

Signal Denoising Using Empirical Mode Decomposition And

Featuring traditional coverage as well as new research results that, until now, have been scattered throughout the professional literature, this book brings together—in simple language—the basic ideas and methods that have been developed to study natural and man-made signals whose frequency content changes with time—e.g., speech, sonar and radar, optical images, mechanical vibrations, acoustic signals, biological/biomedical and geophysical signals. Covers time analysis, frequency analysis, and scale analysis; time-bandwidth relations; instantaneous frequency; densities and local quantities; the short time Fourier Transform; time-frequency analysis; the Wigner representation; time-frequency representations; computation methods; the synthesis problem; spatial-spatial/frequency representations; time-scale representations; operators; general joint representations; stochastic signals; and higher order time-frequency distributions. Illustrates each concept with examples and shows how the methods have been extended to other variables, such as scale. For engineers, acoustic scientists, medical scientists and developers, mathematicians, physicists, and

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mangers working in the fields of acoustics, sonar, radar, image processing, biomedical devices, communication.

Features of statistical and operational research methods and tools being used to improve the healthcare industry With a focus on cutting-edge approaches to the quickly growing field of healthcare, *Healthcare Analytics: From Data to Knowledge to Healthcare Improvement* provides an integrated and comprehensive treatment on recent research advancements in data-driven healthcare analytics in an effort to provide more personalized and smarter healthcare services. Emphasizing data and healthcare analytics from an operational management and statistical perspective, the book details how analytical methods and tools can be utilized to enhance healthcare quality and operational efficiency. Organized into two main sections, Part I features biomedical and health informatics and specifically addresses the analytics of genomic and proteomic data; physiological signals from patient-monitoring systems; data uncertainty in clinical laboratory tests; predictive modeling; disease modeling for sepsis; and the design of cyber infrastructures for early prediction of epidemic events. Part II focuses on healthcare delivery systems, including system advances for transforming clinic workflow and patient care; macro analysis of patient flow distribution; intensive care units; primary care; demand

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and resource allocation; mathematical models for predicting patient readmission and postoperative outcome; physician–patient interactions; insurance claims; and the role of social media in healthcare. Healthcare Analytics: From Data to Knowledge to Healthcare Improvement also features:

- Contributions from well-known international experts who shed light on new approaches in this growing area
- Discussions on contemporary methods and techniques to address the handling of rich and large-scale healthcare data as well as the overall optimization of healthcare system operations
- Numerous real-world examples and case studies that emphasize the vast potential of statistical and operational research tools and techniques to address the big data environment within the healthcare industry
- Plentiful applications that showcase analytical methods and tools tailored for successful healthcare systems modeling and improvement

The book is an ideal reference for academics and practitioners in operations research, management science, applied mathematics, statistics, business, industrial and systems engineering, healthcare systems, and economics. Healthcare Analytics: From Data to Knowledge to Healthcare Improvement is also appropriate for graduate-level courses typically offered within operations research, industrial engineering, business, and public health departments. The International conference series on Computer Science, Engineering &

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Applications (ICCSEA) aims to bring together researchers and practitioners from academia and industry to focus on understanding computer science, engineering and applications and to establish new collaborations in these areas. The Second International Conference on Computer Science, Engineering & Applications (ICCSEA-2012), held in Delhi, India, during May 25-27, 2012 attracted many local and international delegates, presenting a balanced mixture of intellect and research both from the East and from the West. Upon a strenuous peer-review process the best submissions were selected leading to an exciting, rich and a high quality technical conference program, which featured high-impact presentations in the latest developments of various areas of computer science, engineering and applications research.

