

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>

Mitsuko Aramaki · Richard Kronland-Martinet
Sølvi Ystad (Eds.)

Bridging People and Sound

12th International Symposium, CMMR 2016
São Paulo, Brazil, July 5–8, 2016
Revised Selected Papers

Editors

Mitsuko Aramaki
Laboratoire PRISM, CNRS-AMU
Marseille
France

Sølvi Ystad
Laboratoire PRISM, CNRS-AMU
Marseille
France

Richard Kronland-Martinet
Laboratoire PRISM, CNRS-AMU
Marseille
France

ISSN 0302-9743

ISSN 1611-3349 (electronic)

Lecture Notes in Computer Science

ISBN 978-3-319-67737-8

ISBN 978-3-319-67738-5 (eBook)

DOI 10.1007/978-3-319-67738-5

Library of Congress Control Number: 2017954606

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

© Springer International Publishing AG 2017

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. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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

The 12th International Symposium on Computer Music Multidisciplinary Research, CMMR 2016 “Bridging People and Sound” (<http://cmmr2016.ime.usp.br>), took place in São Paulo, Brazil on 5–8 July 2016 at the Computer Science and Music Departments located on the main campus of the University of São Paulo, the University City, which constitutes an amazing green area of the city.

This was the first time that CMMR had been organized on the American continent. CMMR 2016 was co-organized by the Computer Music Research Group (<http://compmus.ime.usp.br/en>), the NuSom - Research Centre on Sonology (<http://www2.eca.usp.br/nusom/node/22>), and the former “Audio Group” of the LMA - CNRS (Centre National de la Recherche Scientifique), Marseilles, France, which in January 2017 moved to the new laboratory PRISM (Perception, Representations, Image, Sound, Music - www.prism.cnrs.fr) - CNRS-AMU, Marseilles, France.

This year’s conference theme “Bridging People and Sound” aimed at encouraging contributions from artists and listeners on the one side and audio and music technology researchers on the other. A strong interest for the conference from the artistic community was revealed through the large number of music contributions (more than 60) that were submitted to the conference.

The scientific program contained 3 keynote presentations (Pedro Rebelo, SARC/QUB, Belfast, UK; Jônatas Manzolli, NICS/UNICAMP, Campinas, Brazil; and Sølvi Ystad, LMA-CNRS, France), seven paper sessions, one poster session, four demo sessions, and a panel discussion that concluded the conference. During the first 3 days of the conference, a series of 3 concerts with the selected music contributions was organized.

The CMMR 2016 post proceedings edition is the 12th CMMR proceedings volume published by Springer in the Lecture Notes in Computer Sciences series (LNCS 2771, LNCS 3310, LNCS 3902, LNCS 4969, LNCS 5493, LNCS 5954, LNCS 6684, LNCS 7172, LNCS 7900, LNCS 8905, and LNCS 9617). This year’s symposium edition contains a total of 22 peer-reviewed and revised articles. It has been divided into 7 sections containing various subjects that reveal the pluridisciplinary nature of the conference, spanning from technology-oriented questions related to music information retrieval and music structure analysis to music production systems, new musical interfaces, music composition, and multisensory inquiries.

We would like to thank all the participants of CMMR 2016, who contributed to making this 12th symposium a memorable happening. We would also like to thank the Program and Music Committee members for their indispensable selection tasks. We are very grateful to the Local Organizing Committee at the Computer Science and Music Departments of the University of São Paulo, who took care of the practical organization

and insured a smooth and efficient coordination between attendees, speakers, audiences, and musicians in both the scientific and artistic program. Finally, we would like to thank Springer for accepting to publish the CMMR 2016 post proceedings edition in their LNCS series.

July 2017

Richard Kronland-Martinet
Mitsuko Aramaki
Sølvi Ystad

Organization

The 12th International Symposium on Computer Music Multidisciplinary Research, CMMR 2016 “Bridging People and Sound”, was co-organized by the Computer Music Research Group, the NuSom - Research Centre on Sonology, and the former “Audio Group” of the LMA (now PRISM) - CNRS (Centre National de la Recherche Scientifique), Marseilles, France.

