

Stephen C. Hirtle Andrew U. Frank (Eds.)

# Spatial Information Theory

## A Theoretical Basis for GIS

International Conference COSIT '97  
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Proceedings



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## Foreword

COSIT, the Conference on Spatial Information Theory, has moved across the Atlantic from Europe to North America for the first time. While the location has changed, the focus has not. COSIT remains the prime conference for scientists interested in the understanding and representation of spatial information. The COSIT conference series provides an interdisciplinary platform for the analysis of large-scale (geographic) space and, thus, provides a strong theoretical basis for the development and use of next generation Geographic Information Systems.

COSIT'97 was the third biennial conference in the series that began in 1993 with the first COSIT conference on the Island of Elba in Italy [Frank & Campari, 1993] and continued in Semmering, Austria in 1995 [Frank & Kuhn, 1995]. With its forerunner [Frank et al, 1992] and a series of related workshops and conferences [e.g., Olivier & Gapp, in press; Egenhofer & Golledge, 1997], the COSIT series has established a tradition of presenting innovative research in applying research methods and results of cognitive science and artificial intelligence to spatial reasoning and geographic information system technology. The impact of these conferences is documented by the growing number of references in the literature to these conference proceedings. Research published in the COSIT volumes has also influenced the commercial development of Geographic Information Systems.

One of the hallmarks of the COSIT conferences has been the diversity of the academic fields cooperating and communicating. COSIT'97 maintained this multidisciplinary flavor. Judging by the affiliation of the authors, computer scientists gave 8 presentations, geographers gave 7 presentations, and researchers from spatial information science presented 7 papers. While these were the disciplines with the largest contingents, there were also multiple presentations from the fields of geomatics, psychology, and cognitive science. The remaining 4 presentations came from the fields of cartography, surveying, philosophy, and multimedia.

Research in spatial information theory reported at COSIT'97 follows several approaches. A possible classification divides the papers into formal models of space (10 papers), cognitive aspects (6 papers), and spatial structures and processes (10 papers), and general applications and theories (6 papers). It is particularly interesting to note that this topical classification crosscuts a subdivision by affiliation. For example, a paper on cognitive aspects is as likely to be discussed from the perspective of computer science as from that of psychology. Likewise, the development of a new theory is as likely to be presented from the perspective of an applied researcher as from the perspective of a theoretical scientist. The conclusion that one draws from this observation is that the problems in spatial information theory not only suggest, but require, the tools of many disciplines working together. COSIT has provided, and continues to provide, a forum for this truly multidisciplinary exchange of research.

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This year, 66 papers were submitted to COSIT'97. Despite the change in venue to the western hemisphere, the distribution of papers was very similar to previous years with fifty-two percent of the submissions from Europe and only forty-two percent from North America. The papers were reviewed carefully by three experts in the field from the COSIT scientific committee, including at least two from the same or a closely related discipline as the authors. The reviewers provided detailed comments with regard to both the extent to which the paper advanced the field of spatial information theory and the thoroughness of the presentation. The program committee chairs, on the basis of the reviews, selected 32 papers for full presentation. The quality of the submissions made this final process extremely difficult and we strove to achieve a program, which stimulated discussion and advanced new ideas in the field. Authors of several of the stronger papers that could not be fitted into the regular session were invited to present their work in an interactive poster session. A two-page extended abstract describes each of these contributions in the proceedings.

Werner Kuhn and Swantje Willms organized a Doctoral Consortium immediately following the COSIT'97 conference. This provided the opportunity for young scientists to present their research ideas to their peers and to obtain feedback from senior researchers in the field. By providing an interdisciplinary context, the Consortium gave students a better understanding of the breadth and diversity of contemporary research in spatial information science. Proceedings of the previous doctoral consortium are available as a technical report from the Department of Geoinformation at the Technical University of Vienna [Kuhn & Timpf, 1995].

The conference organization was handled in a gracious and competent way by the members of the Spatial Information Research Group (SIRG) from the School of Information Sciences at the University of Pittsburgh. Molly Sorrows spent long hours arranging and assisting with the small details of conference planning. Susan Strauss was the registrant for the conference with secretarial assistance from Mary Kerr. Guoray Cai, Misook Heo, and Linda Roberts all assisted where needed in making sure that the conference ran smoothly. Adrijana Car worked diligently both in Pittsburgh and in Vienna to ensure the quality of the review process and to oversee the preparation of the final proceedings. Her attention to detail was appreciated greatly by the editors. Roswitha Markwart helped in the final stage of the production of the proceedings.

Finally, a conference of this quality is only made possible by the dedication of the authors who submitted papers and the reviewers, who helped select the strongest contributions and shape the final presentations. We gratefully acknowledge their contributions to the success of COSIT'97.

Pittsburgh and Vienna, July 1997

Stephen C. Hirtle  
Andrew U. Frank

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# Lecture Notes in Computer Science

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