

# Lecture Notes in Artificial Intelligence 1404

Subseries of Lecture Notes in Computer Science

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Karl F. Wender (Eds.)

## Spatial Cognition

An Interdisciplinary Approach  
to Representing and Processing  
Spatial Knowledge



Springer

# Spatial Cognition An Interdisciplinary Approach To Representing And Procebing Spatial Knowledge

**Michael Brown**



## **Spatial Cognition An Interdisciplinary Approach To Representing And Processing Spatial Knowledge:**

*Spatial Cognition* Christian Freksa, Christopher Habel, Karl F. Wender, 2003-05-20 Research on spatial cognition is a rapidly evolving interdisciplinary enterprise for the study of spatial representations and cognitive spatial processes be they real or abstract human or machine Spatial cognition brings together a variety of search methodologies empirical investigations on human and animal orientation and navigation studies of communicating spatial knowledge using language and graphical or other pictorial means the development of formal models for representing and processing spatial knowledge and computer implementations to solve spatial problems to simulate human or animal orientation and navigation behavior or to reproduce spatial communication patterns These approaches can interact in interesting and useful ways Results from empirical studies call for formal explanations both of the underlying memory structures and of the processes operating upon them we can develop and implement operational computer models obeying the relationships between objects and events described by the formal models we can empirically test the computer models under a variety of conditions and we can compare the results to the results from the human or animal experiments A disagreement between these results can provide useful indications towards the refinement of the models

**Spatial Cognition** Christian Freksa, Christopher Habel, Karl F. Wender, 1998-05-25 Research on spatial cognition is a rapidly evolving interdisciplinary enterprise for the study of spatial representations and cognitive spatial processes be they real or abstract human or machine Spatial cognition brings together a variety of search methodologies empirical investigations on human and animal orientation and navigation studies of communicating spatial knowledge using language and graphical or other pictorial means the development of formal models for representing and processing spatial knowledge and computer implementations to solve spatial problems to simulate human or animal orientation and navigation behavior or to reproduce spatial communication patterns These approaches can interact in interesting and useful ways Results from empirical studies call for formal explanations both of the underlying memory structures and of the processes operating upon them we can develop and implement operational computer models obeying the relationships between objects and events described by the formal models we can empirically test the computer models under a variety of conditions and we can compare the results to the results from the human or animal experiments A disagreement between these results can provide useful indications towards the refinement of the models *Spatial Cognition*, 1998

**Spatial Cognition** Seán Ó Nualláin, 2000-11-23 Spatial Cognition brings together psychology computer science linguistics and geography discussing how people think about space our internal cognitive maps and spatial perception and how we communicate about space for instance giving route directions or using spatial metaphors The technological applications adding dynamism to the area include computer interfaces educational software multimedia and in car navigation systems On the experimental level themes as varied as gender differences in orientation and of course wholly unrelated the role of the hippocampus in rodent navigation are described Much detailed analysis and computational modeling of the

structure of short term memory STM is discussed The papers were presented at the 1998 annual meeting of the Cognitive Science Society of Ireland Mind III Series B *Spatial Cognition* Thomas Barkowsky, Christian Freksa, 2014-09-01 *Space, Time, and the Use of Language* Thora Tenbrink, 2008-09-25 Does temporal language depend on spatial language This widespread view is intuitively appealing since spatial and temporal expressions are often similar or identical Also metaphors consistently express temporal phenomena in terms of spatial language pointing to a close semantic and conceptual relationship But what about the application of the two kinds of linguistic expressions in natural discourse The book draws together findings on terms that describe the relation of objects or events to each other such as in front behind before after etc highlighting the relationship between cognition and language usage Using the method of cognitively motivated discourse analysis novel empirical results are presented to complement earlier findings The detailed investigation of a selected range of terms that appear to be parallel in space and time highlights both similarities and fundamental differences in their application As a result a new picture emerges The concepts of space and time are represented in language usage in various systematic ways reflecting how we understand the world and at the same time reflecting how our concepts of space and time differ fundamentally The volume contributes to a debate that has been of interest for cognitive linguists for several decades concerning the understanding of transfer processes between two conceptually intertwined domains The specific contribution of this work consists of addressing the novel question of how such processes come into play in the actual application of relevant expressions in natural discourse By adopting established approaches from Discourse Analysis for issues that are deeply rooted in interdisciplinary research in Cognitive Science insights are drawn together from two hitherto largely unrelated fields of research to approach the topic from an original perspective leading to a deeper understanding of the relationship between the domains of space and time and their expression in language *Spatial Cognition*, 2005 **ECAI 2004** Ramon López de Mántaras, Lorenza Saitta, 2004 This is the Golden Age for Artificial Intelligence The world is becoming increasingly automated and wired together This also increases the opportunities for AI to help people and commerce Almost every sub field of AI had now been used in substantial applications Some of the fields highlighted in this publication are CBR Technology Model Based Systems Data Mining and Natural Language Techniques Not only does this publication show the activities capabilities and accomplishments of the sub fields it also focuses on what is happening across the field as a whole

