Background for the Special Issue

In the spatial conception, architectural design, engineering and construction of buildings, space, its built form, and function play an intrinsically important role. Computer systems aiming at assisting designers, architects, and engineers in the design process must therefore be able to support the notions of space, place, structure, form, and function on a semantic level, which is close to the way humans perceive, reason, and experience it.

There are a number of recently evolved computational methods that have the potential for a substantial improvement in spatial design assistance, further closing the gap between humans and computers, and leading closer to a fundamental shift in computer-aided spatial design.

Broadly, this special issue of Automation in Construction will address interdisciplinary collaborative methods for the development of people-centered spatial design assistance systems. We invite original papers presenting novel approaches, methodologies and findings in the field of computing for spatial design assistance. Some of the basic themes and core research areas for the Special Issue are listed below.

Scope of the Special Issue

The themes addressed by this Special Issue are:

- Spatial and Architectural Design
- Design Computing
- Spatial Computing for Design
- Artificial Intelligence for Design
- Design Semantics
- Assistive Technologies for Design
- Spatial Design Assistance Systems and Tools
- Computer Human Interaction, Interaction Design and Simulation
- Creative, Functional, and People-Centered Design Assistance

The Core Research Areas within the Special Issues’ Scope are about Computation and Computational Theory and include:

- Spatial Computing for Design
  - Visual and Spatial Representation and Reasoning
  - Representing and reasoning about 3D space
- Qualitative modelling and reasoning
- Geometric and spatial reasoning, geometric processing
- Qualitative spatial and temporal reasoning
- Commonsense reasoning in design

- Design Semantics
  - Design Aesthetics
  - Applied Ontology in Design and Engineering
  - Ontological Reasoning
  - Spatial Semantics
  - Semantic Modelling
  - Modular Representations
  - Design Interoperability, Semantic Web
  - Standardisation in Architecture

- Diagnosis and hypothetical reasoning
- Pedestrian dynamics, wayfinding, orientation and cognitive mapping
- Soft computing, machine learning for design
- Graph representations and algorithms
- Geometric Modelling and Processing
- Spatial Query Processing

Special Issue topics are about Frameworks, Engineering, Industry and Practice and include:
- Industry Foundation Classes (IFC)
- Industry standards and frameworks
- Built Infrastructure Modelling
- Design and functional simulation
- Advanced building simulation
- Behaviour modelling (agents, and artefacts)
- Parametric and generative design
- 3D/4D Building Information Models

The Special Issue will focus on the following Application Areas:
- Architectural Design
- Conceptual Design
- Structural Design
- Code Compliance Checking
- Collaborative Design
- Decision Support
- Design Space Exploration
- Wayfinding analysis
- Construction Planning and Monitoring

Dates and Submission Procedure

For further details about the journal and dates and submission procedures visit the designated website here.

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