

Adaptive Processing of Brain Signals

By Saeid Sanei

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In this book, the field of adaptive learning and processing is extended to arguably one of its most important contexts which is the understanding and analysis of brain signals. No attempt is made to comment on physiological aspects of brain activity; instead, signal processing methods are developed and used to assist clinical findings. Recent developments in detection, estimation and separation of diagnostic cues from different modality neuroimaging systems are discussed.

These include constrained nonlinear signal processing techniques which incorporate sparsity, nonstationarity, multimodal data, and multiway techniques.

Key features:

- Covers advanced and adaptive signal processing techniques for the processing of electroencephalography (EEG) and magneto-encephalography (MEG) signals, and their correlation to the corresponding functional magnetic resonance imaging (fMRI)
- Provides advanced tools for the detection, monitoring, separation, localising and understanding of functional, anatomical, and physiological abnormalities of the brain
- Puts a major emphasis on brain dynamics and how this can be evaluated for the assessment of brain activity in various states such as for brain-computer interfacing emotions and mental fatigue analysis
- Focuses on multimodal and multiway adaptive processing of brain signals, the new direction of brain signal research

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Editorial Review

From the Back Cover
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About the Author

Dr Saeid Sanei, Reader in Biomedical Signal Processing and Deputy Head of Computing Department, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey, United Kingdom.

Dr Sanei received his PhD from Imperial College of Science, Technology and Medicine, London, in Biomedical Signal and Image Processing in 1991. He has made a major contribution to Electroencephalogram (EEG) analysis; blind source separation, sparse component analysis and compressive sensing; parallel factor analysis and tensor factorization; particle filtering; chaos and time series analysis; support vector machines; hidden Markov models; and brain computer interfacing (BCI).He has published over 180 papers in refereed journals and conference proceedings, and a book on EEG Signal Processing. He has served as an editor, member of the technical committee, and reviewer for a number of journals and conferences, and has recently been selected as the Biomedical Signal Processing Track Chair for the IEEE Engineering in Medicine and Biology Conference 2009. His international collaborations involve both educational and industrial organizations, including the RIKEN Brain Science Research Institute in Japan. He also teaches extensively at both undergraduate and postgraduate level.

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