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Independent Component Analysis and Blind Signal Separation

6th International Conference, ICA 2006
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Proceedings



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Preface

This volume contains the papers presented at the 6th International Conference on Independent Component Analysis (ICA) and Blind Source Separation (BSS) organized in historic Charleston, SC, USA, March 5-8, 2006.

The sixth edition of the conference has brought the latest developments in one of the most exciting areas of statistical signal processing/unsupervised machine learning. ICA theory has received attention from several research communities including machine learning, neural networks, statistical signal processing and Bayesian modeling. ICA/BSS has applications at the intersection of many science and engineering disciplines concerned with understanding and extracting useful information from data as diverse as neuronal activity and brain images, bioinformatics, communications, the world wide-web, audio, video, sensor signals, or time series.

Papers were solicited in all areas of independent component analysis and blind source separation, including the following: algorithms and architectures (e.g. statistical learning algorithms based on ICA and BSS using linear/nonlinear mixture models, convolutive and noisy models, extensions of basic models, combinatorial optimization, kernel methods, graphical models), applications (innovative applications or fielded systems that use ICA and BSS, including systems for acoustic signal separation, time series prediction, data mining, multimedia processing, telecommunications), medical applications (e.g., bioinformatics, neuroimaging, processing of electrocardiograms, electroencephalograms, magnetoencephalograms, and functional magnetic resonance imaging), speech and signal processing (e.g., computational auditory speech analysis, source separation, auditory perception, coding, recognition, synthesis, denoising, segmentation, dynamic and temporal models), theory (e.g., information theory, estimation methods, complex methods, time/frequency representations, optimization, sparse representations, asymptotic analysis, unsupervised learning, coding), visual and sensory processing (e.g., image processing and coding, segmentation, object detection and recognition, motion detection and tracking, visual scene analysis and interpretation).

Accepted papers covered these topics well, and as a result this volume has a simple organization based on the six sections: Algorithms and Architectures, Applications, Medical Applications, Speech and Signal Processing, Theory, and Visual and Sensory Processing. Within each section, papers were organized alphabetically by the first author's last name. Several topics are widely represented in the present volume such as audio source separation, bioinformatics, convolutive models of ICA, denoising, estimation methods, linear/nonlinear mixture models, optimization in ICA/BSS, time/frequency representations, sparse representations, and statistical learning.

The 2006 event introduced several innovations compared to previous meetings. The paper review/acceptance system relied on the Program Committee members' responsibility in assigning papers for review and drawing acceptance decisions. For the first time two tutorials were included in the program about outstanding developments in the area: "Neural theory and neural analysis using ICA," lectured by Tony Bell of the University of California at Berkeley, and "Bayesian machine learning for signal processing," lectured by Hagai T. Attias of Golden Metallic, Inc. The conference offered Student Best Paper Awards and travel support to participating students.

The interest in the conference was demonstrated by the large number of author registrations and the healthy submission rate. The conference database included 183 submissions. The review process was more selective than at the previous conferences and many meritourious submissions could not be accepted for the final program. In the end, the Program Committee selected 64% of the papers for inclusion in this volume. The vast majority of papers benefited from at least four reviews. The authors of accepted papers had the opportunity to upgrade their manuscripts based on the peer review feedback.

The conference had a combination of high-quality tutorials, research papers, applications papers, posters, and invited talks, which demonstrated that ICA has become a mature conference and the main venue for researchers and practitioners in this area.

Many people deserve credit for their hard work on behalf of the conference. Thanks go to all paper authors in this volume. In addition we thank the members of the Program Committee and the reviewers for their efforts in organizing the reviews, and for reviewing and selecting the papers to be included in this volume. We are also grateful to the organizers of the special sessions for their work in inviting, selecting presentations, and putting together the sessions. All these efforts have been essential in compiling a high-quality scientific program.

Special acknowledgements go to many people whose effort and dedication contributed to the success of the conference. We thank Jose Principe for his efforts in organizing the conference, the staff of the University of Florida for the support with various phases of the process, Thomas Preuss for designing and helping with the excellent web submission and conference database engine ConfMaster, and Antonio Paiva for acting as webmaster of the conference. We thank the members of the ICA Steering Committee for their advice and for assigning the job to the present team.

Last but not least, the cooperation with Springer in preparation of this volume and the CD-ROM proceedings was outstanding. We hope you will find the proceedings interesting and stimulating.

January 2006

Justinian Rosca
Deniz Erdogmus
Jose Principe
Simon Haykin

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