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Preface

Spatial information theory explores the foundations of space and time. It searches to model perceptions and cognition of space and time, their efficient representation, reasoning about these representations, and the communication of knowledge about space and time. The Conference on Spatial Information Theory, COSIT, focuses especially on the geographic scale, the scale beyond immediate vista. Even within the limits to geographical scale, spatial information theory covers interests of multiple disciplines, such as philosophy, cognitive psychology, linguistics, mathematics, artificial intelligence, and geography. This list is not exhaustive, but it shows the need and desire to talk across disciplinary boundaries. COSIT is the place for this exchange and search for common foundations. To foster the encounter, COSIT is a single-track conference with a limited number of papers, and is traditionally held at secluded locations.

For COSIT 2007, a record number of 102 submissions were received and carefully reviewed by the international Program Committee and many additional reviewers. In the end, 27 papers were selected for presentation, which corresponds to an acceptance rate of 26%. To preserve the single-track format of COSIT, the number of accepted papers was kept within the range of previous COSITs. Consequently, COSIT 2007 was the most competitive COSIT yet, with a lower acceptance rate than any previous COSIT. At COSIT 2007, 25 peer-reviewed posters were also presented, with three keynotes given by Deborah McGuinness (Knowledge Systems, Stanford University, USA), Mandyam Srinivasan (Queensland Brain Institute, Australia) and Kim Marriott (Constraint Solving and Optimization, Monash University, Australia).

The day before the conference, participants had the difficult choice between four international workshops: the Workshop on Spatial Cognition in Architectural Design chaired by Thomas Barkowsky (Germany), Zafer Bilda (Australia), Christoph Hölscher (Germany) and Georg Vrachliotis (Switzerland); the Workshop on Semantic Similarity Measurement and Geospatial Applications chaired by Krzysztof Janowicz (Germany), Angela Schwering (Germany), Martin Raubal (USA) and Werner Kuhn (Germany); the Joint Workshop on Distributed Geoinformatics and Sensing, Ubiquity, and Mobility organized by Patrick Laube (Australia) and co-chaired by Matt Duckham (Australia), Arie Croitoru (Canada), Peggy Agouris (USA), Lars Kulik and Egemen Tanin (both Australia); and the Workshop on Social Space and Geographic Space chaired by Stephan Winter and Garry Robins (both Australia). All four workshops were full-paper peer-reviewed, and the proceedings were published separately.

The last conference day was reserved for the doctoral colloquium, a highlight of every COSIT. Doctoral students had the opportunity to present their research in a supportive environment to an international audience of researchers, industry and fellow students. Participants received valuable feedback on issues such as how

to identify and refine research questions, how to present research orally, and how to publish research, as well as insights into how to complete a PhD successfully in an interdisciplinary field.

COSIT 2007 was held at the Melbourne Business School in Mount Eliza, Victoria: a quiet place on top of the cliffs of Port Phillip Bay, and some distance from buzzing Melbourne. This location was chosen in the spirit of previous conference locations. COSITs were held in Pisa (Italy), Elba (Italy), Semmering (Austria), Laurel Highlands (Pennsylvania, USA), Stade (Germany), Morro Bay (California, UDA), Ittingen (Switzerland) and Ellicottville (New York, USA). This list shows that COSIT 2007 was already the eighth conference in this series (Pisa counts traditionally as "COSIT 0").

It also shows that COSIT 2007 was the first COSIT taking place in the Asia-Pacific region. The declared goal of this decision was to create better opportunities for researchers from Asia and Oceania to join the ongoing scientific discussion, and to promote in this region spatial information theory as one of the central foundations of an information society, considering that almost all decisions have a spatial component. This goal came out evenly: five papers and 11 posters had authors or co-authors from this region, not to mention the doctoral colloquium. But a place that is easier to access for some, is more difficult to access for others. The majority of participants had made a special effort to come to COSIT 2007, and this is recognized and appreciated by the organizers.

Any conference needs many contributors to make it a success, and COSIT 2007 was no exception. In scientific terms, success can only be linked to the encounter with new ideas, the discussions with new and old colleagues, and the feedback, encouragement, inspiration or plans for collaborations taken home from Mount Eliza. In this respect, all thanks go to the participants.

In financial terms, success was largely supported by our generous sponsors. ESRI was the COSIT 2007 primary sponsor. Ordnance Survey and Multimedia Victoria were COSIT 2007 key sponsors. Shell was the COSIT 2007 poster session sponsor. To support the participation of doctoral students, special thanks go to Google Inc. as the COSIT 2007 doctoral colloquium sponsor and PSMA Australia Ltd. as COSIT 2007 student scholarship sponsor. The Cooperative Research Center for Spatial Information (CRCSI) supported some of their doctoral students to participate. The Spatial Sciences Institute credited participating Australian professionals with points in its continuing professional development program. The Department of Computer Science and Software Engineering and the Department of Geomatics of the University of Melbourne helped with prefinancing the deposits. All this support made COSIT 2007 possible and accessible, and we would like to express our thanks to all our sponsors.

