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Nota di contenuto	Foreword; Preface; Contents; Part I General Views on Brain-Computer Interfacing; 1 Brain Computer Interface: A Review; Abstract; 1.1 Introduction; 1.2 Neuroimaging-Based Approaches in the BCI; 1.2.1 The Neuroimaging Modalities; 1.2.1.1 Electroencephalography; 1.2.1.2 Electrocorticography; 1.2.1.3 Magnetoencephalography; 1.2.1.4 Intracortical Neuron Recording; 1.2.1.5 Functional Magnetic Resonance Imaging; 1.2.1.6 Near Infrared Spectroscopy; 1.3 Control Signals in BCI Systems; 1.3.1 EEG Signal Processing for BCI; 1.3.1.1 Data Collection Through Electrodes 1.3.1.2 Pre-processing Methods in BCI Designs 1.3.1.3 Sources of Noise in EEG Signal; 1.3.2 Preprocessing Techniques that Deal with EOG/EMG Artifacts; 1.3.3 Feature Extraction for BCI Designs; 1.3.3.1 EEG Features; 1.3.3.2 Feature Dimension Reduction Techniques; 1.3.4 Classification Methods and Post-processing; 1.3.4.1 Properties of Classifiers; 1.3.4.2 Brief Survey of Classifiers Used in BCI Research; 1.3.4.3 Linear Classifiers; 1.3.4.4 Neural Networks; 1.3.4.5 Nonlinear

Bayesian Classifiers; 1.3.4.6 Nearest Neighbor Classifiers; 1.3.4.7 Combinations of Classifiers  
 1.3.5 Classification Performance Metrics  
 1.4 Conclusion; References; 2 Basics of Brain Computer Interface; Abstract; 2.1 Introduction; 2.2 Brain Anatomy; 2.3 Brain Computer Interface Types; 2.3.1 Invasive BCI Acquisition Techniques; 2.3.2 Partially Invasive BCI Acquisition Techniques; 2.3.3 Non Invasive BCI Acquisition Techniques; 2.4 Types of BCI Signals; 2.5 Components of Interest; 2.5.1 Oscillatory EEG Activity; 2.5.2 Event-Related Potentials; 2.6 Monitoring Brain Activity Using EEG; 2.7 BCI System; 2.8 BCI Monitoring Hardware and Software; 2.9 Brain Computer Interface Applications  
 2.10 BCI Trends  
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 3.5.5 Electroneurogram (ENG)

Sommario/riassunto

The success of a BCI system depends as much on the system itself as on the user's ability to produce distinctive EEG activity. BCI systems can be divided into two groups according to the placement of the electrodes used to detect and measure neurons firing in the brain. These groups are: invasive systems, electrodes are inserted directly into the cortex are used for single cell or multi unit recording, and electrocorticography (ECoG), electrodes are placed on the surface of the cortex (or dura); noninvasive systems, they are placed on the scalp and use electroencephalography (EEG) or magnetoencephalography (MEG) to detect neuron activity. The book is basically divided into three parts. The first part of the book covers the basic concepts and overviews of Brain Computer Interface. The second part describes new theoretical developments of BCI systems. The third part covers views on real applications of BCI systems.