forthcoming 2004) User Centered Time Geography For Location-Based Services. *Geografiska Annaler B*.

M. Raubal and W. Kuhn (2004) Ontology-Based Task Simulation. *Spatial Cognition and Computation* 4(1): 15-37.

M. Raubal and S. Winter (2002) Enriching Wayfinding Instructions with Local Landmarks. in: M. Egenhofer and D. Mark (Eds.), *Geographic Information Science - Second International Conference, GIScience 2002, Boulder, CO, USA, September 2002. Lecture Notes in Computer Science* 2478, pp. 243-259, Springer, Berlin.

M. Raubal (2001) Human wayfinding in unfamiliar buildings: a simulation with a cognizing agent. *Cognitive Processing* (2-3): 363-388.

M. Raubal (2001) Ontology and epistemology for agent-based wayfinding simulation. *International Journal of Geographical Information Science* 15(7): 653-665.

M. Raubal and M. Worboys (1999) A Formal Model of the Process of Wayfinding in Built Environments. in: C. Freksa and D. Mark (Eds.), *Spatial Information Theory - Cognitive and Computational Foundations of Geographic Information Science, International Conference COSIT '99, Stade, Germany. Lecture Notes in Computer Science* 1661, pp. 381-399, Springer, Berlin.