In terms of organization, the Chairs were actively supported by the COSIT Steering Committee. Thanks also go to the COSIT Program Committee and the additional reviewers, who had to deal with the largest number of submissions of any COSIT so far. Tessa Fitzpatrick from Melbourne Conference Management took the burden of managing the conference registrations, and Shauna Houston from the Melbourne Business School in Mount Eliza was the local organizer. Stu-

dents from the University of Melbourne gave a helping hand. And last, but not least, thanks to Alexander Klippel from Penn State University, who organized the COSIT 2007 doctoral colloquium.

September 2007

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Progress on Yindjibarndi Ethnophysiography

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Abstract. This paper reviews progress on the Ethnophysiography study of the Yindjibarndi language from the Pilbara region of Western Australia. Concentrating on terms for water-related features, it concludes that there are significant differences to the way such features are conceptualized and spoken of in English. Brief comments regarding a similar project with the Diné (Navajo) people of Southwestern USA are provided, together with conclusions regarding Ethnophysiography.

1 Introduction

Granö [8] divided the human perceptual environment into two zones: the proximity and the landscape. People interact directly with objects in the proximity, while the landscape remains at a distance, perceived mainly through vision. Spatial cognition research at landscape scales has principally examined imagery, navigation and wayfinding, whereas research on conceptualization and categorization has mainly dealt with objects in the proximity. To begin filling this gap, Mark and Turk [12,13] coined the term "Ethnophysiography" to cover a new research field that examines the similarities and differences in conceptualizations of landscape held by different language and/or cultural groups. Ethnophysiography also examines emotional and spiritual bonds to place and landscape, and the role of landscape features in traditional knowledge systems.

In this paper, we present a case study of such issues among the Yindjibarndi people of northwestern Australia. After a brief review of Ethnophysiography, we present results on how water-related features are conceptualized and expressed in the Yindjibarndi language. We then review some findings regarding traditional spiritual connections to landscape, before providing a summary and pointers to future research.

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1.1 What Is Ethnophysiography?

The core of Ethnophysiography is the investigation (for any particular language) of categories of landscape features, especially those denoted by common words (usually nouns or noun-phrases). Those terms and their definitions form a research topic of considerable importance in their own right. But an understanding of the landscape vocabulary also provides foundations for understanding other important dimensions of Ethnophysiography, including the study of knowledge systems, beliefs and customs of a people concerning landforms and landscapes. Thus, Ethnophysiography is related to the study of 'place' and 'place attachment', termed *Topophilia* by Tuan [26], and examines how these significances are tied into the traditional beliefs, often embedded in creation stories, which help to make sense of the world, of its physiographic entities and their relationship to everyday activities, including traditional cultural practices. As broadly constituted, Ethnophysiography also includes study of the nature of place names (toponyms) and their relationship to generic landscape terms.

Mark and Turk [12,13,14] initiated the Ethnophysiography topic in the ongoing case study with the Australian Indigenous language Yindjibarndi. To some extent it was a natural extension of earlier work on geographical ontology and especially on geographic categories in some European languages [21]. Since 2004, the authors have expanded their Ethnophysiography research to include a case study of landscape terminology and conceptualization employed by the Diné (Navajo) people of South Western USA. This paper, however, reports mainly on results of the Yindjibarndi project.

The authors have also been collaborating with researchers at the Max Planck Institute for Psycholinguistics (MPI) in Nijmegen. Researchers in the MPI's Language and Cognition Group have recently concluded a set of case studies of landscape terms (and some place names) in ten languages in a wide variety of geographic locations (although all in tropical regions) [6]. This work has extended very significantly the range of Ethnophysiography case studies and strengthened its linguistic basis. In the introduction to this collection of studies Burenhult and Levinson ([6], p. 1) discuss the theoretical basis of the work and its relationship to Ethnophysiography. They review the results of the case studies and state that *"The data point to considerable variation within and across languages in how systems of landscape terms and place names are ontologised. This has important implications for practical applications from international law to modern navigation systems."*

Ethnophysiography addresses several fundamental research issues in cognitive linguistics and category formation. Ethnophysiography also has important implications for the design of Indigenous mapping systems and GIS. Also, the results of ethnophysiographic studies can be of value to communities where cultural and language preservation is important, by providing contributions to Indigenous information systems and pictorial dictionaries of landscape features.

1.2 Landscape Terms and Categories

> *Of all the countless possible ways of dividing entities of the world into categories, why do members of a culture use some groupings and not use others? What is it about the nature of the human mind and the way that it*

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