Lecture Notes in Computer Science 9929

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison
Lancaster University, Lancaster, UK
Takeo Kanade
Carnegie Mellon University, Pittsburgh, PA, USA
Josef Kittler
University of Surrey, Guildford, UK
Jon M. Kleinberg
Cornell University, Ithaca, NY, USA
Friedemann Mattern
ETH Zurich, Zurich, Switzerland
John C. Mitchell
Stanford University, Stanford, CA, USA
Moni Naor
Weizmann Institute of Science, Rehovot, Israel
C. Pandu Rangan
Indian Institute of Technology, Madras, India
Bernhard Steffen
TU Dortmund University, Dortmund, Germany
Demetri Terzopoulos
University of California, Los Angeles, CA, USA
Doug Tygar
University of California, Berkeley, CA, USA
Gerhard Weikum
Max Planck Institute for Informatics, Saarbrücken, Germany

More information about this series at http://www.springer.com/series/7409

Yuhua Luo (Ed.)

Cooperative Design, Visualization, and Engineering

13th International Conference, CDVE 2016
Sydney, NSW, Australia, October 24–27, 2016
Proceedings

Springer

Editor
Yuhua Luo
University of the Balearic Islands
Palma, Mallorca
Spain

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-46770-2 ISBN 978-3-319-46771-9 (eBook)
DOI 10.1007/978-3-319-46771-9

Library of Congress Control Number: 2016952870

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

© Springer International Publishing AG 2016
This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

CDVE2016 celebrated in a new continent – Australia, for the first time in the beautiful coast city Sydney. CDVE conferences have become more international and more global after being held in Asia and North America.

Our conferences are very international by having researchers from over 20 countries. This year, we had submissions from some new countries. We welcome the researchers from these countries to join our community.

Among papers this year, we saw a large amount of submissions from the field of cooperative visualization. As we can see, the cooperative visualization research has been very active in recent years. It has been applied to a very broad area of applications. We also find that the cooperative visualization is combined with other techniques such as virtual reality, augmented reality, which provides much more possibilities for better visualization. Applications include for work training, cooperative design using virtual reality, and augmented reality, but via small mobile devices and large-scale display walls. It also finds applications to increase the user experience, visual comprehension such as in disaster preparation, museum, and virtual tourism.

Originated from visualization and using it as a tool, visual analytics has achieved some higher-level analysis of big data and reached some interesting analytic results that have never been achieved before. There are papers analyzing student check-in data and other data such as consumption data to find out student behavior and its relationship with academic performances. There are papers for ranking authors by analyzing their co-authorship from social media and publications. To help to control the network security, visual analytics also finds its own way by visualizing and analyzing the network flow logs to show the communication patterns and network abnormalities. The communication network itself can also be visualized to show its structure.

In the field of cooperative engineering, a couple of papers discuss the new challenges in the networked and cloud manufacturing environment. The key issues discussed in the papers involve: how to model the manufacturing process cooperatively, how to cooperate but keep the enterprise's own information undisclosed, how to tell a network potential partner is trustful, how to choose proper resources from a service cloud etc. The papers present their own solutions and recommendations by analyzing the problems and designing prototypes to evaluate them.

Within the cooperative engineering and a special area of engineering, the construction industry, using BIM (Building Information Modeling), was a central topic for two papers. BIM has been a tool for sharing data through centralized or distributed platforms. Collaboration is not at the center of BIM. There are papers discussing how to make the BIM to be a collaborative platform so as to facilitate the collaboration among stake-holders.

In the field of cooperative design, crowd sourcing has been a concern of a few studies. There are papers comparing the Web-based crowd behavior with the experts.

The basic findings of these papers can be a base for broader use of crowd sourcing and group intelligence in the field of cooperative design.

In the field of cooperative applications, there are many applications such as cooperative learning using mobile devices, using cloud to share resources, using IOT for medical care, traffic congestion monitoring, network security ensuring, etc. Among the techniques used, ontology seems to be a strong tool in many application areas from cooperative manufacturing to patient caring.

The papers published in this volume reflect the progress in our field, which is a result of hard work and ongoing effort for better technological solutions. I would like to express my sincere thanks to all of the authors for submitting their paper to the CDVE 2016 conference and presenting their hard-earned research results.

I would like to thank all of our volunteer reviewers, Program Committee members, Organization Committee members for their continuous support to the conference. My special thanks go to my colleague, the Organization Committee Chair Dr. Tony Huang, and the two co-chairs. I would also like to thank the University of Tasmania for its support of this conference. The success of this year's conference would not have been possible without their generous support.

