Imaging Systems For Medical Diagnostics Fundamentals Technical Solutions And Applications For Systems Applying Ionizing Radiation Nuclear Magnetic Resonance And Ultrasound | c5282feebbf4afda8301192d6b09f8d2

Fundamentals of Medical Imaging


This chapter provides an overview of the theoretical and experimental essentials and state of the art in cancer MRI. It includes biophysical and theoretical explanations of the most relevant MRI techniques as well as examples of these techniques in cancer applications. The introductory part of the book covers basic cancer biology, theoretical aspects of NMR/MRI physics, and the hardware required to form MR images. Forming the core of the book, the next three parts illustrate how to characterize tissue properties with endogenous and exogenous contrast mechanisms and discuss common image processing techniques relevant for cancer. The final part expands emerging areas of MR cancer characterization, including radiation therapy planning, cellular and molecular imaging, pH imaging, and hyperpolarized MR. Each of the post-introductory chapters describes the salient qualitative and quantitative aspects of the techniques before proceeding to preclinical and clinical applications. Each chapter also contains references for further study. Leading the way toward more personalized medicine, this text brings together existing and emerging quantitative MRI techniques for assessing cancer. It provides a self-contained overview of the theoretical and experimental essentials and state of the art in cancer MRI.

Medical Imaging Systems Technology

Propelling quantitative MRI techniques from bench to bedside, Quantitative MRI in Cancer presents a range of quantitative MRI methods for assessing tumor biology. It includes biophysical and theoretical explanations of the most relevant MRI techniques as well as examples of these techniques in cancer applications. The introductory part of the book covers basic cancer biology, theoretical aspects of NMR/MRI physics, and the hardware required to form MR images. Forming the core of the book, the next three parts illustrate how to characterize tissue properties with endogenous and exogenous contrast mechanisms and discuss common image processing techniques relevant for cancer. The final part expands emerging areas of MR cancer characterization, including radiation therapy planning, cellular and molecular imaging, pH imaging, and hyperpolarized MR. Each of the post-introductory chapters describes the salient qualitative and quantitative aspects of the techniques before proceeding to preclinical and clinical applications. Each chapter also contains references for further study. Leading the way toward more personalized medicine, this text brings together existing and emerging quantitative MRI techniques for assessing cancer. It provides a self-contained overview of the theoretical and experimental essentials and state of the art in cancer MRI.

Medical Imaging Systems Technology

Hands-on text for a first course aimed at end-users, focusing on concepts, practical issues and problem solving.

Fundamental Mathematics and Physics of Medical Imaging

The Physics of Medical Imaging reviews the scientific basis and physical principles underpinning imaging in medicine. It covers the major imaging methods of x-ray, ultrasound, magnetic resonance, and considers promising new techniques. Following these reviews are several thematic chapters that cover the mathematics of medical imaging, image perception, computational requirements, and techniques. Throughout the book, the author encourages readers to consider key questions concerning imaging. This profusely illustrated and extensively indexed text is accessible to graduate physical scientists, advanced undergraduates, and research
Medical Imaging Systems Technology: Modalities

Describes the most common imaging technologies and their diagnostic applications so that pharmacists and other health professionals, as well as imaging researchers, can understand and interpret medical imaging science. This book guides pharmacists and other health professionals and researchers to understand and interpret medical imaging. Divided into two sections, it covers both fundamental principles and clinical applications. It describes the most common imaging technologies and their use to diagnose diseases. In addition, the authors introduce the emerging role of molecular imaging including PET in the diagnosis of cancer and to assess the effectiveness of cancer treatments. The book features many illustrations and discusses many patient case examples. Medical Imaging for Health Professionals: Technologies and Clinical Applications offers in-depth chapters explaining the basic principles of: X-Ray, CT, and Mammography Technology; Nuclear Medicine Imaging Technology; Radiopharmaceuticals; Magnetic Resonance Imaging (MRI) Technology; and Ultrasound Imaging Technology. It also provides chapters written by expert radiologists in well-explained terminology discussing clinical applications including: Cardiac Imaging; Lung Imaging; Breast Imaging; Endocarid Gland Imaging; Abdominal Imaging; Genitourinary Tract Imaging; Imaging of the Head, Neck, Spine and Brain; Musculoskeletal Imaging; and Molecular Imaging with Positron Emission Tomography (PET). Teaches pharmacists, health professionals, and researchers the basics of medical imaging technology introduces all of the customary imaging tools—X-ray, CT, ultrasound, MRI, SPECT, and PET—and describes their diagnostic applications. Explains how molecular imaging aids in cancer diagnosis and in assessing the effectiveness of cancer treatments. Includes many case examples of imaging applications for diagnosing common diseases. Medical Imaging for Health Professionals: Technologies and Clinical Applications is an important resource for pharmacists, nurses, physiotherapists, respiratory therapists, occupational therapists, radiological or nuclear medicine technologists, health physicists, radiotherapists, as well as researchers in the imaging field.

