

Design Computing and Cognition '10

John S. Gero

Editor

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Springer

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John S. Gero

Krasnow Institute for Advanced Study

University Avenue 4400

22030 Fairfax Virginia

USA

E-mail: john@johngero.com

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Preface

Design research has two strands exemplified by the terms science of design and design as science. Both are commonly referred to as design science. The former studies designing scientifically and the latter treats designing as a science. The ways that designing can be studied scientifically include both computational modeling and cognitive modeling. Many computational models of designing are not founded directly on results of cognitive studies. They are founded on conjectures about designing using concepts from artificial intelligence with its focus on ways of representation and on processes that support simulation and generation. Artificial intelligence continues to provide an environmentally rich paradigm within which design research based on computational constructions can be carried out. Increasingly design cognition research, founded on concepts from cognitive science. It provides tools and methods to study human designers in both laboratory and practice settings. It is beginning to allow us to test the claims being made about designing whether carried out individually or in teams and to study the effects of the introduction of novel technologies into the acts of designing.

Just as design cognition is starting to provide evidence-based support for computational studies, so cognitive neuroscience is starting to provide support for cognitive acts in designing.

Design thinking, the label given to the unique acts of designing, has become as paradigmatic view that has transcended the discipline of design and is now widely used in business and elsewhere. As a consequence there is an increasing interest in design research and government agencies are gradually increasing funding of design research, and increasing numbers of engineering schools are revising their curricula to emphasize design. This is because of the realization that design is part of the wealth creation of a nation and needs to be better understood and taught. The continuing globalization of industry and trade has required nations to re-examine where their core contributions lie if not in production efficiency. Design is a precursor to manufacturing for physical objects and is the precursor to implementation for virtual objects. At the same time, the need for sustainable

development is requiring design of new products and processes, and feeding a movement towards design innovations and inventions.

This conference series aims at providing a bridge between the fields of design computing and design cognition. The confluence of these two fields continues to provide the foundation for further advances in each of them.

The papers in this volume are from the *Fourth International Conference on Design Computing and Cognition (DCC'10)* held at the University of Stuttgart, Germany. They represent the state-of-the-art of research and development in design computing and design cognition. They are of particular interest to researchers, developers and users of advanced computation in design and those who need to gain a better understanding of designing.

In these proceedings the papers are grouped under the following nine headings, describing both advances in theory and application and demonstrating the depth and breadth of design computing and design cognition:

- Design Cognition
- Framework Models in Design
- Design Creativity
- Lines, Planes, Shape and Space in Design
- Decision-Making Processes in Design
- Knowledge and Learning in Design
- Using Design Cognition
- Collaborative/Collective Design
- Design Generation

There were 125 full paper submissions to the conference of which 38 were accepted. Each paper was extensively reviewed by three reviewers drawn from the international panel of 115 active reviewers listed on the next pages. The reviewers' recommendations were then assessed before the final decision on each paper was taken. Thanks go to them, for the quality of these papers depends on their efforts.

Mercedes Paulini worked to turn the variegated submissions into the conference format to produce a unified volume, special thanks go to her.

July 2010

John S. Gero
Krasnow Institute for Advanced Study

Contents

Preface	v
List of Reviewers	xiii
 Part I: Design Cognition	
A Comparison of Cognitive Heuristics Use between Engineers and Industrial Designers	3
<i>Seda Yilmaz, Shanna R. Daly, Colleen M. Seifert, Richard Gonzalez</i>	
Studying the Unthinkable Designer: Designing in the Absence of Sight	23
<i>Ann Heylighen</i>	
Design Heuristics: Cognitive Strategies for Creativity in Idea Generation	35
<i>Seda Yilmaz, Colleen M. Seifert, Richard Gonzalez</i>	
An Anthro-po-Based Standpoint on Mediating Objects: Evolution and Extension of Industrial Design Practices	55
<i>Catherine Elsen, Françoise Darses, Pierre Leclercq</i>	
 Part II: Framework Models in Design	
Beyond the Design Perspective of Gero’s FBS Framework	77
<i>Gaetano Cascini, Luca Del Frate, Gualtiero Fantoni, Francesca Montagna</i>	
A Formal Model of Computer-Aided Visual Design	97
<i>Ewa Grabska, Grażyna Ślusarczyk</i>	

Design Agents and the Need for High-Dimensional Perception . . .	115
<i>Sean Hanna</i>	

A Framework for Constructive Design Rationale	135
<i>Udo Kannengiesser, John S. Gero</i>	

Part III: Design Creativity

The Curse of Creativity	157
<i>David C. Brown</i>	

Enabling Creativity through Innovation Challenges: The Case of Interactive Lightning	171
<i>Stefania Bandini, Andrea Bonomi, Giuseppe Vizzari, Vito Acconci</i>	