Biotechnology can be defined as the manipulation of biological process, systems, and organisms in the production of various products. With applications in a number of fields such as biomedical, chemical, mechanical, and civil engineering, research on the development of biologically inspired materials is essential to further advancement. Biotechnology: Concepts, Methodologies, Tools, and Applications is a vital reference source for the latest research findings on the application of biotechnology in medicine, engineering, agriculture, food production, and other areas. It also examines the economic impacts of

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biotechnology use. Highlighting a range of topics such as pharmacogenomics, biomedical engineering, and bioinformatics, this multi-volume book is ideally designed for engineers, pharmacists, medical professionals, practitioners, academicians, and researchers interested in the applications of biotechnology. In the current age of information explosion, newly invented technological sensors and software are now tightly integrated with our everyday lives. Many sensor processing algorithms have incorporated some forms of computational intelligence as part of their core framework in problem-solving. These algorithms have the capacity to generalize and discover knowledge for themselves and to learn new information whenever unseen data are captured. The primary aim of sensor processing is to develop techniques to interpret, understand, and act on information contained in the data. The interest of this book is in developing intelligent signal processing in order to pave the way for smart sensors. This involves the mathematical advancement of nonlinear signal processing theory and its applications that extend far beyond traditional techniques. It bridges the boundary between theory and application, developing novel theoretically inspired methodologies targeting both longstanding and emergent signal processing applications. The topics range from phishing detection to integration of terrestrial laser scanning, and from fault diagnosis to bio-inspired filtering. The book will

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appeal to established practitioners, along with researchers and students in the emerging field of smart sensor signal processing.

This book presents real-world problems and pioneering research that reflect novel approaches to cybernetics, algorithms and software engineering in the context of intelligent systems. It gathers the peer-reviewed proceedings of the 2nd Computational Methods in Systems and Software 2018 (CoMeSySo 2018), a conference that broke down traditional barriers by being held online. The goal of the event was to provide an international forum for discussing the latest high-quality research results.

This volume presents the contributions of the 6th International Conference on Advancements of Medicine and Health Care through Technology – MediTech 2018, held between 17 – 20 October 2018 in Cluj-Napoca, Romania. The papers of this Proceedings volume present new developments in : - Health Care Technology - Medical Devices, Measurement and Instrumentation - Medical Imaging, Image and Signal Processing - Modeling and Simulation - Molecular Bioengineering - Biomechanics

Epilepsy is one of the most common neurological disorders, with a prevalence of 4-10/1000. The book contains the practical methods to approaching the classification and diagnosis of epilepsy, and provides information on

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management. Epilepsy is a comprehensive book which guides the reader through all aspects of epilepsy, both practical and academic, covering all aspects of diagnosis and management of children with epilepsy in a clear, concise, and practical fashion. The book is organized so that it can either be read cover to cover for a comprehensive tutorial or be kept desk side as a reference to the epilepsy. Each chapter introduces a number of related epilepsy and its diagnosis, treatment and co-morbidities supported by examples. Included chapters bring together valuable materials in the form of extended clinical knowledge from practice to clinic features.

This book is written for scientists and engineers who use HHT (Hilbert–Huang Transform) to analyze data from nonlinear and non-stationary processes. It can be treated as a HHT user manual and a source of reference for HHT applications. The book contains the basic principle and method of HHT and various application examples, ranging from the correction of satellite orbit drifting to detection of failure of highway bridges. The thirteen chapters of the first edition are based on the presentations made at a mini-symposium at the Society for Industrial and Applied Mathematics in 2003. Some outstanding mathematical research problems regarding HHT development are discussed in the first three chapters. The three new chapters of the second edition reflect the latest HHT development, including ensemble empirical mode decomposition

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(EEMD) and modified EMD. The book also provides a platform for researchers to develop the HHT method further and to identify more applications.

Contents: Introduction to the Hilbert–Huang Transform and Its Related Mathematical Problems Ensemble Empirical Mode Decomposition and Its Multi-Dimensional Extensions Multivariate Extensions of Empirical Mode Decomposition B-Spline Based Empirical Mode Decomposition EMD Equivalent Filter Banks, From Interpretation to Applications HHT Sifting and Filtering Statistical Significance Test of Intrinsic Mode Functions The Time-Dependent Intrinsic Correlation The Application of Hilbert–Huang Transforms to Meteorological Datasets Empirical Mode Decomposition and Climate Variability EMD Correction of Orbital Drift Artifacts in Satellite Data Stream HHT Analysis of the Nonlinear and Non-Stationary Annual Cycle of Daily Surface Air Temperature Data Hilbert Spectra of Nonlinear Ocean Waves EMD and Instantaneous Phase Detection of Structural Damage HHT-Based Bridge Structural Health-Monitoring Method Applications of HHT in Image Analysis

Readership: Applied mathematicians, climate scientists, highway engineers, medical scientists, geologists, civil engineers, mechanical engineers, electrical engineers, economics and graduate students in science or engineering.