Pattern Recognition and Signal Analysis in Medical Imaging

Noninvasive medical diagnosis (NIMD) is as old as medical practice itself. From the earliest healers’ observations of odors, skin color, and breath sounds to today’s wealth of technologies, the basics remain the same and keep the role of NIMD essential to effective medical care. Noninvasive Instrumentation and Measurement in Medical Diagnosis

Computer-Aided Detection and Diagnosis in Medical Imaging

This scholarly set of well-harmonized volumes provides indispensable and complete coverage of the exciting and evolving subject of medical imaging systems. Leading experts on the international scene tackle the latest cutting-edge techniques and technologies in an in-depth but eminently clear and readable approach. Complementing and intersecting one another, each volume offers a comprehensive treatment of substantive importance to the subject areas. The chapters, in turn, address topics in a self-contained manner with authoritative introductions, useful summaries, and detailed reference lists. Extensively well-illustrated with figures throughout, the five volumes as a whole achieve a unique depth and breadth of coverage. As a cohesive whole or independent of one another, the volumes may be acquired as a set or individually.

Machine Learning and Medical Imaging

This scholarly set of well-harmonized volumes provides indispensable and complete coverage of the exciting and evolving subject of medical imaging systems. Leading experts on the international scene tackle the latest cutting-edge techniques and technologies in an in-depth but eminently clear and readable approach. Complementing and intersecting one another, each volume offers a comprehensive treatment of substantive importance to the subject areas. The chapters, in turn, address topics in a self-contained manner with authoritative introductions, useful summaries, and detailed reference lists. Extensively well-illustrated with figures throughout, the five volumes as a whole achieve a unique depth and breadth of coverage. As a cohesive whole or independent of one another, the volumes may be acquired as a set or individually.

Webb’s Physics of Medical Imaging, Second Edition

This third edition provides a concise and generously illustrated survey of the complete field of medical imaging and image computing, explaining the mathematical and physical principles and giving the reader a clear understanding of how images are obtained and interpreted. Medical imaging and image computing are rapidly evolving fields, and this edition has been updated with the latest developments in the field, as well as new images and animations. An introductory chapter on digital image processing is followed by chapters on the imaging modalities: radiography, CT, MRI, nuclear medicine and ultrasound. Each chapter covers the basic physics and interaction with tissue, the image reconstruction process, image quality aspects, modern equipment, clinical applications, image biological effects and safety issues. Subsequent chapters review image computing and visualization for diagnosis and treatment. Engineers, physicists and clinicians at all levels will find this new edition an invaluable aid in understanding the principles of imaging and their clinical applications.

Improving Diagnosis in Health Care

This scholarly set of well-harmonized volumes provides indispensable and complete coverage of the exciting and evolving subject of medical imaging systems. Leading experts on the international scene tackle the latest cutting-edge techniques and technologies in an in-depth but eminently clear and readable approach. Complementing and intersecting one another, each volume offers a comprehensive treatment of substantive importance to the subject areas. The chapters, in turn, address topics in a self-contained manner with authoritative introductions, useful summaries, and detailed reference lists. Extensively well-illustrated with figures throughout, the five volumes as a whole achieve a unique depth and breadth of coverage. As a cohesive whole or independent of one another, the volumes may be acquired as a set or individually.