Facetwise Study of Modelling Activities in the Algorithm for Inventive Problem Solving ARIZ and Evolutionary Algorithms . . .	189
<i>Céline Conrardy, Roland de Guio, Bruno Zuber</i>	

Exploring Multiple Solutions and Multiple Analogies to Support Innovative Design	209
<i>Apeksha Gadwal, Julie Linsey</i>	

Creative and Inventive Design Support System: Systematic Approach and Evaluation Using Quality Engineering	229
<i>Hiroshi Hasegawa, Yuki Sonoda, Mika Tsukamoto, Yusuke Sato</i>	

Part IV: Line, Plane, Shape, Space in Design

Line and Plane to Solid: Analyzing Their Use in Design Practice through Shape Rules	251
<i>Gareth Paterson, Chris Earl</i>	

Interactions between Brand Identity and Shape Rules	269
<i>Rosidah Jaafar, Alison McKay, Alan de Pennington, Hau Hing Chau</i>	

Approximate Enclosed Space Using Virtual Agent	285
<i>Aswin Indraprastha, Michihiko Shinozaki</i>	

Associative Spatial Networks in Architectural Design: Artificial Cognition of Space Using Neural Networks with Spectral Graph Theory	305
<i>John Harding, Christian Derix</i>	

Part V: Decision-Making Processes in Design

Comparing Stochastic Design Decision Belief Models: Pointwise versus Interval Probabilities 327
Peter C. Matthews

A Redefinition of the Paradox of Choice 347
Michal Piasecki, Sean Hanna

Rethinking Automated Layout Design: Developing a Creative Evolutionary Design Method for the Layout Problems in Architecture and Urban Design 367
Sven Schneider, Jan-Ruben Fischer, Reinhard König

Applying Clustering Techniques to Retrieve Housing Units from a Repository 387
Álvaro Sicilia, Leandro Madrazo, Mar González

Part VI: Knowledge and Learning in Design

Different Function Breakdowns for One Existing Product: Experimental Results 405
Thomas Alink, Claudia Eckert, Anne Ruckpaul, Albert Albers

A General Knowledge-Based Framework for Conceptual Design of Multi-disciplinary Systems 425
Yong Chen, Ze-Lin Liu, You-Bai Xie

Learning Concepts and Language for a Baby Designer 445
Madan Mohan Dabbeeru, Amitabha Mukerjee

Organizing a Design Space of Disparate Component Topologies 465
Mukund Kumar, Matthew I. Campbell

Part VII: Using Design Cognition

Imaging the Designing Brain: A Neurocognitive Exploration of Design Thinking 489
Katerina Alexiou, Theodore Zamenopoulos, Sam Gilbert

A Computational Design System with Cognitive Features Based on Multi-objective Evolutionary Search with Fuzzy Information Processing	505
<i>Michael S. Bittermann</i>	
Narrative Bridging	525
<i>Katarina Borg Gyllenbäck, Magnus Boman</i>	
Generic Non-technical Procedures in Design Problem Solving: Is There Any Benefit to the Clarification of Task Requirements?	545
<i>Constance Winkelman, Winfried Hacker</i>	
Virtual Impression Networks for Capturing Deep Impressions ...	559
<i>Toshiharu Taura, Eiko Yamamoto, Mohd Yusof Nor Fasiha, Yukari Nagai</i>	
 Part VIII: Collaborative/Collective Design	
Scaling Up: From Individual Design to Collaborative Design to Collective Design	581
<i>Mary Lou Maher, Mercedes Paulini, Paul Murty</i>	
Building Better Design Teams: Enhancing Group Affinity to Aid Collaborative Design	601
<i>Michael A. Oren, Stephen B. Gilbert</i>	
Measuring Cognitive Design Activity Changes during an Industry Team Brainstorming Session	621
<i>Jeff W.T. Kan, John S. Gero, Hsien-Hui Tang</i>	
 Part IX: Design Generation	
Interactive, Visual 3D Spatial Grammars	643
<i>Frank Hoisl, Kristina Shea</i>	
A Graph Grammar Based Scheme for Generating and Evaluating Planar Mechanisms	663
<i>Pradeep Radhakrishnan, Matthew I. Campbell</i>	
A Case Study of Script-Based Techniques in Urban Planning	681
<i>Anastasia Koltsova, Gerhard Schmitt, Patrik Schumacher, Tomoyuki Sudo, Shipra Narang, Lin Chen</i>	

**Complex Product form Generation in Industrial Design:
A Bookshelf Based on Voronoi Diagrams** 701
*Axel Nordin, Damien Motte, Andreas Hopf, Robert Bjärnemo,
Claus Christian Eckhardt*

**A Computational Concept Generation Technique for
Biologically-Inspired, Engineering Design** 721
Jacquelyn K.S. Nagel, Robert B. Stone

First Author Email Address 741

Author Index 743

List of Reviewers

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