

Communications in Computer and Information Science

647

Commenced Publication in 2007

Founding and Former Series Editors:

Alfredo Cuzzocrea, Dominik Ślęzak, and Xiaokang Yang

Editorial Board

Simone Diniz Junqueira Barbosa

*Pontifical Catholic University of Rio de Janeiro (PUC-Rio),
Rio de Janeiro, Brazil*

Phoebe Chen

La Trobe University, Melbourne, Australia

Xiaoyong Du

Renmin University of China, Beijing, China

Joaquim Filipe

Polytechnic Institute of Setúbal, Setúbal, Portugal

Orhun Kara

TÜBİTAK BİLGEM and Middle East Technical University, Ankara, Turkey

Igor Kotenko

*St. Petersburg Institute for Informatics and Automation of the Russian
Academy of Sciences, St. Petersburg, Russia*

Ting Liu

Harbin Institute of Technology (HIT), Harbin, China

Krishna M. Sivalingam

Indian Institute of Technology Madras, Chennai, India

Takashi Washio

Osaka University, Osaka, Japan

More information about this series at <http://www.springer.com/series/7899>

Takashi Yoshino · Gwo-Dong Chen
Gustavo Zurita · Takaya Yuizono
Tomoo Inoue · Nelson Baloian (Eds.)

Collaboration Technologies and Social Computing

8th International Conference, CollabTech 2016
Kanazawa, Japan, September 14–16, 2016
Proceedings

Editors

Takashi Yoshino
Wakayama University
Wakayama
Japan

Gwo-Dong Chen
National Central University
Taoyuan City
Taiwan

Gustavo Zurita
Department of Management Control
and Information Systems
University of Chile
Santiago
Chile

Takaya Yuizono
Asahidai
JAIST
Nomi-shi
Japan

Tomoo Inoue
University of Tsukuba
Tsukuba
Japan

Nelson Baloian
University of Chile
Santiago
Chile

ISSN 1865-0929

ISSN 1865-0937 (electronic)

Communications in Computer and Information Science

ISBN 978-981-10-2617-1

ISBN 978-981-10-2618-8 (eBook)

DOI 10.1007/978-981-10-2618-8

Library of Congress Control Number: 2016950900

© Springer Science+Business Media Singapore 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 Science+Business Media Singapore Pte Ltd.

Preface

Message from the General Chairs

CollabTech 2016, the 8th International Conference on Collaboration Technologies, offered a unique forum for academics and practitioners to present and discuss innovative ideas, methods, or implementations related to collaboration technologies, which are greatly needed for various everyday collaboration activities owing to recent advances in networking, computing, and interaction technologies.

The previous CollabTech conferences were held in Tokyo in 2005, Tsukuba in 2006, Seoul in 2007, Wakayama in 2008, Sydney in 2009, Sapporo in 2012, and Santiago in 2014. Following the success of the joint organization with CRIWG in the last conference, CollabTech 2016 was co-located and organized with CRIWG 2016 again, but this time in Kanazawa, Japan. The CRIWG and CollabTech communities had similar research topics and goals, but had been geographically located in different regions. We believed this joint endeavor would provide an interesting opportunity to meet each other.

The success of the conference was largely due to the authors and presenters, as well as the Program Committee and the Conference Committee members, whose efforts made the conference possible. The success was also due to the SIG on Groupware and Network Services of the Information Processing Society of Japan, the SIG on Cyberspace of the Virtual Reality Society of Japan, and the SIG on Communication Enhancement of the Human Interface Society. The Japan Advanced Institute of Science and Technology (JAIST) and the Faculty of Library, Information and Media Science of the University of Tsukuba also gave us warm support. Ishikawa Prefecture, Kanazawa City, Support Center for Advanced Telecommunications Technology Research (SCAT), and Hitachi, Ltd. contributed financially to the success of the conference.

We are pleased that the conference was fruitful for all participants and played an important role in cultivating the community in this research field.

September 2016

Tomoo Inoue
Takaya Yuizono
Nelson Baloian

Message from the Program Chairs

After seven events of the International Conference on Collaboration Technologies series, we had the eighth edition (CollabTech 2016) in Kanazawa, Japan. The following topics on collaboration technologies were discussed:

- Cross-Cultural Collaboration
- Learning Support Systems
- Social Networking
- Rescue and Health Support
- Real and Virtual Collaboration

For this conference, we received 48 submissions (28 full papers, 20 work-in-progress papers) and assigned five reviewers per full paper or three reviewers per work-in-progress paper. As a result, we had 16 full papers and four work-in-progress papers. The acceptance rate was 42 %. Because of the high quality of the submissions, many excellent papers were not among those accepted. We hope that the detailed technical review comments we provided were helpful.