Keywords: Hilbert–Huang Transform; Empirical Mode Decomposition; Intrinsic Mode Function; Hilbert Spectral Analysis; Time-Frequency Analysis

Key Features: A tool book for analyzing nonlinear and non-stationary data A source book for HHT development and applications The most complete reference for

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HHT method and applications

The book focuses on the integration of intelligent communication systems, control systems, and devices related to all aspects of engineering and sciences. It includes high-quality research papers from the 3rd international conference, ICICCD 2018, organized by the Department of Electronics, Instrumentation and Control Engineering at the University of Petroleum and Energy Studies, Dehradun on 21–22 December 2018. Covering a range of recent advances in intelligent communication, intelligent control and intelligent devices., the book presents original research and findings as well as researchers' and industrial practitioners' practical development experiences of. This book focuses on recent advances in the Internet of Things (IoT) in biomedical and healthcare technologies, presenting theoretical, methodological, well-established, and validated empirical work in these fields. Artificial intelligence and IoT are set to revolutionize all industries, but perhaps none so much as health care. Both biomedicine and machine learning applications are capable of analyzing data stored in national health databases in order to identify potential health problems, complications and effective protocols, and a range of wearable devices for biomedical and healthcare applications far beyond tracking individuals' steps each day has emerged. These prosthetic technologies have made significant strides in recent decades with the advances in materials and development. As a result, more flexible, more mobile chip-enabled prosthetics or other robotic devices are on the horizon. For example, IoT-

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enabled wireless ECG sensors that reduce healthcare cost, and lead to better quality of life for cardiac patients. This book focuses on three current trends that are likely to have a significant impact on future healthcare: Advanced Medical Imaging and Signal Processing; Biomedical Sensors; and Biotechnological and Healthcare Advances. It also presents new methods of evaluating medical data, and diagnosing diseases in order to improve general quality of life.

"Biomedical signal processing is a rapidly expanding field with a wide range of applications, from the construction of artificial limbs and aids for disabilities to the development of sophisticated medical imaging systems. Acquisition and processing of bio"

This book aims to provide an international forum for scholarly researchers, practitioners and academic communities to explore the role of information and communication technologies and its applications in technical and scholarly development. The conference attracted a total of 464 submissions, of which 152 submissions (including 4 poster papers) have been selected after a double-blind review process. Academic pioneering researchers, scientists, industrial engineers and students will find this series useful to gain insight into the current research and next-generation information science and communication technologies. This book discusses the aspects of communication, data science, ambient intelligence, networking, computing, security and Internet of things, from classical to intelligent scope. The authors hope that readers find the

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volume interesting and valuable; it gathers chapters addressing state-of-the-art intelligent methods and techniques for solving real-world problems along with a vision of the future research.

Oil and Gas Exploration: Methods and Application presents a summary of new results related to oil and gas prospecting that are useful for theoreticians and practical professionals. The study of oil and gas complexes and intrusions occurring in sedimentary basins is crucial for identifying the location of oil and gas fields and for making accurate predictions on oil findings. Volume highlights include: Advanced geophysical techniques for achieving hydrocarbon exploration efficiency from beneath the Earth Discussion of theoretical and practical approaches in solving problems related to exploring and mining new oil and gas deposits New geological concepts for predicting potential hydrocarbon targets Novel methods of control of the outworking of these deposits using different geophysical methods, significant for optimization of mining hydrocarbon and carbonate deposits Estimation of the degree of outworking of oil and gas deposits, to facilitate the use of space-time monitoring of different kinds of fields Analysis of exploration data by an efficient processing system, based on strong methods proven mathematically Oil and Gas Exploration is a valuable resource for exploration geophysicists, petroleum engineers, geoengineers, petrologists, mining engineers, and economic geologists, who will gain insights into exploring new methods involved in finding natural resources from our Earth. Read an interview with the editors

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to find out more: <https://eos.org/editors-vox/where-and-how-can-we-find-new-sources-of-oil-and-gas>

