Book Reviews

INFORMATION PROCESSING IN MEDICAL IMAGING. Proceedings of the 8th Conference, Brussels, August 29–September 2, 1983.
F. Deconinck, Ed. Boston, Martinus Nijhoff, 1984, 580 pp, $84.00

This book is very valuable for the medical imaging scientist and may serve several purposes: as a detailed and relatively complete introduction to a possibly unfamiliar area of medical imaging, and as a source of inspiration for one's own research.

True to the book's title, the papers address aspects of the information content of medical imaging: how to detect, measure, classify, and display it. Measurement may be subdivided into instrumentation for the acquisition of data, reconstruction of the raw data into an image, and pre- and postprocessing to enhance information in the images. Taking some liberties with the authors intentions, the papers may be classified by this scheme.

In the detection of information, Venot et al. discuss detecting changes in images whereas Geiser et al. concentrate on endocardial boundary detection.

The instrumentation aspect of measurement is considered in several papers. Bizais et al. and Barrett et al. discuss coded aperture tomography. Barber et al. describe applied potential tomography, and Clayton et al. describe the use of the uncollimated Compton profile in measuring osteoporotic changes in the vertebrae.

Reconstruction methods focus on single photon emission computed tomography (SPECT). Oppenheim and Appledorn compare algebraic and convolution algorithms while Tanaka and Toyama present a weighted back projection algorithm. Defrise and DeMol discuss more generally the problem of limited angle reconstruction.

The processing of data both before and after reconstruction is the largest part of measurement and of the book. Konstantinow et al. reduce crosstalk in first-pass angiocardiography, Todd-Pokropek et al. describe pre-processing steps to make SPECT attenuation correction object-independent. Leach et al. apply variable median filtering to projections prior to tomographic reconstruction. Houston and MacLeod compare a variety of temporal functional images derived from multigated cardiac studies while Brown et al. describe automatic functional imaging from such data. Bacharach et al. discuss the effects of sharp cutoff filters on time-activity curves, and Luypaert and Bossuyt consider the assessment of cardiac function from noisy data using synergy indices. Goris describes a single measure of regional wall motion based on normalization to global performance. Toet et al. discuss topological methods of image analysis and DeGraaf et al. apply several hierarchical image processing algorithms. Somer and Jongsma present an acusto-optical method of deconvolution for real-time echography. Ortendahl et al. describe a Bayesian resolution recovery algorithm. Sandor et al. create zonal parametric images applying the concepts of segmental analysis and functional imaging. Wagner and Brown present a unified analysis of the SNR characteristics of medical imaging systems.

The goal of many of these measurements techniques is to supply processed data from which a diagnosis or some other classification may be made. Several classification approaches are discussed. Nijran and Barber apply factor analysis to dynamic studies. Duvernoy et al. employ linear classifiers in recognizing the temporal behavior of the heart. Pavel et al. provide the normal data for several functional images computed from multigated heart studies. Schmidlin and Clorius use discriminant analysis on exercise venograms. Goris et al. describe the interpretation of thallium myocardial perfusion studies on a stochastic basis. Metz et al. examine the significance of ROC curve differences arising from correlated data. Ortendahl et al. discuss the fundamentals necessary for automating tissue characterization by nuclear magnetic resonance (NMR).

Two papers discuss aspects of the visual presentation of information. Pizer et al. describe an interactive three-dimensional image display while Baxter et al. discuss the visual performance of the observer.

The papers in the areas with which this reviewer is most familiar, temporal analysis of multigated cardiac studies and NMR, are up-to-date as of 1983, and make substantial contributions toward answering important questions. These papers remain significant 2 yr after they were first presented.

While this book is an excellent resource for the imaging scientist, the physician with a technical bent might also benefit from it. This reviewer eagerly awaits the proceedings of the ninth conference.

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MANUAL OF DIAGNOSTIC IMAGING. A CLINICIAN'S GUIDE TO CLINICAL PROBLEM SOLVING.
W. H. Straub, Ed. Boston, Little, Brown and Co., 1984, 298 pp, $16.95

This soft-cover paperback, one of the series of inexpensive spiral-bound manuals produced by Little, Brown and Co., meets the editor's stated goal of producing an inexpensive manual for daily use, "superficial by intent" but providing an overview of an efficient approach to diagnostic imaging. The introductory section deals with economic and statistical aspects of modern medical practice, speculations on the effect of DRGs and the algorithmic, decision-tree approach to medical problem solving. The sections which follow present concise discussions of clinical problems as varied as scrotal masses, dementia, and renal transplant rejection. These discussions follow an effective and logical fixed format: the overview of the role of imaging studies, one or several decision trees, and a commented bibliography of key references. The approach to imaging is genuinely coherent and humane and the use of interventional techniques is presented with reasoned enthusiasm. The chapters on staging of tumors are particularly good. Discussions are well presented and easy to find by flipping pages. However, it should be emphasized that some of the