CALL FOR PAPERS

AI EDAM Special Issue, November 2011, Vol. 25, No. 4
REPRESENTING AND REASONING ABOUT THREE-DIMENSIONAL SPACE

Guest Editors: Sean Hanna & Bill Regli

This Special Issue will survey the range of approaches to representing and reasoning about three-dimensional (3-D) space. We seek practice-based contributions in spatial design domains such as architecture, urban planning, and mechanical design; theoretical contributions, for example, from cognitive modeling; and technical approaches to the representation of space from computer-aided design (CAD)/manufacturing, computer-aided architectural design, and computer-aided engineering. Our intent is to provide common ground across this variety of disciplines and focus the discussion on specific factors that support a wide variety of design and engineering problem domains, so that representations and approaches can be usefully compared.

The way 3-D space is represented and understood is fundamental to all design. In architecture and urban design, space is the product of design. In the engineering of smaller artifacts, it is the context in which their parts relate to one another. In manufacturing, it is the environment in which control systems must operate physical processes.

Papers may address alternative representations of space. The typical Cartesian representation of geometry as symbolic primitives in relation to a single origin is powerful and ubiquitous, but relationships between geometry (of adjacency interior/exterior, convex space) that are clear to designers require significant additional computation. Parametric and topological alternatives, graph-based representations, and distance metrics each play a role across a variety of disciplines from cognitive and perceptual modeling to virtual reality and CAD. Spatial reasoning techniques from artificial intelligence and robotics are also of interest. The choice of representation affects the process of design and should be understood prior to the creation and utilization of intelligent computational applications.

Reasoning about 3-D space may also be the focus of submitted papers. The analysis of space from either a methodological point of view or as used in design is of interest. In this context, "space" also includes work on 3-D representations and reasoning techniques for shape, form, and function. Work that deals with space while avoiding representation in the traditional sense, as in embodied robotics, is welcomed, as is work in which space itself plays a role in reasoning or serves as a means of communication, such as in agent-based models.

Topics may include, but are not limited to, the following:

- AI and cognitive models of 3-D space;
- approaches to perception and action in 3-D space;
- computational methods for spatial analysis;
- computational methods for spatial design (architecture, urban, etc.);
- the role of spatial reasoning in design;
- spatial reasoning in robotics and manufacturing/fabrication control systems;
- alternative representations in CAD and design tools;
- spatial representation as a common language across design disciplines;
- exchange of 3-D spatial data across systems, domains, and time;
- development and use of standards; and
- case studies.

All submissions will be anonymously reviewed by at least three reviewers, and the selection for publication will be made on the basis of these reviews. High quality papers not selected for this Special Issue may be considered for standard publication in *AI EDAM*.

Information about the format and style required for *AI EDAM* papers can be found at www.cs.wpi.edu/~aiedam/Instructions/ However, note that all submissions for Special Issues go to the Guest Editors, **not** to the Editor in Chief.

Important Dates

Intent to submit:	As soon as possible
Submission deadline for full papers:	15 September 2010

Reviews due: 15 December 2010
Notification and reviews to authors: 15 January 2011
Revised version submission deadline: 1 May 2011

Guest Editors

Please direct all inquiries and submissions to the Guest Editors.

Sean Hanna   Bill Regli
UCL Bartlett School of Graduate Studies   Department of Computer Science
University College London   Drexel University
Gower Street   3201 Arch Street
London WC1E 6BT, UK   Philadelphia, PA 19104, USA
E-mail: s.hanna@ucl.ac.uk   E-mail: regli@drexel.edu