This highly acclaimed work has so far been available only in French. It is a detailed survey of a variety of techniques for time-frequency/time-scale analysis (the essence of "Wavelet Analysis"). This book has broad and comprehensive coverage of a topic of keen interest to a variety of engineers, especially those concerned with signal and image processing. Flandrin provides a discussion of numerous issues and problems that arise from a mixed description in time and frequency, as well as problems in interpretation inherent in signal theory. Detailed coverage of both linear and quadratic solutions Various techniques for both random and deterministic signals

ICEEE is a forum for presenting excellent results and new challenges facing the field of the reliability and availability of Electrical and Electronics Engineering It brings together experts from industry, governments and academia, experienced in engineering, design and research

This book, divided in two volumes, originates from Techno-Societal 2018: the 2nd International Conference on Advanced Technologies for Societal Applications, Maharashtra, India, that brings together faculty members of various engineering colleges to solve Indian regional relevant problems under the guidance of eminent researchers from various reputed organizations. The focus is on technologies that help develop and improve society, in particular on issues such

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as the betterment of differently abled people, environment impact, livelihood, rural employment, agriculture, healthcare, energy, transport, sanitation, water, education. This conference aims to help innovators to share their best practices or products developed to solve specific local problems which in turn may help the other researchers to take inspiration to solve problems in their region. On the other hand, technologies proposed by expert researchers may find applications in different regions. This offers a multidisciplinary platform for researchers from a broad range of disciplines of Science, Engineering and Technology for reporting innovations at different levels.

Adaptive filtering is useful in any application where the signals or the modeled system vary over time. The configuration of the system and, in particular, the position where the adaptive processor is placed generate different areas or application fields such as: prediction, system identification and modeling, equalization, cancellation of interference, etc. which are very important in many disciplines such as control systems, communications, signal processing, acoustics, voice, sound and image, etc. The book consists of noise and echo cancellation, medical applications, communications systems and others hardly joined by their heterogeneity. Each application is a case study with rigor that shows weakness/strength of the method used, assesses its suitability and

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suggests new forms and areas of use. The problems are becoming increasingly complex and applications must be adapted to solve them. The adaptive filters have proven to be useful in these environments of multiple input/output, variant-time behaviors, and long and complex transfer functions effectively, but fundamentally they still have to evolve. This book is a demonstration of this and a small illustration of everything that is to come.

The book covers a wide range of topics in Computer Science and Information Technology including swarm intelligence, artificial intelligence, evolutionary algorithms, and bio-inspired algorithms. It is a collection of papers presented at the First International Conference on Intelligent Computing and Communication (ICIC2) 2016. The prime areas of the conference are Intelligent Computing, Intelligent Communication, Bio-informatics, Geo-informatics, Algorithm, Graphics and Image Processing, Graph Labeling, Web Security, Privacy and e-Commerce, Computational Geometry, Service Orient Architecture, and Data Engineering. This book presents the latest trends and approaches in artificial intelligence research and its application to intelligent systems. It discusses hybridization of algorithms, new trends in neural networks, optimisation algorithms and real-life issues related to the application of artificial methods. The book constitutes the second volume of the refereed proceedings of the Artificial Intelligence and

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Algorithms in Intelligent Systems of the 7th Computer Science On-line Conference 2018 (CSOC 2018), held online in April 2018.

This two-volume set constitutes the refereed post-conference proceedings of the 8th International Conference on Advancement of Science and Technology, ICAST 2020, which took place in Bahir Dar, Ethiopia, in October 2020. The 74 revised full papers were carefully reviewed and selected from more than 200 submissions of which 157 were sent out for peer review. The papers present economic and technologic developments in modern societies in 6 tracks: Chemical, food and bio-process engineering; Electrical and computer engineering; IT, computer science and software engineering; Civil, water resources, and environmental engineering; Mechanical and industrial engineering; Material science and engineering.

This book contains a selection of thoroughly refereed and revised papers from the Second International ICST Conference on Wireless and Mobile Communication in Healthcare, MobiHealth 2010, held in Ayia Napa, Cyprus, in October 2010. The 33 papers in this volume describe various applications of information and communication technologies in healthcare and medicine and cover a wide range of topics such as intelligent public health monitoring services, mobile health technologies, signal processing techniques for monitoring services,

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wearable biomedical devices, ambient assistive technologies, emergency and disaster applications, and integrated systems for chronic monitoring and management.