Symposium Chairs

Marcelo Queiroz	IME/USP, São Paulo, Brazil
Fernando Iazzetta	ECA/USP, São Paulo, Brazil

Paper, Program, and Proceedings Chairs

Richard Kronland-Martinet	CNRS-LMA Marseilles, France
Mitsuko Aramaki	CNRS-LMA Marseilles, France
Sølvi Ystad	CNRS-LMA Marseilles, France
Marcelo Queiroz	IME/USP, São Paulo, Brazil

Committees

Local Organizing Committee

Marcelo Queiroz	IME/USP, São Paulo, Brazil
Fernando Iazzetta	ECA/USP, São Paulo, Brazil
Regis Faria	FFCLRP/USP, Ribeirão Preto, Brazil

Paper Committee

Mitsuko Aramaki	CNRS-LMA, France
Federico Avanzini	University of Padua, Italy
Mathieu Barthet	Queen Mary University of London, UK
Frédéric Bevilacqua	IRCAM, France
Marta Bienkiewicz	Aix-Marseille University-ISM, France
Christophe Bourdin	Aix-Marseille University-ISM, France
Lionel Bringuoux	Aix-Marseille University-ISM, France
John Ashley Burgoyne	University of Amsterdam, The Netherlands
Marcelo Caetano	INESC Porto, Portugal
Emilios Cambouroupoulos	Aristotle University of Thessaloniki, Greece
Amilcar Cardoso	University of Coimbra, Portugal
Olivier Derrien	Toulon-Var University and CNRS-LMA, France

Joel Eaton	University of Plymouth, UK
Georg Essl	University of Michigan, USA
Regis R.A. Faria	University of São Paulo, Brazil
Bruno Giordano	University of Glasgow, UK
Rolf Inge Gødooy	University of Oslo, Norway
Mick Grierson	Goldsmiths Digital Studios, London, UK
Brian Gygi	Veterans Affairs Northern California Health Care Service, USA
Kristoffer Jensen	Independent Researcher, Denmark
Luis Jure	University of Montevideo, Uruguay
Maximos	University of Thessaloniki, Greece
Kaliakatsos-Papakostas	
Timour Klouche	National Institute for Music Research, Germany
Richard Kronland-Martinet	CNRS-LMA, France
Darius Kucinskas	Kaunas University of Technology, Lithuania
Fernando Iazzetta	University of São Paulo, Brazil
Thor Magnusson	University of Sussex, UK
Jônatas Manzolli	University of Estadual Campinas, Brazil
Sylvain Marchand	University of Brest, France
Jean-Arthur	University of Bordeaux, France
Micoulaud-Franchi	
Eduardo Miranda	University of Plymouth, UK
Marcelo Queiroz	University of São Paulo, Brazil
Davide Rocchesso	Università Iuav di Venezia, Italy
Matthew Rodger	Queen's University Belfast, UK
Flavio Schiavoni	Federal University of São João Del Rey, Brazil
Diemo Schwarz	IRCAM, France
Stefania Serafin	Aalborg University Copenhagen, Denmark
Julius Smith	Stanford University, USA
Tiago Tavares	State University of Campinas (UNICAMP), Brazil
Marcelo Wanderley	CIRMMT, Canada
Ian Whalley	University of Waikato, New Zealand
Duncan Williams	University of Plymouth, UK
Sølvi Ystad	CNRS-LMA, France