September 2016 Yuhua Luo

Organization

Conference Chair

Yuhua Luo University of the Balearic Islands, Spain

International Program Committee

Program Chair

Dieter Roller University of Stuttgart, Germany

Members

Jose Alfredo Costa
Peter Demian
Carrie Sturts Dossick
Susan Finger
Sebastia Galmes
Halin Gilles
Matti Hannus
Shuangxi Huang
Tony Huang
Claudia-Lavinia Ignat
Ursula Kirschner
Harald Klein
Jean-Christophe Lapayre
Francis Lau
Pierre Leclercq
Jang Ho Lee
Moira C. Norrie
Jaime Lloret
Jos P. van Leeuwen
Kwan-Liu Ma
Mary Lou Maher
Manuel Ortega
Niko Salonen
Fernando Sanchez
Weiming Shen
Ram Sriram
Chengzheng Sun
Thomas Tamisier
Xiangyu Wang
Nobuyoshi Yabuki

Reviewers

Md Morshed Alam
Jose Alfredo Costa
Peter Demian
Selim Erol
Hongfei Fan
Susan Finger
Sebastia Galmes
Halin Gilles
Nam Hyuk Ham
Patrik Hitzelberger
Tony Huang
Harald Klein
Xiaodi Huang
Jean-Christophe Lapayre
Pierre Leclercq
Jang Ho Lee
Jos P. Leeuwen
Tingting Liu
Jaime Lloret
Sungkon Moon
Manuel Ortega
Roberto Pérez
Romain Pinquié
Guofeng Qin
Dieter Roler
Niko Salonen
Fernando Sanchez
Alexandru Senciuc
Weiming Shen
Thomas Tamisier
Xiangyu Wang
Nobuyoshi Yabuki
Li-Nan Zhu

Organization Committee

Chair

Tony Huang	University of Tasmania, Australia

Co-chairs

Quang Vinh Nguyen	Western Sydney University, Australia
Mao Lin Huang	University of Technology Sydney, Australia

Members

Xiaodi Huang
Tomeu Estrany
Alex Garcia
Takayuki Fujimoto
Guofeng Qin

Contents

Facilitating Design Automation in Multi-organization Concurrent Engineering: Insights from Graph-Rewriting Theory 1
Julian R. Eichhoff, Felix Baumann, and Dieter Roller

The Design and Development of Manufacturing Process Knowledge Base System Based on Ontology. 9
Haojie Song, Huifen Wang, Tingyu Liu, Qiqi Zhang, and Binbin Gao

Collaborative Modeling of Manufacturing Processes – a Wiki – Based Approach 17
Selim Erol

Performance-Matching-Based Resource Selection for Cloud Manufacturing. . . . 25
Li-Nan Zhu, Yan-Wei Zhao, and Guo-Jiang Shen

A Framework for Improving Collaboration Patterns in BIM Projects 34
Eva-Charlotte Forgues, Vincent Carignan, Daniel Forgues, and Samia Ben Rajeb

BIM-Enabled Collaborative Scaffolding Scoping and Design 43
Jun Wang, Hung-Lin Chi, Chongyi Liu, and Xiangyu Wang

Modeling Temporal Behavior to Identify Potential Experts in Question Answering Communities 51
Min Fu, Min Zhu, Yabo Su, Qiuhui Zhu, and Mingzhao Li

Representation in Collective Design: Are There Differences Between Expert Designers and the Crowd? 59
Darin Phare, Ning Gu, and Michael Ostwald

City Probe: The Crowdsourcing Platform Driven by Citizen-Based Sensing for Spatial Identification and Assessment 69
Yang Ting Shen, Yi Shiang Shiu, and Peiwen Lu

Collaborative Cloud Printing Service 77
Felix Baumann, Julian Eichhoff, and Dieter Roller

Supplier Selection Based on Recommendations. 86
Sylvia Encheva

Kernel Semi-supervised Extreme Learning Machine Applied in Urban Traffic Congestion Evaluation 90
Qing Shen, Xiaojuan Ban, Chong Guo, and Cong Wang

Tablet-Based Synchronous Learning System with Floor-Controlled Multimedia Interaction for Students 98
Jang Ho Lee

CIAM Mobile: Methodology Supporting Mobile Application Design and Evaluation Applied on GreedEx Tab 102
Yoel Arroyo, Christian X. Navarro, Ana I. Molina, and Miguel A. Redondo

TerrainVis: Collaborative, Interactive, Visualisation Tool for Engaging Residents in Disaster Preparedness 110
Dylan Mathiesen, Trina Myers, Ian Atkinson, and Jeremy VanDerWal

Enhancing Design Project Review Board Effectiveness Through a Visual Collaborative Approach 118
Vasilije Kokotovich and Catherine P. Killen

DataChopin - Designing Interactions for Visualisation Composition in a Co-Located, Cooperative Environment 126
Daniel Filonik, Markus Rittenbruch, and Marcus Foth

What Next in Designing Personalized Visualization of Web Information 134
Shibli Saleheen, Wei Lai, Xiaodi Huang, Weidong Huang, and Mao Lin Huang

Isotone Galois Connections and Employees Resource Management 142
Sylvia Encheva

Network Visual Analysis Based on Community Detection 149
Yao Zhonghua and Wu Lingda

Evaluating Overall Quality of Dynamic Network Visualizations 157
Weidong Huang, Min Zhu, Mao Lin Huang, and Henry Been-Lirn Duh

An Ingredient Selection System for Patients Using SWRL Rules Optimization and Food Ontology 163
Chakkrit Snae Namahoot, Sakesan Sivilai, and Michael Brückner

