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BLIND SOURCE SEPARATION USING FREQUENCY INDEPENDENT COMPONENT ANALYSIS



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Ezeude, 2010-07 The need for speech enhancement is very important because of the acoustic environment we are living in which is composed of noise and other atmospheric disturbances and this makes it almost impossible to record a speech signal in pure form. In most of the mixed signals there is usually no information about each source. In such a situation the estimates of the original source signals is done based on the information of the received mixed signals; therefore the approach to be adopted in such cases to separate the signals must be one that does it blindly. Thus the method Blind Source Separation is used in this work. Our thesis work focuses on Frequency domain Blind Source Separation (BSS) in which the received mixed signals are converted into the frequency domain and Independent Component Analysis (ICA) is applied at each frequency bin. Our main target in this project is to solve the permutation and scaling ambiguities in real time applications using the method proposed by Minje et al. in [12]. Our results show that this method works better in offline mixtures than in real time and lastly we gave some suggestions to improve the results.

Handbook of Blind Source Separation Pierre Comon, Christian Jutten, 2010-02-17 Edited by the people who were forerunners in creating the field together with contributions from 34 leading international experts, this handbook provides the definitive reference on Blind Source Separation, giving a broad and comprehensive description of all the core principles and methods, numerical algorithms and major applications in the fields of telecommunications, biomedical engineering and audio/acoustic and speech processing. Going beyond a machine learning perspective, the book reflects recent results in signal processing and numerical analysis and includes topics such as optimization criteria, mathematical tools, the design of numerical algorithms, convolutive mixtures and time-frequency approaches. This Handbook is an ideal reference for university researchers. It covers algebraic identification of underdetermined mixtures, time-frequency methods, Bayesian approaches, blind identification under non-negativity, approaches, semi-blind methods for communications. Shows the applications of the methods to key application areas such as telecommunications, biomedical engineering, speech/acoustic audio and music processing while also giving a general method for developing applications.

Independent Component Analysis and Blind Signal Separation Carlos G. Puntonet, 2004-09-17 In many situations found both in Nature and in human built systems, a set of mixed signals is observed frequently along with noise and it is of great scientific and technological relevance to be able to isolate or separate them so that the information in each of the signals can be utilized. Blind source separation (BSS) research is one of the more interesting emerging fields nowadays in the field of signal processing. It deals with the algorithms that allow the recovery of the original sources from a set of mixtures only. The adjective blind is applied because the purpose is to estimate the original sources without any a priori knowledge about either the sources or the mixing system. Most of the models employed in BSS assume the hypothesis about the independence of the original sources. Under this hypothesis a BSS problem can be considered as a particular case of

independent component analysis ICA a linear transformation technique that starting from a multivariate representation of the data minimizes the statistical dependence between the components of the representation. It can be claimed that most of the advances in ICA have been motivated by the search for solutions to the BSS problem and the other way around. Advances in ICA have been immediately applied to BSS. ICA and BSS algorithms start from a mixture model whose parameters are estimated from the observed mixtures. Separation is achieved by applying the inverse mixture model to the observed signals separating or unmixing model. Mixture models usually fall into three broad categories: instantaneous linear models, convolutive models, and nonlinear models, the first being the simplest but in general not near realistic applications. The development and test of the algorithms can be accomplished through synthetic data or with real world data. Obviously the most important aim and most difficult is the separation of real world mixtures. BSS and ICA have strong relations also apart from signal processing with other fields such as statistics and artificial neural networks. As long as we can find a system that emits signals propagated through a medium and those signals are received by a set of sensors and there is an interest in recovering the original sources we have a potential field of application for BSS and ICA. Inside that wider range of applications we can find for instance noise reduction applications, biomedical applications, audio systems, telecommunications, and many others. This volume comes out just 20 years after the first contributions in ICA and BSS [1] appeared. Thereafter the number of research groups working in ICA and BSS has been constantly growing so that nowadays we can estimate that far more than 100 groups are researching in these fields. As proof of the recognition among the scientific community of ICA and BSS developments there have been numerous special sessions and special issues in several well known journals. *Journal of Herault, B. Ans, Circuits neuronaux synapses modifiables d'encodage de messages complexes pour apprentissage non supervisé*, C. R. de l'Académie des Sciences vol 299 no III 13 pp 525-528 1984.

Independent Component Analysis and Signal Separation Mike E. Davies, Christopher C. James, Samer A. Abdallah, Mark D. Plumbley, 2007-08-28. This book constitutes the refereed proceedings of the 7th International Conference on Independent Component Analysis and Blind Source Separation ICA 2007 held in London UK in September 2007. It covers algorithms and architectures, applications, medical applications, speech and signal processing theory and visual and sensory processing.

Independent Component Analysis and Signal Separation Tulay Adali, Christian Jutten, Joao Marcos Travassos Romano, Allan Kardec Barros, 2009-02-25. This book constitutes the refereed proceedings of the 8th International Conference on Independent Component Analysis and Signal Separation ICA 2009 held in Paraty Brazil in March 2009. The 97 revised papers presented were carefully reviewed and selected from 137 submissions. The papers are organized in topical sections on theory, algorithms and architectures, biomedical applications, image processing, speech and audio processing, other applications as well as a special session on evaluation.