Electromagnetic Technologies for Medical Diagnostics

Advances in digital technology led to the development of digital x-ray detectors that are currently in wide use for projection radiography, including Computed Radiography (CR) and Digital Radiography (DR). Digital Imaging Systems for Plain Radiography addresses the current technological methods available to medical imaging professionals to ensure the optimization of the radiological process concerning image quality and reduction of patient exposure. Based on extensive research by the authors and reference to the current literature, the book addresses how exposure parameters influence the diagnostic quality in digital systems, what the current acceptable radiation doses are for useful diagnostic images, and at what level the dose could be reduced to maintain an accurate diagnosis. The book is a valuable resource for both students learning the field and for imaging professionals to apply to their own practice while performing radiological examinations with digital systems.

Medical Diagnostic Imaging Systems

Authored by a leading educator, this book teaches the fundamental mathematics and physics concepts associated with medical imaging systems. Going beyond mere description of imaging modalities, this book delves into the mechanisms of image formation and image quality...
AI Innovation in Medical Imaging Diagnostics

This book, written by authors with more than a decade of experience in the design and development of artificial intelligence (AI) systems in medical imaging, provides readers in the field with an updated roadmap for the current and future landscape. After an introductory description of classical machine learning techniques, the fundamentals of deep learning are explained in a simple yet comprehensive manner. The book then proceeds with a historical perspective of how medical AI developed in time, detailing which applications triumphed and which failed, from the era of computer aided detection systems on to the current cutting-edge applications in deep learning today, which are starting to exhibit on-par performance with clinical experts. In the last section, the book offers a view on the complexity of the validation of artificial intelligence applications for commercial use, describing the recently introduced concept of software as a medical device, as well as good practices and relevant considerations for training and testing machine learning systems for medical use. Open problematics on the validation for public use of systems which by nature continuously evolve through new data is also explored. The book will be of interest to graduate students in medical physics, biomedical engineering and computer science, in addition to researchers and medical professionals operating in the medical imaging domain, who wish to better understand these technologies and the future of the field. Features: An accessible yet detailed overview of the field Explores a hot and growing topic Provides an interdisciplinary perspective

Imaging Systems for Medical Diagnostics

Over recent years there has been a vast expansion in the variety of imaging techniques available, and developments in machine specifications continue apace. If radiologists and radiographers are to obtain optimal image quality while minimising exposure times, a good understanding of the fundamentals of the radiological science underpinning diagnostic imaging is essential. The second edition of this well-received textbook continues to cover all technical aspects of diagnostic radiology, and remains an ideal companion during examination preparation and beyond. The content includes a review of basic science aspects of imaging, followed by a detailed explanation of radiological sciences, conventional x-ray image formation and other imaging techniques. The enormous technical advances in computed tomography, including multislice acquisition and 3D image reconstruction, digital imaging in the form of image plate and direct radiography, magnetic resonance imaging, colour flow imaging in ultrasound and positron radiopharmaceuticals in nuclear medicine, are all considered here. A chapter devoted to computers in radiology considers advances in radiology information systems and computer applications in image storage and communication systems. The text also deals with a series of general topics relating to diagnostic imaging. The content has been revised and updated throughout to ensure it remains in line with the Fellowship of the Royal College of Radiologists (FRCR) examination, while European and American perspectives on technology, guidelines and regulations ensure international relevance.

The Physics of Diagnostic Imaging Second Edition

Informatics in Medical Imaging provides a comprehensive survey of the field of medical imaging informatics. In addition to radiology, it also addresses other specialties such as pathology, cardiology, dermatology, and surgery, which have adopted the use of digital images. The book discusses basic imaging informatics protocols, picture archiving and communication systems, and the electronic medical record. It details key instrumentation and data mining technologies used in medical imaging informatics as well as practical operational issues, such as procurement and maintenance, telecommunication and security. The basics of informatics in medical imaging are explained from the basic ideas of imaging informatics, the terms used, and how data are represented and transmitted. Emphasizes the fundamental communication paradigms: HL7, DICOM, and IHE. Describes information systems that are typically used within imaging departments: orders and result systems, acquisition systems, reporting systems, archives, and information-display systems. Outlines the principal components of modern computing, networks, and storage systems. Covers the technology and principles of display and acquisition detectors, and rounds out with a discussion of other key computer technologies. Discusses procurement and maintenance issues; ethics and its relationship to government initiatives like HIPAA; and constructs beyond radiology.

