Lung Cancer Detection Using Image Processing Techniques

Internet of Things and Big Data Technologies for Next Generation Healthcare
Lung Cancer Detection and Classification Using SVM

2020 International Conference on Computing, Communication and Networking Technologies (ICCCNT)
Detection of Lung Tumours in CT Images Using Matlab Software

2018 Fourth International Conference on Computing Communication Control and Automation (ICCCUBA)
Handbook of Research on Information Security in Biomedical Signal Processing

Data Science and Analytics Development and Evaluation of Stereographic Display for Lung Cancer Screening

Computer-aided Cancer Detection and Diagnosis

Signal and Image Processing Techniques for the Development of Intelligent Healthcare Systems

On Improving Early Lung Cancer Detection and Treatment

Image Processing Techniques for the Development of Intelligent Healthcare Systems

Data Analytics and Learning

Lung Imaging and CADxLung Cancer and Imaging

Artificial Intelligence for Data-Driven Medical Imaging


Advances in Computational and Bio-Engineering

Progress in Advanced Computing and Software Innovations in Biomedical Engineering

Early-stage Lung Cancer Image Classification for Early Detection of Lung Cancer

Early detection is crucial to increase the chances of survival. Modern developments in diagnostic tools and methodologies have revolutionized the approach to lung cancer detection, diagnosis, and treatment. Early detection can significantly improve survival rates, as it allows for prompt intervention and proper treatment. However, early detection remains a challenge due to the varied symptoms and the asymptomatic nature of the disease.

A key aspect of lung cancer detection is the use of imaging techniques. One of the prominent methods in this field is using image processing techniques. These techniques leverage the analysis of medical images to identify patterns and characteristics that may indicate the presence of cancer. Various methods and tools are employed in this process, such as convolutional neural networks (CNN), multi-layer perceptrons (MLP), and other machine learning algorithms.

The success of these methods relies on the quality and quantity of the data, as well as the sophistication of the algorithms used. Researchers continue to explore and refine these techniques to enhance their accuracy and efficiency, aiming to improve early detection rates and overall patient outcomes.

In conclusion, image processing techniques play a crucial role in the detection and early diagnosis of lung cancer. As technology advances, these methods are expected to become even more effective, offering hope for improved outcomes in the fight against this deadly disease.
intelligence, and intelligent systems. As such, the book offers a valuable resource for researchers and practitioners alike. This book provides the most recent findings and knowledge in advanced diagnostics technology, covering a wide spectrum including brain activity analysis, breast cancer detection, echocardiography, external biopsy, fetal assessment to neurovascular imaging, computer vision and 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 disorders as well as the use of Computer-Aided System (CAD) are also discussed in this book. This book will be useful for students, lecturers or professionals in the field of biomedical sciences and image processing. This book covers novel strategies and state-of-the-art approaches for automated non-invasive systems for early prostate cancer diagnosis. Prostate cancer is the most frequently diagnosed malignancy after skin cancer and the second leading cause of cancer-related male deaths in the USA after lung cancer. However, early detection of prostate cancer increases chances of patients’ survival. Generally, The CAD systems analyze the prostate images in three steps: (i) prostate segmentation; (ii) Prostate description or feature extraction; and (iii) classification of the prostate status. These methodologies for diagnosis and therapy in clinical applications. Often patients must be followed for years with serial CT scans in order to establish a diagnosis, but inter-scan variability, slice selection artifacts, differences in degree of inspiration, and body age makes comparison of serial scans unreliable. Lung Imaging and Computer Aided Diagnosis brings together researchers in pulmonary image analysis to present state-of-the-art image processing techniques for detecting and diagnosing lung cancer at an early stage. This book addresses variables and discrepancies in scans and proposes ways of evaluating small lung masses more consistently to allow for more accurate measurement of growth rates and analysis of shape and appearance of the detected lung nodules. Dealing with all aspects of image analysis of the data, this book examines: Lung segmentation Nodule segmentation Vessels segmentation Airways segmentation Lung registration Detection of lung nodules Diagnosis of detected lung nodules Shape and appearance analysis of lung nodules. Contributors also explore the effective use of these methodologies for diagnosis and therapy in clinical applications. Arguably the first book of its kind to address and evaluate image-based diagnostic approaches for the early diagnosis of lung cancer, Lung Imaging and Computer Aided Diagnosis constitutes a valuable resource for biomedical engineers, researchers, and practitioners in the field of biomedical sciences and image processing. To investigate the feasibility, accuracy and efficiency of three display modes, the performance of lung nodule detection and segmentation are evaluated. Developing an expert lung-cancer-diagnosis-aiding computer-aided-diagnosis (CAD) system for lung cancer is of great clinical importance and can significantly increase the patient’s chance for survival. For this reason, CAD systems for lung cancer have been investigated in a large number of research studies. A typical CAD system for lung cancer diagnosis is composed of four main processing steps: segmentation of the lung fields, detection of nodules inside the lung fields, segmentation of the detected nodule, and finally, classification of the nodule status. This book overview the state-of-the-art CAD systems that have been developed to implement each of these CAD processing steps. This book overview the state-of-the-art CAD systems for lung cancer imaging and diagnosis. This book contains detailed coverage of 3D and 4D image segmentations. The illustrations feature an extremely diverse set of medical imaging techniques. The book contains extensive references at the end of each chapter to enhance further study. The book is divided into 3 sections: Lung Imaging and Computer Aided Diagnosis presents an overview of the latest state-of-the-art diagnostic CAD systems for lung cancer. It presents the latest state-of-the-art diagnostic CAD systems for lung cancer imaging and diagnosis. Offers detailed coverage of 3D and 4D image segmentations. The illustrations feature an extremely diverse set of medical imaging techniques. The book contains extensive references at the end of each chapter to enhance further study. The book is divided into 3 sections: Lung Imaging and Computer Aided Diagnosis presents an overview of the latest state-of-the-art diagnostic CAD systems for lung cancer.
security vulnerabilities in the context of e-health. Moreover, the book addresses healthcare systems that handle large volumes of data driven by patients' records and health/personal information, including big-data-based knowledge management systems to support clinical decisions. Several chapters are dedicated to the role of big data and artificial intelligence in the treatment of lung cancer, as well as to the NIST framework for addressing those problems as well as a case study in healthcare analytics. Addressing trust, privacy, and security issues as well as the IoT and big data challenges, the book highlights the advances in the field to guide engineers developing different IoT devices and evaluating the performance of different IoT techniques. Additionally, it explores the impact of such technologies on public, private, community, and hybrid scenarios.