The book covers the most recent developments in machine learning, signal analysis, and their applications. It covers the topics of machine intelligence such as: deep learning, soft computing approaches, support vector machines (SVMs), least square SVMs (LSSVMs) and their variants; and covers the topics of signal analysis such as: biomedical signals including electroencephalogram (EEG), magnetoencephalography (MEG), electrocardiogram (ECG) and electromyogram (EMG) as well as other signals such as speech signals, communication signals, vibration signals, image, and video. Further, it analyzes normal and abnormal categories of real-world signals, for example normal and epileptic EEG signals using numerous classification techniques. The book is envisioned for researchers and graduate students in Computer Science and Engineering, Electrical Engineering, Applied Mathematics, and Biomedical Signal Processing.

This Special Issue with 35 published articles shows the significance of the topic “Signal Processing and Analysis of Electrical Circuit”. This topic has been gaining increasing attention in recent times. The presented articles can be categorized into four different areas: signal processing and analysis methods of

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electrical circuits; electrical measurement technology; applications of signal processing of electrical equipment; fault diagnosis of electrical circuits. It is a fact that the development of electrical systems, signal processing methods, and circuits has been accelerating. Electronics applications related to electrical circuits and signal processing methods have gained noticeable attention in recent times. The methods of signal processing and electrical circuits are widely used by engineers and scientists all over the world. The constituent papers represent a significant contribution to electronics and present applications that can be used in industry. Further improvements to the presented approaches are required for realizing their full potential.

This book gathers selected papers presented at the Inventive Communication and Computational Technologies conference (ICICCT 2019), held on 29–30 April 2019 at Gnanamani College of Technology, Tamil Nadu, India. The respective contributions highlight recent research efforts and advances in a new paradigm called ISMAC (IoT in Social, Mobile, Analytics and Cloud contexts). Topics covered include the Internet of Things, Social Networks, Mobile Communications, Big Data Analytics, Bio-inspired Computing and Cloud Computing. The book is chiefly intended for academics and practitioners working to resolve practical issues in this area.

This book features papers presented at IIH-MSP 2018, the 14th International Conference on Intelligent Information Hiding and Multimedia Signal Processing. The scope of IIH-MSP

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included information hiding and security, multimedia signal processing and networking, and bio-inspired multimedia technologies and systems. The book discusses subjects related to massive image/video compression and transmission for emerging networks, advances in speech and language processing, recent advances in information hiding and signal processing for audio and speech signals, intelligent distribution systems and applications, recent advances in security and privacy for multimodal network environments, multimedia signal processing, and machine learning. Presenting the latest research outcomes and findings, it is suitable for researchers and students who are interested in the corresponding fields. IIH-MSP 2018 was held in Sendai, Japan on 26–28 November 2018. It was hosted by Tohoku University and was co-sponsored by the Fujian University of Technology in China, the Taiwan Association for Web Intelligence Consortium in Taiwan, and the Swinburne University of Technology in Australia, as well as the Fujian Provincial Key Laboratory of Big Data Mining and Applications (Fujian University of Technology) and the Harbin Institute of Technology Shenzhen Graduate School in China.

In the last decade, we have witnessed the rapid development of electronic technologies that are transforming our daily lives. Such technologies are often integrated with various sensors that facilitate the collection of human motion and physiological data and are equipped with wireless communication modules such as Bluetooth, radio frequency identification, and near-field communication. In smart healthcare applications, designing ergonomic and intuitive human–computer interfaces is crucial because a system that is not easy to use will create a huge obstacle to adoption and may significantly reduce the efficacy of the solution. Signal and data processing is another important consideration in smart healthcare applications because it

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must ensure high accuracy with a high level of confidence in order for the applications to be useful for clinicians in making diagnosis and treatment decisions. This Special Issue is a collection of 10 articles selected from a total of 26 contributions. These contributions span the areas of signal processing and smart healthcare systems mostly contributed by authors from Europe, including Italy, Spain, France, Portugal, Romania, Sweden, and Netherlands. Authors from China, Korea, Taiwan, Indonesia, and Ecuador are also included.

