

Book Review

Advances in Processing and Pattern Analysis of Biological Signals, edited by Isak Gath and Gideon F. Ibar. New York: Plenum, 1996, 424 pp., \$115 (US).

An International Symposium on Processing and Pattern Analysis of Biological Signals was held at the Technion-Israel Institute of Technology in 1995. This book contains 27 papers from the five sessions of that symposium.

The first section, “Processing and Pattern Analysis of Normal and Pathological EEG,” covers such modern topics as nonlinear dynamic modeling, time varying parametric modeling, and Markov analysis. These techniques are applied to topics such as the analysis of epileptic EEG, sleep EEG, and psychiatric EEG.

The second section, “Investigation of Psychophysiological Phenomena by Processing and Pattern Analysis of Evoked Potentials,” describes methods for analyzing single trial evoked potentials. Modern techniques such as wavelet decomposition are discussed.

The third section follows the same approach for pattern analysis of neural cell activity. Topics such as system identification methods are covered here, as well as coherence analysis and temporal encoding.

The fourth section is entitled “Processing and Pattern Analysis of ECG in Health and Disease.” The six papers in this section cover such topics as heart rate variability, arrhythmia analysis, and analyses of ventricular fibrillation.

The final section is devoted to applications for EMG and human movement problems as described in six papers. Applications include the processing of multichannel EMG signals and the modeling and analysis of human movement such as handwriting.

These very brief descriptions of the sections merely give a feel for the breadth of topics covered in this symposium and its published proceedings and are by no means exhaustive. This collection gives one a sense of the rapid developments in the field of signal processing and analysis as applied to a wide range of biological and biomedical applications. Techniques such as spectral estimation, wavelet transforms, nonlinear system modeling, and chaos analysis are used successfully throughout the papers to seek understanding of basic physiological mechanisms. This book provides a useful resource for anyone working in any of these fields, who wants to delve into current advances in that field or, perhaps, to look for elusive connections and insights from the examples of advanced signal processing and analysis techniques applied in different circumstances.

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