

# Preface

The book reports on recent advances in studying autonomic nervous system (ANS) dynamics for the assessment of mood and emotional states. We will illustrate several concepts, some of which are currently sparse over different manuscripts, in order to bring out a clear breakthrough in the field of affective computing, mood assessment, biomedical engineering, biomedical signal processing, and data acquisition. The aim is to describe some personalized methodologies able to characterize the affective state of a subject by means of the analysis of a wide spectrum of peripheral biosignals such as Heart Rate Variability, Electrodermal Response, Respiration Activity, Eye gaze information.

These methodologies will be presented with applications on actual data gathered from healthy subjects as well as patients affected by mood disorders, although the reported advances can also be applied to several other (clinical) fields. Starting from a psychological description of how-to-elicite an emotion (including models of emotions, affective stimuli etc.), concepts will move to the neuro-physiology of emotions, explaining the physiological bases of emotion recognition through non-invasive monitoring of the ANS. Afterwards, advanced methodologies of biomedical signal processing will be thoroughly described pointing out the crucial role of ANS nonlinear dynamics. Then, the book will emphasize a probabilistic framework based on point-processes able to instantaneously assess the ANS control on the linear and the nonlinear cardiovascular dynamics. Concerning the signal acquisition, novel wearable monitoring systems will be described in further sections along with experimental procedures on healthy subjects and patients with bipolar disorders. The high technical content and all the proposed pioneering approaches make this monograph of large interest. Several professionals such as biomedical engineers as well as physiologists, neuroscientists, etc. could benefit from the content of this book.

Pisa, Italy  
August 2013

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Autonomic Nervous System Dynamics for Mood and  
Emotional-State Recognition

Significant Advances in Data Acquisition, Signal  
Processing and Classification

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2014, XIX, 162 p. 49 illus., 36 illus. in color., Hardcover

ISBN: 978-3-319-02638-1