Without our distinguished Program Committee members, we could not have maintained our high standards. We truly appreciated their devotion. Finally, we hope that these proceedings serve as a reference for future researchers in this rapidly evolving field.

September 2016

Takashi Yoshino
Gwo-Dong Chen
Gustavo Zurita

Organization

Conference Co-chairs

| | |
|----------------|--|
| Nelson Baloian | Universidad de Chile, Chile |
| Tomoo Inoue | University of Tsukuba, Japan |
| Takaya Yuizono | Japan Advanced Institute of Science and Technology, Japan |

Program Co-chairs

| | |
|-----------------|-------------------------------------|
| Gwo-Dong Chen | National Central University, Taiwan |
| Takashi Yoshino | Wakayama University, Japan |
| Gustavo Zurita | Universidad de Chile, Chile |

Financial Co-chairs

| | |
|----------------|----------------|
| Shinkuro Honda | NTT, Japan |
| Kei Utsugi | Hitachi, Japan |

Local Arrangements Co-chairs

| | |
|-------------------|--|
| Hideaki Kanai | Japan Advanced Institute of Science and Technology, Japan |
| Kazushi Nishimoto | Japan Advanced Institute of Science and Technology, Japan |

Local Arrangements Members

| | |
|-------------------|--|
| Tessai Hayama | Kanazawa Institute of Technology, Japan |
| Atsuo Yoshitaka | Japan Advanced Institute of Science and Technology, Japan |
| Tomohito Yamamoto | Kanazawa Institute of Technology, Japan |

Publication Chair

| | |
|--------------|--------------------------|
| Junko Ichino | Kagawa University, Japan |
|--------------|--------------------------|

Publicity Co-chairs

| | |
|--------------|--------------------------------|
| Yugo Hayashi | Ritsumeikan University, Japan |
| Masaki Omata | University of Yamanashi, Japan |

Registration Chairs

| | |
|-------------------|---|
| Hidekazu Shiozawa | Tamagawa University, Japan |
| Hironori Egi | University of Electro-Communications, Japan |

IPSJ SIG GN Liaison

| | |
|------------------|----------------------------------|
| Satoshi Ichimura | Otsuma Women's University, Japan |
|------------------|----------------------------------|

VRSJ SIG CS Liaison

| | |
|--------------|------------|
| Kazuyuki Iso | NTT, Japan |
|--------------|------------|

HIS SIG CE Liaison

| | |
|-----------------|----------------------------|
| Takashi Yoshino | Wakayama University, Japan |
|-----------------|----------------------------|

Steering Committee

| | |
|------------------|------------------------------|
| Hideaki Kuzuoka | University of Tsukuba, Japan |
| Ken-ichi Okada | Keio University, Japan |
| Jun Munemori | Wakayama University, Japan |
| Minoru Kobayashi | Meiji University, Japan |
| Hiroaki Ogata | Kyushu University, Japan |

Program Committee

| | |
|----------------------|--|
| Pedro Antunes | Victoria University of Wellington, New Zealand |
| Luis Carriço | University of Lisbon, Portugal |
| Maiga Chang | Athabasca University, Canada |
| Hui Chun Chu | Soochow University, Taiwan |
| Gj De Vreede | University of South Florida, USA |
| Dominique Decouchant | UAM Cuajimalpa, Mexico DF, Mexico - LIG de Grenoble, France |
| Yannis Dimitriadis | University of Valladolid, Spain |
| Hironori Egi | The University of Electro-Communications, Japan |
| Benjamim Fonseca | UTAD/INESC TEC, Portugal |
| Kinya Fujita | Tokyo University of Agriculture and Technology, Japan |
| Adam Giemza | University of Duisburg-Essen, Germany |
| Atsuo Hazeyama | Tokyo Gakugei University, Japan |
| Adam Hou | NTHU, Taiwan |
| Gwo-Jen Hwang | National Taiwan University of Science and Technology, Taiwan |
| Satoshi Ichimura | Otsuma Women's University, Japan |
| Junko Ichino | Kagawa University, Japan |

