histogram equalization and then masking techniques, smoothing, and noise filtering.

- Defines a potpourri of edge detection techniques and then discusses image segmentation using line detection and luminance thresholding.
- Uses nonstationary signals as a rationale for needing wavelets and provides a cursory definition of 1 and 2 D wavelets using MATLAB tools.
- Presents a variety of definitions but concentrates on stochastic signals Stationarity, auto- and cross-correlation functions, and power spectra are defined. Interestingly, entropy and Huffman coding are also defined.
- Defines clusters and clustering and reviews the K-means algorithm. Then widely used classification techniques, such as Bayes and maximum likelihood, and perceptron are defined.
- Section II deals with basics and processing of biomedical signals; it contains five chapters.
- Ion transport is reviewed as a mechanism for generating action potentials. Then the Hodgkin-Huxley equations and wave propagation are presented.
- A good summary of the mechanical function of the heart and its concomitant/causal electrical activity is presented. Electrode placement for measuring electrocardiogram (ECG) and typical normal ECG sets the stage for understanding the various cardiac abnormalities and their pathologic ECG patterns.
- A schematic of the brain and the generation of the electroencephalogram (EEG) are discussed. The montage for measuring the EEG is shown and the various waves and their significance are discussed. This is followed by various brain dysfunctions and how they are represented in the EEG and evoked potentials. The chapter ends with a discussion of coherence.

The structure of skeletal muscle is presented and then force generation in muscles as a consequence of ionic activity is summarized. The excitation contraction coupling leads to the definition of intramuscular and extramuscular electromyograms (EMG). Then neuromuscular pathologies and how they affect the EMG is discussed. (The chapters on ECG, EMG, and EEG end with brief summaries of analysis approaches in the time, frequency, and wavelet domains).

Several of other biomedical signals, such as blood pressure, are described.

Section III deals with the processing of biomedical images; it contains six chapters.

This chapter contains a mathematical treatment of computed tomography. Source-attenuation relationships and projection functions using parallel beams are described.

The next several chapters, except 16, present specific imaging modalities, starting with X-ray imaging and the importance of dosage. Attenuation is mathematically defined and how various tissues attenuate energy is shown. Finally the various detection media and their sensitivity to anatomic structures are discussed. A similar approach is used to present MRI and fMRI. Special emphasis is given to fMRI and the capability for imaging time-varying cortical activity.

Ultrasound imaging is overviewed, including the mathematics of sound generation, attenuation, reflection, and detection. The mathematics of the modalities for attenuation, time-of-flight, and reflection are presented separately. The challenges of artifacts, image reconstruction, and registration are briefly discussed.

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Science and Technology in Medicine, An Illustrated Account Based on Ninety-Nine Landmark Publications From Five Centuries, by Andras Gedeon

Springer Press, 2006, ISBN 0-387-27874-5, vii + 551 pages, US$89.95

This is a coffee table and teaching text that covers some 99 well-selected scientific and technical discoveries over the past five centuries that have had a significant impact on the practice of medicine. The text has over 1,130 illustrations. Each chapter begins with a short biography of the inventors or discoverers of the technology (such as Michael Phelps), a description of the technology (such as "Application of Annihilation Coincidence Detection to Transaxial Reconstruction Tomography,") a perspective of the field, and a brief discussion of major modifications since the inception of the technology. The topics are wide-ranging, and include the discovery of ether, the Doppler Effect, invention of the ophthalmoscope, antiseptic surgery, the modern ECG recorder, etc. The chapters are well referenced and very well illustrated, the original text or cover sheets of many articles are to be found in many of the chapters (in their original language.) The text as a whole is a pleasure to read. Once started, it is difficult to put down.

As a coffee table text, this book belongs in the waiting room of every BME department chairman's office! It is a motivator for anyone thinking about the interaction of technology, engineering, and medicine. It is appropriate for many other offices such as medical physics and history of medicine departments.

A great deal of effort has gone into the generation of this text. I wish only that there were an accompanying CD with all the illustrations on it (at least) such that one could pick and choose illustrations for teaching purposes!

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Wiley Encyclopedia of Biomedical Engineering, Edited by Metin Akay

Wiley Interscience Press, 2006, ISBN 0-471-24967-X, 4,037 pages. US$1,950.

Wiley, after publishing the six volume *Encyclopedia of Medical Devices and Instrumentation* by Webster, has done it again with the publication of the six volume *Encyclopedia of Biomedical Engineering*! In 3,881 pages, 350 articles describe from accelerometer to xenotransplantation various engineering topics relevant to biomedical engineering and the educational pursuit thereof.