Artificial Intelligence in Medical Imaging

This volume comprises of 21 selected chapters, including two overview chapters devoted to abdominal imaging in clinical applications supported computer aided diagnosis approaches as well as different techniques for solving the pectoral muscle extraction problem in the preprocessing part of the CAD systems for detecting breast cancer in its early stage using digital mammograms. The aim of this book is to stimulate further research in medical imaging applications based algorithmic and computer based approaches and utilize them in real-world clinical applications. The book is divided into four parts: Part-I: Clinical Applications of Medical Imaging, Part-II: Classification and clustering, Part-III: Computer Aided Diagnosis (CAD) Tools and Case Studies, and Part-IV: Bio-inspiring based Computer Aided diagnosis techniques.

Medical Imaging Systems Technology: Methods in cardiovascular and brain systems

This volume describes concurrent engineering developments that affect or are expected to influence future development of digital diagnostic imaging. It also covers current developments in Picture Archiving and Communications System (PACS) technology, with particular emphasis on integration of emerging imaging technologies into the hospital environment.

Diagnostic Ultrasound Imaging: Inside Out

Medical imaging is one of the heaviest funded biomedical engineering research areas. The second edition of Pattern Recognition and Signal Analysis in Medical Imaging brings sharp focus to the development of integrated systems for use in the clinical sector, enabling both imaging and the automatic assessment of the resultant data. Since the first edition, there has been tremendous development of new, powerful technologies for detecting, storing, transmitting, analyzing, and displaying medical images. Computer-aided analytical techniques, coupled with a continuing need to derive more information from medical images, has led to a growing application of digital processing techniques in cancer detection as well as elsewhere in medicine. This book is an essential tool for students and professionals, compiling and explaining proven and cutting-edge methods in pattern recognition for medical imaging. New edition has been expanded to cover signal analysis, which was only superficially covered in the first edition. New chapters cover Cluster Validity Techniques, Computer-Aided Diagnosis Systems in Breast MRI, Support Vector Machines in Functional, Contrast-Enhanced and Perfusion Cardiovascular MRI. Gives readers an unparalleled insight into the latest pattern recognition and signal analysis technologies, modeling, and applications.

Handbook of Medical Imaging

Covers the most important imaging modalities in radiology: projection radiography, x-ray computed tomography, nuclear medicine, ultrasound imaging, and magnetic resonance imaging. Organized into parts to emphasize key overall conceptual divisions.
Quantitative MRI in Cancer

This book provides the most recent findings and knowledge in advanced diagnostics technology, covering a wide spectrum including brain activity analysis, breast and lung cancer detection, echocardiography, computer-aided skeletal assessment to mitochondrial biology imaging at the cellular level. The authors explored magneto acoustic approaches and tissue elasticity imaging for the purpose of breast cancer detection. Perspectives in fetal echocardiography from an image processing angle are included. Diagnostic imaging in the field of mitochondrial diseases as well as the use of Computer-Aided System (CAD) are also discussed in the book. This book will be useful for students, lecturers or professional researchers in the field of biomedical sciences and image processing.

Noninvasive Instrumentation and Measurement in Medical Diagnosis

Electromagnetic (EM) wave technologies for medical imaging represent an emerging alternative diagnostic modality with some unique features, which is attracting the attention of many researchers worldwide. Diagnostic devices based on EM technology have no side-effects, as they exploit non-ionizing radiation, and their intrinsic low cost makes them sustainable for healthcare systems. This Special Issue provides a comprehensive account of this very active research area by gathering contributions that cover a variety of topics ranging from fundamental research questions to experimental validation and clinical translation.

