1. Record Nr. UNINA9910299472803321

Autore	Valenza Gaetano
Titolo	Autonomic Nervous System Dynamics for Mood and Emotional-State Recognition : Significant Advances in Data Acquisition, Signal Processing and Classification / / by Gaetano Valenza, Enzo Pasquale Scilingo
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	9783319026398 3319026399
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (xix, 162 pages) : illustrations (some color)
Collana	Series in BioEngineering, , 2196-887X
Disciplina	168
Soggetti	Biomedical engineering Artificial intelligence Psychobiology Signal processing Computational intelligence Neurosciences Biomedical Engineering and Bioengineering Artificial Intelligence Biological Psychology Signal, Speech and Image Processing Computational Intelligence Neuroscience
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"ISSN: 2196-8861." "ISSN: 2196-887X (electronic)."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Emotions and Mood States: Modeling, Elicitation, and Classification through Autonomic Patterns -- Gathering Data from the Autonomic Nervous System: Experimental Procedures and Wearable Monitoring Systems -- Methodology of Advanced Signal Processing and Modeling -- Experimental Evidences on Healthy Subjects and Bipolar Patients -- Discussion on mood and emotional-state recognition using the

Autonomic Nervous System Dynamics -- Summary of the Book and Direction for Future Research.

Sommario/riassunto

This monograph reports on advances in the measurement and study of autonomic nervous system (ANS) dynamics as a source of reliable and effective markers for mood state recognition and assessment of emotional responses. Its primary impact will be in affective computing and the application of emotion-recognition systems. Applicative studies of biosignals such as: electrocardiograms; electrodermal responses; respiration activity; gaze points; and pupil-size variation are covered in detail, and experimental results explain how to characterize the elicited affective levels and mood states pragmatically and accurately using the information thus extracted from the ANS. Nonlinear signal processing techniques play a crucial role in understanding the ANS physiology underlying superficially noticeable changes and provide important quantifiers of cardiovascular control dynamics. These have prognostic value in both healthy subjects and patients with mood disorders. Moreover, Autonomic Nervous System Dynamics for Mood and Emotional-State Recognition proposes a novel probabilistic approach based on the point-process theory in order to model and characterize the instantaneous ANS nonlinear dynamics providing a foundation from which machine “understanding” of emotional response can be enhanced. Using mathematics and signal processing, this work also contributes to pragmatic issues such as emotional and mood-state modeling, elicitation, and non-invasive ANS monitoring. Throughout the text a critical review on the current state-of-the-art is reported, leading to the description of dedicated experimental protocols, novel and reliable mood models, and novel wearable systems able to perform ANS monitoring in a naturalistic environment. Biomedical engineers will find this book of interest, especially those concerned with nonlinear analysis, as will researchers and industrialtechnicians developing wearable systems and sensors for ANS monitoring.