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# Speech, Sound and Music Processing: Embracing Research in India

8th International Symposium, CMMR 2011  
20th International Symposium, FRSM 2011  
Bhubaneswar, India, March 9-12, 2011  
Revised Selected Papers

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# Preface

The Computer Music Modeling and Retrieval (CMMR) 2011 conference was the 8th event of this international series, and the first that took place outside Europe. Since its beginnings in 2003, this conference has been co-organized by the Laboratoire de Mécanique et d'Acoustique in Marseille, France, and the Department of Architecture, Design and Media Technology (ad:mt), University of Aalborg, Esbjerg, Denmark, and has taken place in France, Italy, Spain, and Denmark. Historically, CMMR offers a cross-disciplinary overview of current music information retrieval and sound modeling activities and related topics, such as human interaction, perception and cognition and much more. CMMR built its strength on its open and multidisciplinary approach to these fields and the interaction of researchers with expertise in the CMMR areas. As such, CMMR evolves with the researchers and their openness to new trends and directions within the related fields of interest.

Frontiers of Research in Speech and Music (FRSM) has been organized in different parts of India every year since 1991. Previous conferences were held at ITC-SRA Kolkata, NPL New Delhi, BHU Varanasi, IIT Kanpur, Lucknow University, AIISH Mysore, IITM Gwalior, Utkal University, Bhubaneswar, Annamalai University, and IIDL Thiruvananthapuram to promote research activities covering many interdisciplinary research areas such as physics, mathematics, speech, musicology, electronics and computer science and their practical application. Through this symposium indigenous speech technologies applicable for Indian languages get an appropriate platform for their advancement. Indian music is multicategorical in nature in this country of multilingualism. It has rich classical music at one end and numerous ethnic and folk music at the other end. At FRSM, different aspects of Indian classical music and its impact in cognitive science are the focus of discussion. Eminent scientist from the USA, Japan, Sweden, France, Poland, Taiwan, India and other European and Asian countries have delivered state-of-the-art lectures in these areas every year at different places providing an opportunity to researchers, academicians and industrialists to enhance their knowledge and to interact with each other to share their knowledge and experience in the latest developments in the fields. Participation in FRSM has always encouraged researchers to contribute toward achieving the objectives of the symposium effectively.

This year the two conferences merged for the first time into the FRSM/CMMR-2011 symposium that took place in Bhubaneswar, Orissa, India, during March 9–12, 2011. The conference was organized by the Resource Centre For Indian Language Technology Solution, Department of Computer Science and Application, Utkal University, together with LMA and INCM (CNRS, France) and ad:mt, Aalborg University Esbjerg (Denmark). The conference featured prominent keynote speakers working in the area of music information retrieval and

automatic speech recognition, and the program of CMMR 2011 included paper sessions, panel discussions, posters, and cultural events. We are pleased to announce that in light of the location in India there was a special focus on Indian speech and music. The melting pot of the FRSM and CMMR events gave rise to many interesting meetings with a focus on the field from different cultural perspectives.

The proceedings of previous CMMR conferences were published in the *Lecture Notes in Computer Science* series (LNCS 2771, LNCS 3310, LNCS 3902, LNCS 4969, LNCS 5493, LNCS 5954 and LNCS 6684), and the present edition follows the lineage of the previous ones, including a collection of 17 papers on the topics of CMMR. These articles were specially reviewed and corrected for this proceedings volume. The current book is divided into four main chapters that reflect the high quality of the sessions of CMMR 2011, the collaboration with FRSM 2011, and the Indian influence on the topics of Indian music, music information retrieval, sound analysis synthesis and perception and speech processing of Indian languages. The Indian focus provided many interesting topics related to the Raga, from a music theory point of view to the instruments and the specific ornamentation of Indian classical singing. Another particular topic that reflects the participation of FRSM is related to the speech of different Indian languages. We are pleased to present this work of FRSM/CMMR 2011 that brings forward both fundamental research in these important areas and research with a special focus from an Indian perspective, and gives a splendid opportunity to keep up to date on these issues.