Problems and Solutions in Medical Physics

Since the publication of the best-selling, highly acclaimed first edition, the technology and clinical applications of medical imaging have changed significantly. Gathering these developments into one volume, Webb’s Physics of Medical Imaging, Second Edition presents a thorough update of the basic physics, modern technology and many examples of clinical application across all the modalities of medical imaging. New to the second edition Extensive updates to all original chapters Coverage of state-of-the-art detector technology and computer processing used in medical imaging 11 new contributors in addition to the original team of authors Two new chapters on medical image processing and multimodality imaging More than 50 percent new examples and over 80 percent new figures Glossary of abbreviations, color insert and contents lists at the beginning of each chapter Keeping the material accessible to graduate students, this well-illustrated book reviews the basic physics underpinning imaging in medicine. It covers the major techniques of x-radiology, computerised tomography, nuclear medicine, ultrasound and magnetic resonance imaging, in addition to infrared, electrical impedance and optical imaging. The text also describes the mathematics of medical imaging, image processing, image perception, computational requirements and multimodality imaging.

Physics in Medical Diagnosis

Provides detailed information on diagnostic radiology contributing to the broad field of imaging. Entries are written by leading experts and will provide basic and clinical scientists in academia, practice and industry with valuable information about the field of diagnostic imaging.

Encyclopedia of Imaging

Advances in Medical Diagnostic Technology

Recent advancements in the technology of medical imaging, such as CT and MRI scanners, are making it possible to create more detailed 3D and 4D images. These powerful images require vast amounts of digital data to help with the diagnosis of the patient. Artificial intelligence (AI) must play a role in supporting the analysis of this medical imaging data, but it will only be as effective as long as healthcare professionals and AI interact to embrace deep thinking platforms such as automation in the identification of diseases in patients. AI Innovation in Medical Imaging Diagnostics is an essential reference source that examines AI applications in medical imaging that can transform hospitals to become more efficient in the management of patient treatment plans through the production of faster imaging and the reduction of radiation dosages through the PET and SPECT imaging modalities. The book also explores how data clusters from these images can be translated into small data packages that can be accessed by healthcare departments to give a real-time insight into patient care and required interventions. Featuring research on topics such as assistive healthcare, cancer detection, and machine learning, this book is ideally designed for healthcare administrators, radiologists, data analysts, computer science professionals, medical imaging specialists, diagnosticians, medical professionals, researchers, and students.

Principles of Medical Imaging

Physics has been applied to medical diagnosis for very nearly 400 years, and has now become an essential element of medical practice. This book concentrates on the theoretical basis of the physics which supports diagnostic techniques in modern clinical practice. Arising out of a decade of teaching a course on medical physics to third year undergraduate students, the book has been structured so that individuals with a non-physics background, such as medical students or practitioners, can also benefit.

Diagnostic Imaging: Nuclear Medicine E-Book

This open access book gives a complete and comprehensive introduction to the fields of medical imaging systems, as designed for a broad range of applications. The authors of the book first explain the foundations of system theory and image processing, before highlighting several modalities in a dedicated chapter. The initial focus is on modalities that are closely related to traditional camera systems such as endoscopy and microscopy. This is followed by more complex image formation processes: magnetic resonance imaging, X-ray projection imaging, computed tomography, X-ray phase-contrast imaging, nuclear imaging, ultrasound, and optical coherence tomography.

Medical Imaging Systems Technology: Methods in diagnosis optimization

For courses in medical imaging systems. With signal processing as its foundation, this text covers the most important imaging modalities in radiology: projection radiography, x-ray computed tomography, nuclear medicine, ultrasound imaging, and magnetic resonance imaging. Organized into parts to emphasize key overlapping conceptual divisions, Medical Imaging is most appropriate for engineering students who have taken the prerequisite signals and systems courses as well as elementary probability.

Digital Imaging Systems for Plain Radiography

From first principles to current computer applications, Monte Carlo Calculations in Nuclear Medicine, Second Edition: Applications in Diagnostic Imaging covers the applications of Monte Carlo calculations in nuclear medicine and critically reviews them from a diagnostic perspective. Like the first edition, this book explains the Monte Carlo method and the principles behind SPECT and PET imaging, introduces the reader to some Monte Carlo software currently in use, and gives the reader a detailed idea of some possible applications of Monte Carlo in current research in SPECT and PET. New chapters in this edition cover codes and applications in pre-clinical PET and SPECT. The book explains how Monte Carlo methods and software packages can be applied to evaluate scatter in SPECT and PET imaging, collimation, and image deterioration. A guide for researchers and students developing methods to improve image resolution, it also demonstrates how Monte Carlo techniques can be used
The Physics of Medical Imaging