**KI-98: Advances in Artificial Intelligence** Otthein Herzog, Andreas Günter, 1998-09-09 This book constitutes the refereed proceedings of the 22nd Annual German Conference on Artificial Intelligence KI 98 held in Bremen Germany in September 1998 The 16 revised full papers presented were carefully reviewed and selected for inclusion in the proceedings Also included are three invited papers and abstracts of two invited talks as well as an appendix containing up to date descriptions of German AI projects Thus the volume gives a unique overview of AI research in Germany *Context-specific Route Directions* Kai-Florian Richter, 2008 Route directions assist people in unfamiliar environments In order to be useful

these route directions should reflect human conceptualization of wayfinding situations they should be well memorable and they should cover the spatial situations to be encountered while following a route In this thesis Guard is presented a process for generating context specific route directions that cover these properties Jacket **Spatial Cognition V** Thomas Barkowsky,Markus Knauff,Gérard Ligozat,Daniel R. Montello,2007-11-16 This book constitutes the refereed proceedings of the International Conference on Spatial Cognition Spatial Cognition 2006 It covers spatial reasoning human robot interaction visuo spatial reasoning and spatial dynamics spatial concepts human memory mental reasoning and assistance spatial concepts human memory and mental reasoning navigation wayfinding and route instructions as well as linguistic and social issues in spatial knowledge processing **Spatial Information Theory** ,2001 Geoinformatics ,2006

*Representations in Mind and World* Jeffrey M. Zacks,Holly A. Taylor,2017-07-20 This volume pulls together interdisciplinary research on cognitive representations in the mind and in the world The chapters from cutting edge researchers in psychology philosophy computer science and the arts explore how structured representations determine cognition in memory spatial cognition information visualization event comprehension and gesture It will appeal to graduate level cognitive scientists technologists philosophers linguists and educators **Spatial Cognition III** Christian Freksa,Wilfried Brauer,Christopher Habel,Karl F. Wender,2003-08-03 This third volume documents the results achieved within a priority program on spatial cognition funded by the German Science Foundation DFG The 23 revised full papers presented went through two rounds of reviewing and improvement and reflect the increased interdisciplinary cooperation in the area The papers are organized in topical sections on routes and navigation human memory and learning spatial representation and spatial reasoning **KI ...** ,1998 Frames of Reference and Direct Manipulation Based Navigation Asaf Friedman,2005 The analysis showed that the lack of realism of these systems means that they do not offer a sense of reality because of the user s inability to interact easily with the computer to navigate among represented objects The user cannot 1 Plan a course from a given location to a desired one 2 Shift the direction of their gaze and focus attention to objects as they move across a path 3 Move around an object keeping track of this change in relation to the surrounding objects 4 Turn an object in front of the viewer in order to examine it This lack of sense of reality cannot be simply improved by adding attributed to the system that are more realistic details shadows and reflections *Costs of Switching Perspectives in Route and Survey Descriptions* Paul U. Lee,2002 **Bibliographic Guide to Psychology** New York Public Library. Research Libraries,1998 **VRST** ,2005

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