1. Record Nr.   UNINA9910350360203321

   Autore   Ghosh Dipak

   Titolo   Multifractals and Chronic Diseases of the Central Nervous System / / by
                              Dipak Ghosh, Shukla Samanta, Sayantan Chakraborty

   Pubbl/distr/stampa   Singapore : , : Springer Singapore : , : Imprint : Springer, , 2019

   ISBN   981-13-3552-4

   Edizione   [1st ed. 2019.]

   Descrizione fisica   1 online resource (198 pages)

   Disciplina   616.8

   Soggetti   Biomedical engineering
                              Neurosciences
                              Radiology
                              Biomathematics
                              Neurology
                              Biomedical Engineering/Biotechnology
                              Diagnostic Radiology
                              Mathematical and Computational Biology

   Lingua di pubblicazione   Inglese

   Formato   Materiale a stampa

   Livello bibliografico   Monografia

   Nota di contenuto   Chapter 1. Introduction -- Chapter 2. Multifractal study of EEG signal of
                              subjects with Epilepsy and Alzheimer's -- Chapter 3. Multifractal
                              Approach for Quantification of Autonomic Deregulation due to Epileptic
                              Seizure with ECG data -- Chapter 4. Multifractal Analysis of
                              Electromyography data.-Chapter 5. Multifractal study on Parkinson's
                              and Huntington diseases with human gait data -- Chapter 6.
                              Multifractal correlation study between posture and autonomic
                              deregulation using ECG and blood pressure data -- Chapter 7.
                              Appendix.

   Sommario/riassunto   This book primarily focuses on the study of various neurological
                              disorders, including Parkinson's (PD), Huntington (HD), Epilepsy,
                              Alzheimer's and Motor Neuron Diseases (MND) from a new perspective
                              by analyzing the physiological signals associated with them using non-
                              linear dynamics. The development of nonlinear methods has
                              significantly helped to study complex nonlinear systems in detail by
                              providing accurate and reliable information. The book provides a brief

introduction to the central nervous system and its various disorders, their effects on health and quality of life, and their respective courses of treatment, followed by different bioelectrical signals like those detected by Electroencephalography (EEG), Electrocardiography (ECG), and Electromyography (EMG). In turn, the book discusses a range of nonlinear techniques, fractals, multifractals, and Higuchi's Fractal Dimension (HFD), with mathematical examples and procedures. A review of studies conducted to date on neurological disorders like epilepsy, dementia, Parkinson's, Huntington, Alzheimer's, and Motor Neuron Diseases, which incorporate linear and nonlinear techniques, is also provided. The book subsequently presents new findings on neurological disorders of the central nervous system, namely Parkinson's disease and Huntington's disease, by analyzing their gait characteristics using a nonlinear fractal based technique: Multifractal Detrended Fluctuation Analysis (MFDFA). In closing, the book elaborates on several parameters that can be obtained from cross-correlation studies of ECG and blood pressure, and can be used as markers for neurological disorders. .