Contents

Music Structure Analysis – Music Information Retrieval

deepGTTM-I&II: Local Boundary and Metrical Structure Analyzer Based on Deep Learning Technique	3
<i>Masatoshi Hamanaka, Keiji Hirata, and Satoshi Tojo</i>	
Melody and Rhythm Through Network Visualization Techniques	22
<i>Guillaume Blot, Pierre Saurel, and Francis Rousseaux</i>	
Music Generation with Relation Join	41
<i>Xiuyan Ni, Ligon Liu, and Robert Haralick</i>	
The Framework of Copista: An OMR System for Historical Music Collection Recovery	65
<i>Marcos Laia, Flávio Schiavoni, Daniel Madeira, Dárlinton Carvalho, João Pedro Moreira, Júlio Resende, and Rodrigo Ferreira</i>	

Sound, Motion and Gesture

Recent Findings on Sound and Posture: A Position Paper	91
<i>Lennie Gandemer, Gaëtan Parseihian, Christophe Bourdin, and Richard Kronland-Martinet</i>	
Eluding the Influence of Postural Constraints on Cellists' Bowing Movements and Timbral Quality	109
<i>Jocelyn Rozé, Richard Kronland-Martinet, Mitsuko Aramaki, Christophe Bourdin, and Sølvi Ystad</i>	
Eclipse: A Wearable Instrument for Performance Based Storytelling	125
<i>Ezgi Ucar</i>	

Music Composition, Public Spaces and Mobility

Sound Interaction Design and Creation in the Context of Urban Space	137
<i>Julián Jaramillo Arango</i>	
Increasing Pleasantness and Security Using 3D-Sound Design in Public Transport	150
<i>Gaëtan Parseihian, Christophe Bourdin, Vincent Bréjard, and Richard Kronland-Martinet</i>	

Computer-Supported Interactive Systems for Music Production Performance and Listening

Using Pure Data for Real-Time Granular Synthesis Control Through Leap Motion.	171
<i>Damián Anache</i>	
Angkasa: A Software Tool for Spatiotemporal Granulation.	180
<i>Muhammad Hafiz Wan Rosli and Andres Cabrera</i>	
User Experience in an Interactive Music Virtual Reality System: An Exploratory Study	192
<i>Thomas Deacon, Tony Stockman, and Mathieu Barthet</i>	

Image/Sound Interaction – Digital Games

VORPAL: An Extensible and Flexible Middleware for Real-Time Soundtracks in Digital Games.	219
<i>Wilson Kazuo Mizutani and Fabio Kon</i>	
New Atlantis: Audio Experimentation in a Shared Online World.	229
<i>Peter Sinclair, Roland Cahen, Jonathan Tanant, and Peter Gena</i>	
Estilhaço 1 and 2: Conversations Between Sound and Image in the Context of a Solo Percussion Concert	247
<i>Fernando Rocha and Eli Stine</i>	

Interactive Music Production

The Qualities of the Perceived Sound Forms: A Morphological Approach to Timbre Composition	259
<i>Danilo Rossetti</i>	
Event-Based Ubiquitous Music Interaction with MCMM: A Musical Communication Modeling Methodology.	284
<i>Flávio Luiz Schiavoni</i>	

New Digital Instruments – Multisensory Experiences

A Virtual Musical Instrument for 3D Performance with Short Gestures: Exploring Mapping Strategies with Virtual Reality	301
<i>André Montes Rodrigues, Marcelo Knorich Zuffo, Olavo da Rosa Belloc, and Regis Rossi Alves Faria</i>	
Using Sound to Enhance Taste Experiences: An Overview.	316
<i>Felipe Reinoso Carvalho, Abdellah Touhafi, Kris Steenhaut, Raymond van Ee, and Carlos Velasco</i>	

Revolt and Ambivalence: Music, Torture and Absurdity in the Digital Oratorio <i>The Refrigerator</i>	331
<i>Paulo C. Chagas</i>	
Dynamic Mapping Strategies Using Content-Based Classification: A Proposed Method for an Augmented Instrument	347
<i>Gabriel Rimoldi and Jônatas Manzolli</i>	
Prynth: A Framework for Self-contained Digital Music Instruments.	357
<i>Ivan Franco and Marcelo M. Wanderley</i>	
Author Index	371