| | |
|---------------------|---|
| Yutaka Ishii | Okayama Prefectural University, Japan |
| Kazuyuki Iso | NTT, Japan |
| Marc Jansen | University of Applied Sciences Ruhr West, Germany |
| Jongwon Kim | Gwangju Institute of Science and Technology, South Korea |
| Hyungseok Kim | Konkuk University, South Korea |
| Liang-Yi Li | National Central University, Taiwan |
| Chiu Pin Lin | National Hsinchu University of Education, Taiwan |
| Stephan Lukosch | Delft University of Technology, The Netherlands |
| Wolfram Luther | University of Duisburg-Essen, Germany |
| Sonia Mendoza | CINVESTAV-IPN, Mexico |
| Roc Meseguer | Universitat Politècnica de Catalunya, Spain |
| Kazuyoshi Murata | Aoyama Gakuin University, Japan |
| Hideyuki Nakanishi | Osaka University, Japan |
| Mamoun Nawahdah | Birzeit University, Palestine |
| Andres Neyem | Pontificia Universidad Católica de Chile, Chile |
| Cuong Nguyen | University of Nebraska at Omaha, USA |
| Masayuki Okamoto | Toshiba Corporation, Japan |
| Masaki Omata | University of Yamanashi, Japan |
| Nobuchika Sakata | Osaka University, Japan |
| Flavia Santoro | NP2Tec/UNIRIO, Brazil |
| Rodrigo Santos | Universidad Nacional del Sur - Bahía Blanca, Argentina |
| Yoshiaki Seki | NTT, Japan |
| Hidekazu Shiozawa | Tamagawa University, Japan |
| Marcus Specht | Open University of the Netherlands, The Netherlands |
| Chengzheng Sun | Nanyang Technological University, Singapore |
| Shin Takahashi | University of Tsukuba, Japan |
| Stefan Trausan-Matu | University Politehnica of Bucharest, Romania |
| Vaninha Vieira | Federal University of Bahia (UFBA), Brazil |
| Hao-Chuan Wang | National Tsing Hua University, Taiwan |
| Benjamin Weyers | RWTH Aachen University, Germany |
| Tomohito Yamamoto | Kanazawa Institute of Technology, Japan |

A New You: From Augmented Reality to Augmented Human (Keynote Talk)

Jun Rekimoto

Interfaculty Initiative in Information Studies, The University of Tokyo,
7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033 Japan
Sony Computer Science Laboratories, Inc., 3-14-13 Higashigotanda,
Shinagawaku, Tokyo 141-0022 Japan
rekimoto@acm.org

Abstract. Traditionally, the field of human–computer interaction (HCI) was primarily concerned with designing and investigating interfaces between humans and machines. The primary concern of surface computing is also about designing better interfaces to information. However, with recent technological advances, the concept of enhancing, augmenting, or even re-designing humans themselves is becoming a very feasible and serious topic of scientific research as well as engineering development. *Augmented human* is a term that I use to refer to this overall research direction. Augmented human introduces a fundamental paradigm shift in HCI: from human–computer interaction to human–computer integration. In this talk, I will discuss rich possibilities and distinct challenges in enhancing human abilities. I will introduce recent projects conducted by our group including the design and applications of wearable eye sensing for augmenting our perception and memory abilities, design of flying cameras as our external eyes, a home appliance that can increase your happiness, an organic physical wall/window that dynamically mediates the environment, and an immersive human–human communication called “JackIn.”

Keywords: Human Augmentation · Augmented Reality · Internet of Abilities · JackIn

ACM Classification Keywords: H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

Bio. Jun Rekimoto received his BASc, MSc, and PhD in information science from Tokyo Institute of Technology in 1984, 1986, and 1996, respectively. Since 1994 he has been working for Sony Computer Science Laboratories (Sony CSL). In 1999 he formed and directed the Interaction Laboratory within Sony CSL. Since 2007 he has been a professor in the Interfaculty Initiative in Information Studies at The University of Tokyo. Since 2011 he also has been Deputy Director of Sony CSL.

Rekimoto’s research interests include human–computer interaction, computer-augmented environments, and computer-augmented human (human–computer integration). He invented various innovative interactive systems and sensing technologies, including NaviCam (a hand-held AR system), Pick-and-Drop (a direct-manipulation

technique for inter-appliance computing), CyberCode (the world's first marker-based AR system), Augmented Surfaces, HoloWall, and SmartSkin (two earliest representations of multi-touch systems). He has published more than 100 articles in the area of human-computer interactions, including ACM SIGCHI, and UIST. He received the Multi-Media Grand Prix Technology Award from the Multi-Media Contents Association Japan in 1998, iF Interaction Design Award in 2000, the Japan Inter-Design Award in 2003, iF Communication Design Award in 2005, Good Design Best 100 Award in 2012, Japan Society for Software Science and Technology Fundamental Research Award in 2012, and ACM UIST Lasting Impact Award, Zoom Japon Les 50 qui font le Japon de demain in 2013. In 2007, he was also elected to the ACM SIGCHI Academy.