Improve the Accurate Detection and Diagnosis of Cancer and Other Diseases Despite the expansion of the CAD field in recent decades, there is currently no single book dedicated to the development and use of CAD systems. Filling this need, Computer-Aided Detection and Diagnosis in Medical Imaging covers the major technical advances and methodologies shaping the development and clinical utility of CAD systems in breast imaging, chest imaging, abdominal imaging, and other emerging applications. After a historical overview of CAD, the book is divided into four sections. The first section presents CAD technologies in breast imaging, which is the most advanced area of CAD application. The second section discusses CAD technologies in chest and abdominal imaging. The third section explores emerging CAD technologies in a wide range of imaging modalities designed to address a variety of diseases. The final section describes the current use of CAD systems in clinical practice as well as how CAD will play an important role in quantitative image biomarkers and imaging genomics research. This book brings together this emerging CAD expertise, at a level understandable to graduate students, CAD system developers, basic scientists, and physician scientists. Newcomers to CAD research will learn about fundamental aspects in the process of CAD system development. Developers of CAD systems will gain insight on designing new or improved CAD systems. Experienced researchers will get up-to-date information on the latest CAD technologies.

Medical Imaging Systems Technology: Methods in general anatomy

Machine Learning and Medical Imaging presents state-of-the-art machine learning methods in medical image analysis. It first summarizes cutting-edge machine learning algorithms in medical imaging, including not only classical probabilistic modeling and learning methods, but also modern approaches. The book includes chapters on deep learning, computer vision, and medical computer graphics. It also covers applications in medical imaging, including disease diagnosis, image segmentation, and image registration. The book is suitable for researchers, practitioners, and students in the field of medical imaging.

Medical Imaging

Diagnostic Ultrasound Imaging provides a unified description of the physical principles of ultrasound imaging, signal processing, systems and measurements. This comprehensive reference is a core resource for both graduate students and engineers in medical ultrasound research and design. With continuing advances in technological development of ultrasound in medical diagnosis, it is a critical subject for biomedical engineers, clinical and healthcare engineers and practitioners, medical physicists, and related professionals in the fields of signal and image processing. The book contains 17 new and updated chapters covering the fundamentals and latest advances in the area, and includes four appendices, 450 figures (60 available in color on the companion website), and almost 1,500 references. In addition to the continual influx of readers entering the field of ultrasound worldwide who need the broad grounding in the core technologies of ultrasound, this book provides guidance to researchers already working in these areas with clear and comprehensive expositions of these key new topics as well as introductions to state-of-the-art innovations in this field. Enables practicing engineers, students and clinical professionals to understand the essential physics and signal processing techniques behind modern imaging systems as well as introducing the latest developments that will shape medical ultrasound in the future. Suitable for both newcomers and experienced readers, the practical, progressively organized applied approach is supported by hands-on MATLAB code and worked examples that enable readers to understand the principles underlying diagnostic and therapeutic ultrasound. Covers the new important developments in the use of medical ultrasound: elastography and high-intensity therapeutic ultrasound. Many new developments are comprehensively reviewed and explained, including aberration correction, acoustic measurements, acoustic radiation force imaging, alternate imaging architectures, bioeffects: diagnostic to therapeutic, Fourier transform imaging, multimode imaging, plane wave compounding, research platforms, synthetic aperture, vector Doppler, transient shear wave elastography, ultrastiff imaging and Doppler, functional ultrasound and viscoelastic models.

Medical Imaging Signals and Systems

This scholarly collection of well-harmonized volumes provides indispensable and complete coverage of the exciting and evolving subject of medical imaging systems. Leading experts on the international scene tackle the latest cutting-edge techniques and technologies in an in-depth but eminently clear and readable approach. Complementing and intersecting one another, each volume offers a comprehensive treatment of substantive importance to the subject area. The chapters, in turn, address topics in a self-contained manner with authoritative introductions, useful summaries, and detailed reference lists. Extensively well-illustrated with figures throughout, the five volumes as a whole achieve a unique depth and breadth of coverage. As a cohesive whole or independent of one another, the volumes may be acquired as a set or individually.