Testing and Measurement: Techniques and Applications is divided into 6 sections: Microwave, Ultrasonic and Acoustic Measurement and Application; Material Performance and Measuring and Testing Technique; Laser, Optics Fiber and Sensor; Industrial Autoimmunization and Measurement; Artificial Intelligence and Application; and Image, Signal and In

Nonlinear signal and image processing methods are fast emerging as an alternative to established linear methods for meeting the challenges of increasingly sophisticated applications. Advances in computing performance and nonlinear theory are making nonlinear techniques not only viable, but practical. This book details recent advances in nonl

This book presents a collection of recent and extended academic works in selected topics of biomedical signal processing, bio-imaging and biomedical ethics and legislation. This wide range of topics provide a valuable update to researchers in the multidisciplinary area of biomedical engineering and an interesting introduction for engineers new to the area. The techniques covered include modelling, experimentation and discussion with the application areas ranging from acoustics to oncology, health education and cardiovascular disease.

Oil and Gas Exploration Methods and Application John Wiley & Sons

This book showcases new theoretical findings and techniques in the field of intelligent systems

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and control. It presents in-depth studies on a number of major topics, including: Multi-Agent Systems, Complex Networks, Intelligent Robots, Complex System Theory and Swarm Behavior, Event-Triggered Control and Data-Driven Control, Robust and Adaptive Control, Big Data and Brain Science, Process Control, Intelligent Sensor and Detection Technology, Deep learning and Learning Control, Guidance, Navigation and Control of Aerial Vehicles, and so on. Given its scope, the book will benefit all researchers, engineers, and graduate students who want to learn about cutting-edge advances in intelligent systems, intelligent control, and artificial intelligence.

Neural signal processing is a specialized area of signal processing aimed at extracting information or decoding intent from neural signals recorded from the central or peripheral nervous system. This has significant applications in the areas of neuroscience and neural engineering. These applications are famously known in the area of brain–machine interfaces. This book presents recent advances in this flourishing field of neural signal processing with demonstrative applications.

This second of two volumes on EMG (Electromyography) covers a wide range of clinical applications, as a complement to the methods discussed in volume 1. Topics range from gait and vibration analysis, through posture and falls prevention, to biofeedback in the treatment of neurologic swallowing impairment. The volume includes sections on back care, sports and performance medicine,

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gynecology/urology and orofacial function. Authors describe the procedures for their experimental studies with detailed and clear illustrations and references to the literature. The limitations of SEMG measures and methods for careful analysis are discussed. This broad compilation of articles discussing the use of EMG in both clinical and research applications demonstrates the utility of the method as a tool in a wide variety of disciplines and clinical fields.

In healthcare systems, medical devices help physicians and specialists in diagnosis, prognosis, and therapeutics. As research shows, validation of medical devices is significantly optimized by accurate signal processing. Biomedical Signal and Image Processing in Patient Care is a pivotal reference source for progressive research on the latest development of applications and tools for healthcare systems. Featuring extensive coverage on a broad range of topics and perspectives such as telemedicine, human machine interfaces, and multimodal data fusion, this publication is ideally designed for academicians, researchers, students, and practitioners seeking current scholarly research on real-life technological inventions.

The general theme of MEDICON 2013 is "Research and Development of Technology for Sustainable Healthcare". This decade is being characterized by the appearance and use of emergent technologies under development. This

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situation has produced a tremendous impact on Medicine and Biology from which it is expected an unparalleled evolution in these disciplines towards novel concept and practices. The consequence will be a significant improvement in health care and well-fare, i.e. the shift from a reactive medicine to a preventive medicine. This shift implies that the citizen will play an important role in the healthcare delivery process, what requires a comprehensive and personalized assistance. In this context, society will meet emerging media, incorporated to all objects, capable of providing a seamless, adaptive, anticipatory, unobtrusive and pervasive assistance. The challenge will be to remove current barriers related to the lack of knowledge required to produce new opportunities for all the society, while new paradigms are created for this inclusive society to be socially and economically sustainable, and respectful with the environment. In this way, these proceedings focus on the convergence of biomedical engineering topics ranging from formalized theory through experimental science and technological development to practical clinical applications.

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