Contents

| | |
|--|-----|
| Twitter Bot for Activation of Online Discussion and Promotion of Understanding by Providing Related Articles | 1 |
| <i>Shota Kusajima and Yasuyuki Sumi</i> | |
| Supporting Theatrical Performance Practice by Collaborating Real and Virtual Space | 17 |
| <i>Mitsuki Shimada, Takayoshi Takano, Hiroshi Shigeno, and Ken-ichi Okada</i> | |
| A Video Chat System with Depth Information to Express 3-D Movement Between Remote Spaces | 31 |
| <i>Hiroki Hamaue and Takashi Yoshino</i> | |
| Efficient Generation of Conductor Avatars for the Concert by Multiple Virtual Conductors | 45 |
| <i>Naoki Katayama, Ryosuke Takatsu, Tomoo Inoue, Hiroshi Shigeno, and Ken-ichi Okada</i> | |
| Comparison of Input Methods for Remote Audiences of Live Music Performances | 58 |
| <i>Yuya Morino, Kei Miyazaki, Hiroyuki Tarumi, and Junko Ichino</i> | |
| Civic Social Network: A Challenge for Co-production of Contents About Common Urban Entities | 65 |
| <i>Alessio Antonini, Guido Boella, Lucia Lupi, and Claudio Schifanella</i> | |
| Key-Typing on Teleconference: Collaborative Effort on Cross-Cultural Discussion | 74 |
| <i>Hiromi Hanawa, Xiaoyu Song, and Tomoo Inoue</i> | |
| How Non-native Speakers Perceive Listening Comprehension Problems: Implications for Adaptive Support Technologies | 89 |
| <i>Xun Cao, Naomi Yamashita, and Toru Ishida</i> | |
| Floor Interaction with Wearable Projection Interface Using Hand and Toe . . . | 105 |
| <i>Fumihiro Sato, Tomu Tominaga, Yoshinori Hijikata, and Nobuchika Sakata</i> | |
| Development of Body Conversion System with Motion Picture for Presenting Other's Bodily Sensations | 117 |
| <i>Misato Imamura and Takashi Yoshino</i> | |

| | |
|--|-----|
| A Wearable Action Cueing System for Theatrical Performance Practice | 130 |
| <i>Ryosuke Takatsu, Naoki Katayama, Tomoo Inoue, Hiroshi Shigeno, and Ken-ichi Okada</i> | |
| Development of a Cooking Support System Aimed at University Students Living Alone | 146 |
| <i>Takuma Tsujimoto and Takashi Yoshino</i> | |
| Collaborative Web Search Using Tablet Terminals on a Virtual Tabletop Environment | 159 |
| <i>Tadashi Inoue, Ian Piumarta, and Hideyuki Takada</i> | |
| Social Presence Visualizer: Development of the Collaboration Facilitation Module on CSCL | 174 |
| <i>Masanori Yamada, Kosuke Kaneko, and Yoshiko Goda</i> | |
| Face-to-Face Collaborative Learning by Enhancing Viewpoint-Sharing of Learning Materials | 190 |
| <i>Tessai Hayama, Koji Hasegawa, and Kazushi Hoshiya</i> | |
| Analysis of Non-verbal Behaviors by Students in Cooperative Learning | 203 |
| <i>Eiji Watanabe, Takashi Ozeki, and Takeshi Kohama</i> | |
| Browsing Methods for Multiple Online Handwritten Note Animations | 212 |
| <i>Yuuki Maeda and Motoki Miura</i> | |
| Development of a GeoTour Support System Using a Microblog | 220 |
| <i>Shogo Taniguchi and Takashi Yoshino</i> | |
| A Microtask Drawing Generation System that Links with a Commercial Crowdsourcing Site | 231 |
| <i>Akira Hirata, Kousuke Sasaki, He Ban, and Tomoo Inoue</i> | |
| Proposal of an Architecture and Implementation of a Triage Support System | 246 |
| <i>Ryuga Kato, Kento Izumida, Hiroshi Shigeno, and Ken-ichi Okada</i> | |
| Author Index | 263 |