A Web Based Cooperation Tool for Evaluating Standardized Curricula Using Ontology Mapping 172
Chayan Nuntawong, Chakkrit Snae Namahoot, and Michael Brückner

Co-creation of a Digital Game to Support Language Revitalisation 181
Dianna Hardy, Elizabeth Forest, Zoe McIntosh, Janine Gertz, and Trina Myers

Design and Evaluation of an Integrated Collaboration Platform for Secure Information Sharing 185
Jane Li, John Zic, Nerolie Oakes, Dongxi Liu, and Chen Wang

Securing Shared Systems 194
Mandy Li, Willy Susilo, and Joseph Tonien

NetflowVis: A Temporal Visualization System for Netflow Logs Analysis . . . 202
Likun He, Binbin Tang, Min Zhu, Binbin Lu, and Weidong Huang

Rigid Body Sampling and Boundary Handling for Rigid-Fluid Coupling of Particle Based Fluids 210
Xiaokun Wang, XiaoJuan Ban, YaLan Zhang, and Xu Liu

A Density-Correction Method for Particle-Based Non-Newtonian Fluid 219
Yalan Zhang, Xiaojuan Ban, Xiaokun Wang, and Xing Liu

Areas of Life Visualisation: Growing Data-Reliance 227
Jesse Tran, Quang Vinh Nguyen, Simeon Simoff, and Mao Lin Huang

Discovering the Social Network and Trust Relationship in a Networked Manufacturing Environment 235
Tingting Liu and Huifen Wang

Evaluating the Economic Effect of the Delayed Differentiation in the Customized Product's Supply Chain Network 245
Zhiliang Wang

Concurrency in BIM-Based Project Implementation: An Exploratory Study of Chongqing Jiangbei International Airport's Terminal 3A 257
Erezi Utiome, Sherif Mohamed, Kriengsak Panuwatwanich, Emerson Lin, and Lei Hou

Design of an Architecture for Medical Applications in IoT 263
Freddy Feria, Octavio J. Salcedo Parra, and Brayan S. Reyes Daza

Vehicle Route Tracking System by Cooperative License Plate Recognition on Multi-peer Monitor Videos 271
Guofeng Qin, Qiutao Li, and SichangLi

SIERA: Visual Analytics for Multi-dimensional Data for Learning Assessment in Educational Organisations 283
Manuel J. Ibarra, Cristhian Serrano, and Angel F. Navarro

Visualization of Ranking Authors Based on Social Networks Analysis and Bibliometrics 288
Xiujuan Xu, Ruisi Zhang, Zhenzhen Xu, Feng Ding, and Xiaowei Zhao

Visual Analytics for Interacting on Cultural Heritage 296
Thomas Tamisier, Roderick McCall, Gabriela Gheorghe, and Philippe Pinheiro

socialRadius: Visual Exploration of User Check-in Behavior Based on Social Media Data 300
Changjiang Wen, Zhiyao Teng, Jian Chen, Yifan Wu, Rui Gong, and Jiansu Pu

Prediction System for Decision-Making to Improve the Road Environment. . . . 309
Yu-Mi Song and Sung-Ah Kim

eduCircle: Visualizing Spatial Temporal Features of Student Performance from Campus Activity and Consumption Data 313
Yifan Wu, Rui Gong, Yi Cao, Changjiang Wen, Zhiyao Teng, and Jiansu Pu

Multilevel Psychological Analysis for Cooperative Work Teams 322
Aurelio Olmedilla, Alexandre Garcia-Mas, Yuhua Luo, Cristina Llaneras, Roberto Ruiz-Barquín, and Pilar Fuster-Parra

An Application of Measuring Aesthetics in Visualization 332
Badr Al-Harbi, Ali Alturki, and Adel Ahmed

Generation of 3D Architectural Objects with the Use of an Aesthetic Oriented Multi-agent System 340
Agnieszka Mars and Ewa Grabska

Synchronized Shared Scene Viewing in Mixed VR Devices in Support of Group Collaboration 348
Steve Cutchin and Iker Vazquez

Larchiveum as an Augmented Historical Place: Blended Space Approach . . . 353
Sun-Young Jang and Sung-Ah Kim

Understanding the Impact of Mobile Augmented Reality on Co-design Cognition and Co-modelling. 362
Leman Figen Gül, Müge Halıcı, Can Uzun, and Mustafa Esengün

Cooperative and Immersive Coaching to Facilitate Skill Development in Construction Tasks 371
Lei Hou, Hung-Lin Chi, Erezi Utiome, and Xiangyu Wang

Visualizing Electricity Consumption in Qatar 378
Engy Soliman, Al-Hanouf Al-Mohannadi, and Noora Fetais

A Space Optimized Scatter Plot Matrix Visualization. 382
Wen Bo Wang, Mao Lin Huang, and Quang Vinh Nguyen

SumUp: Statistical Visual Query of Multivariate Data
with Parallel-Coordinate Geometry 386
Phi Giang Pham, Mao Lin Huang, and Quang Vinh Nguyen

Author Index 395