Independent Component Analysis and Blind Signal Separation Justinian Rosca, Deniz Erdogmus, Jose C. Principe, Simon Haykin, 2006-02-27. This book constitutes the refereed proceedings of the 6th International Conference on Independent Component Analysis and Blind Source Separation ICA 2006.

held in Charleston SC USA in March 2006 The 120 revised papers presented were carefully reviewed and selected from 183 submissions The papers are organized in topical sections on algorithms and architectures applications medical applications speech and signal processing theory and visual and sensory processing

Independent Component Analysis for Audio and Biosignal Applications Ganesh R. Naik,2012-10-10 Independent Component Analysis ICA is a signal processing method to extract independent sources given only observed data that are mixtures of the unknown sources Recently Blind Source Separation BSS by ICA has received considerable attention because of its potential signal processing applications such as speech enhancement systems image processing telecommunications medical signal processing and several data mining issues This book brings the state of the art of some of the most important current research of ICA related to Audio and Biomedical signal processing applications The book is partly a textbook and partly a monograph It is a textbook because it gives a detailed introduction to ICA applications It is simultaneously a monograph because it presents several new results concepts and further developments which are brought together and published in the book

Audio Source Separation and Speech Enhancement Emmanuel Vincent,Tuomas Virtanen,Sharon Gannot,2018-10-22 Learn the technology behind hearing aids Siri and Echo Audio source separation and speech enhancement aim to extract one or more source signals of interest from an audio recording involving several sound sources These technologies are among the most studied in audio signal processing today and bear a critical role in the success of hearing aids hands free phones voice command and other noise robust audio analysis systems and music post production software Research on this topic has followed three convergent paths starting with sensor array processing computational auditory scene analysis and machine learning based approaches such as independent component analysis respectively This book is the first one to provide a comprehensive overview by presenting the common foundations and the differences between these techniques in a unified setting Key features Consolidated perspective on audio source separation and speech enhancement Both historical perspective and latest advances in the field e g deep neural networks Diverse disciplines array processing machine learning and statistical signal processing Covers the most important techniques for both single channel and multichannel processing This book provides both introductory and advanced material suitable for people with basic knowledge of signal processing and machine learning Thanks to its comprehensiveness it will help students select a promising research track researchers leverage the acquired cross domain knowledge to design improved techniques and engineers and developers choose the right technology for their target application scenario It will also be useful for practitioners from other fields e g acoustics multimedia phonetics and musicology willing to exploit audio source separation or speech enhancement as pre processing tools for their own needs

Blind Source Separation Xianchuan Yu,Dan Hu,Jindong Xu,2013-12-13 A systematic exploration of both classic and contemporary algorithms in blind source separation with practical case studies The book presents an overview of Blind Source Separation a relatively new signal processing method Due to the multidisciplinary nature of the subject the book has

been written so as to appeal to an audience from very different backgrounds Basic mathematical skills e g on matrix algebra and foundations of probability theory are essential in order to understand the algorithms although the book is written in an introductory accessible style This book offers a general overview of the basics of Blind Source Separation important solutions and algorithms and in depth coverage of applications in image feature extraction remote sensing image fusion mixed pixel decomposition of SAR images image object recognition fMRI medical image processing geochemical and geophysical data mining mineral resources prediction and geoanomalies information recognition Firstly the background and theory basics of blind source separation are introduced which provides the foundation for the following work Matrix operation foundations of probability theory and information theory basics are included here There follows the fundamental mathematical model and fairly new but relatively established blind source separation algorithms such as Independent Component Analysis ICA and its improved algorithms Fast ICA Maximum Likelihood ICA Overcomplete ICA Kernel ICA Flexible ICA Non negative ICA Constrained ICA Optimised ICA The last part of the book considers the very recent algorithms in BSS e g Sparse Component Analysis SCA and Non negative Matrix Factorization NMF Meanwhile in depth cases are presented for each algorithm in order to help the reader understand the algorithm and its application field A systematic exploration of both classic and contemporary algorithms in blind source separation with practical case studies Presents new improved algorithms aimed at different applications such as image feature extraction remote sensing image fusion mixed pixel decomposition of SAR images image object recognition and MRI medical image processing With applications in geochemical and geophysical data mining mineral resources prediction and geoanomalies information recognition Written by an expert team with accredited innovations in blind source separation and its applications in natural science Accompanying website includes a software system providing codes for most of the algorithms mentioned in the book enhancing the learning experience Essential reading for postgraduate students and researchers engaged in the area of signal processing data mining image processing and recognition information geosciences life sciences

Blind Source Separation Ganesh R. Naik, Wenwu

Wang, 2014-05-21 Blind Source Separation intends to report the new results of the efforts on the study of Blind Source Separation BSS The book collects novel research ideas and some training in BSS independent component analysis ICA artificial intelligence and signal processing applications Furthermore the research results previously scattered in many journals and conferences worldwide are methodically edited and presented in a unified form The book is likely to be of interest to university researchers R Dr Wenwu Wang works at University of Surrey UK

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web api 600 trim number chart trim material seat disk backseat stem notes 1 410 410 410 410 410 2 304 304 304 304 304 3 f310 310 310 310 310 4 hard 410 hard 410 hard 410 410 410 seats 750bhn min 5 hardfaced stellite stellite 410 410 5a hardfaced ni cr ni cr 410 410 6 410 and cu ni cu ni 410 410 410 7 410 and

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web api has standardized trim materials by assigning a unique number to each set of trim materials 1 nominal trim 410 trim code f6 stem and other trim parts 410 13cr 200 275 hbn disc wedge f6 13cr 200 hbn seat surface 410 13cr 250 hbn min trim material grade 13cr 0 75ni 1mn service

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seat surface typical grade stem backset a 350 trim 5 or 5a see trim 5 or 5a 15 304 dual hardfaced 350 co cr a d aws a5 13
ecocr a a5 21 ercocr a 18cr 8ni astm a276 t304 note e 16 316 dual