We would like to thank the Program Committee members for their valuable paper reports and thank all the participants who made CMMR 2011 an exciting and original event. In particular, we would like to acknowledge the organizers and participants in FRSM 2011 for their participation. Finally, we would like to thank Springer for accepting to publish the CMMR 2011 proceedings in their LNCS series.

April 2012

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Mitsuko Aramaki  
Richard Kronland-Martinet  
Kristoffer Jensen  
Sanghamitra Mohanty

# Organization

The 8th International Symposium on Computer Music Modeling and Retrieval (CMMR2011) was co-organized with the 20th international Symposium on Frontiers of Research on Speech and Music (FRSM2011) by the Resource Centre For Indian Language Technology Solution, Department of Computer Science and Application, Utkal University (Orissa, India), Aalborg University Esbjerg (Denmark), and Laboratoire de Mécanique et d'Acoustique/Institut de Neurosciences Cognitives de la Méditerranée (Centre National de la Recherche Scientifique), Marseille (France).

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# Table of Contents

## Part I: Indian Music

Objective Assessment of Ornamentation in Indian Classical Singing . . . . <i>Chitralekha Gupta and Preeti Rao</i>	1
Optimized Neural Architecture for Time Series Prediction Using Raga Notes . . . . . <i>Moujhuri Patra, Soubhik Chakraborty, and Dipak Ghosh</i>	26
Meter Detection from Audio for Indian Music . . . . . <i>Sankalp Gulati, Vishweshwara Rao, and Preeti Rao</i>	34
Assessment of Level of Recovery of Cognitive Impairment in the Cerebrovascular Accident and Head Injuries Cases: Therapeutic Impact of North Indian Ragas . . . . . <i>Shashi Bhushan Singh, Soubhik Chakraborty, and Keashav Mohan Jha</i>	44
On Tanpura Drone and Brain Electrical Correlates . . . . . <i>Matthias Braeunig, Ranjan Sengupta, and Anirban Patranabis</i>	53

## Part II: Music Information Retrieval

Musical Instrument Identification Based on New Boosting Algorithm with Probabilistic Decisions . . . . . <i>Jun Wu and Shigeki Sagayama</i>	66
Music Genre Classification Using an Auditory Memory Model . . . . . <i>Kristoffer Jensen</i>	79
Interactive Music 3.0: Empowering People to Participate Musically Inside Nightclubs . . . . . <i>Yago de Quay</i>	89
Hierarchical Clustering of Music Database Based on HMM and Markov Chain for Search Efficiency . . . . . <i>Joe Cheri Ross and John Samuel</i>	98



### Part III: Sound Analysis-Synthesis and Perception

Fundamental Frequency Modulation in Singing Voice Synthesis . . . . .	104
<i>Ryan Stables, Cham Athwal, and Jamie Bullock</i>	
A Statistical Approach to Analyzing Sound Tracings . . . . .	120
<i>Kristian Nymoen, Jim Torresen, Rolf Inge Godøy, and Alexander Refsum Jensenius</i>	
Auditory Time-Frequency Masking: Psychoacoustical Data and Application to Audio Representations . . . . .	146
<i>Thibaud Necciari, Peter Balazs, Richard Kronland-Martinet, Sølvi Ystad, Bernhard Laback, Sophie Savel, and Sabine Meunier</i>	
Perceptual Control of Environmental Sound Synthesis . . . . .	172
<i>Mitsuko Aramaki, Richard Kronland-Martinet, and Sølvi Ystad</i>	

### Part IV: Speech Processing of Indian Languages

Recognition of Assamese Phonemes Using RNN Based Recognizer . . . . .	187
<i>Utpal Bhattacharjee</i>	
A System for Analysis of Large Scale Speech Data for the Development of Rules of Intonation for Speech Synthesis . . . . .	197
<i>Asoke Kumar Datta and Arup Saha</i>	
Adaptive and Iterative Wiener Filter for Oriya Speech Processing Applications . . . . .	207
<i>Sanghamitra Mohanty and Basanta Kumar Swain</i>	
On the Role of Formants in Cognition of Vowels and Place of Articulation of Plosives . . . . .	215
<i>Asoke Kumar Datta and Bhaswati Mukherjee</i>	
<b>Author Index . . . . .</b>	<b>235</b>