Digital Image Processing for Medical Applications

This scholarly collection of well-harmonized volumes provides indispensable and complete coverage of the exciting and evolving subject of medical imaging systems. Leading experts on the international scene tackle the latest cutting-edge techniques and technologies in an in-depth but eminently clear and readable approach. Complementing and intersecting one another, each volume offers a comprehensive treatment of substantive importance to the subject area. The chapters, in turn, address topics in a self-contained manner with authoritative introductions, useful summaries, and detailed reference lists. Extensively well-illustrated with figures throughout, the five volumes as a whole achieve a unique depth and breadth of coverage. As a cohesive whole or independent of one another, the volumes may be acquired as a set or individually.

Informatics in Medical Imaging

A comprehensive and authoritative guide for radiologists and nuclear medicine physicians, Diagnostic Imaging: Nuclear Medicine, Second Edition is practical, easy-to-use, and allows the busy clinician to keep pace with the rapid developments in the field. The new edition is also ideal for medical residents and fellows. The book is divided into five sections: general principles, nuclear medicine physics, medical physics, radiation therapy, and medical informatics. Each section begins with a historical overview and moves on to discuss key concepts, principles, and techniques. The book also features a wide range of clinical applications, including cardiac imaging, bone imaging, and functional imaging. It provides a comprehensive overview of the field, making it an invaluable resource for anyone involved in diagnostic imaging.
use, and in-touch with the realities of multimodality diagnostic imaging. This comprehensive yet accessible reference addresses the most appropriate nuclear medicine options available to answer specific clinical questions within the framework of all imaging modalities. Sweeping updates include a complete reorganization, new differential diagnoses based on findings, and new chapters on physics and Nuclear Regulatory Commission guidelines. User-friendly bulleted text and a uniform chapter layout allow fast and effortless access to the crucial knowledge you need! Time-saving reference features include bulleted text, a variety of test data tables, key facts in each chapter, 2,000 full-color annotated images, and an extensive index. Expanded coverage of the most important topics and trends in nuclear medicine including Recently revised radioactive iodine therapy guidelines for hyperthyroidism and thyroid cancer New bone tumor therapy radium-223 (currently indicated for treatment of painful bone metastases in prostate cancer) New I-123 ioflupane dopamine transporter imaging for diagnosis of parkinsonian syndromes F-18 PET/CT bone scan (particularly its indication for nonaccidental trauma in children) Meticulous updates throughout reflect the latest advances as well as all study guide topics listed for the new American Board of Radiology exam, including physics and Nuclear Regulatory Commission guidelines

Medical Imaging for Health Professionals

A must-read for anyone working in electronics in the healthcare sector. This one-of-a-kind book addresses state-of-the-art integrated circuit design in the context of medical imaging of the human body. It explores new opportunities in ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), nuclear medicine (PET, SPECT), emerging detector technologies, circuit design techniques, new materials, and innovative system approaches. Divided into four clear parts and with contributions from a panel of international experts, Medical Imaging systematically covers: X-ray imaging and computed tomography-X-ray and CT imaging principles; Active Matrix Flat Panel Imagers (AMFPI) for diagnostic medical imaging applications; photon counting and integrating readout circuits; noise coupling in digital X-ray imaging Nuclear medicine-SPECT and PET imaging principles; low-noise electronics for radiation sensors Ultrasound imaging-Electronics for diagnostic ultrasonic imaging Magnetic resonance imaging-Magnetic resonance imaging principles; MRI technology

Medical Imaging Systems

Since the early 1960's, the field of medical imaging has experienced explosive growth due to the development of three new imaging modalities-radionuclide imaging, ultrasound, and magnetic resonance imaging. Along with X-ray, they are among the most important clinical diagnostic tools in medicine today. Additionally, the digital revolution has played a major role in this growth, with advances in computer and digital technology and in electronics making fast data acquisition and mass data storage possible. This text provides an introduction to the physics and instrumentation of the four most often used medical imaging techniques. Each chapter includes a discussion of recent technological developments and the biological effects of the imaging modality. End-of-chapter problem sets, lists of relevant references, and suggested further reading are presented for each technique. X-ray imaging, including CT and digital radiography Radionuclide imaging, including SPECT and PET Ultrasound imaging Magnetic resonance imaging

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