This book offers professionals, scientists, and engineers the latest technologies, techniques, and strategies for IoT and big data. This book comprehensively covers automated systems for lung cancer detection and classification using various advanced image processing techniques as well as deep-learning-based image analysis techniques, used in healthcare diagnostics. It highlights a range of data pre-processing methods used in signal processing for effective data mining in remote healthcare, and discusses pre-processing using filter techniques, noise removal, and contrast-enhancement methods for improving image quality. The book discusses the status quo of artificial intelligence in medical applications, as well as the opportunities and challenges in the future. The book also provides the latest advancements in the development of deep-learning-based smart systems for medical diagnosis and classification.

Lung cancer seems to be a vital field of science, based on cooperation between doctors, physiotherapists and engineers. The editors would like to thank all the people who contributed to the creation of this book – both the authors, and those involved in technical aspects. Lung cancer is the leading cancer killer in both men and women in the U.S. In 2018, it surpassed breast cancer to become the leading cause of cancer deaths in women. An estimated 158,080 Americans died from lung cancer in 2016, accounting for approximately 27 percent of all cancer deaths. Early detection of lung cancer can increase the chance of survival among people. The overall 5-year survival rate for lung cancer patients increases from 14 to 49% if the disease is detected in time.
Computed Tomography (CT) scans of lungs can be more efficient than X-ray or MRI scans in detecting the presence of cancer. The scanned images of lungs are obtained from LIDC (Lung Image Database Consortium). The scans of twenty patients contain both positive and negative scans i.e. scans with and without tumor. The first step is to segment the tumor affected region from the lungs, for this we use Marker Controlled Watershed Segmentation from the Image Processing Toolbox. The next step is to extract the features using Feature Extraction methods from Computer Vision toolbox of MATLAB. Different extraction methods like GLCM, SURF, MSER and BRISK are used. The features are extracted from cancer detected images only. The data or the features extracted is in the form of matrix. These features are used to train the classifier, Support Vector Machine (SVM). SVM classifier is a supervised machine learning algorithm used as a tool for data classification with advantages in handling data with high dimensionality and a small sample size. The performance of the SVM is observed for each feature as input. Hence, a lung cancer detection system that employs Image Processing Techniques is used to detect the presence of lung cancer in CT images. In this study, MATLAB is the software used.

The main aim of this conference is to bring together academicians, researchers, scientists and working professionals to have a brainstorming session on the current trends towards converging technologies related to electrical, electronics, communication and computer engineering. Lung cancer is one of the most common cancers in both men and women worldwide. Early diagnosis of lung cancer can significantly increase the chances of a patient’s survival, yet early detection has historically been difficult. As a result, there has been a great deal of progress in the development of accurate and fast diagnostic tools in recent years.

Lung Cancer and Imaging provides an introduction to both the methods currently used in lung cancer diagnosis and the promising new techniques that are emerging. Areas covered include the major trends and challenges in lung cancer detection and diagnosis, classification of cancer types, lung feature extraction in joint PET/CT images, and algorithms in the area of low dosage CT lung cancer images. This issue gives the general radiologist a solid overview of lung cancer imaging techniques. CT screening for lung cancer is discussed, and the evaluation and management of indeterminate pulmonary nodules is reviewed. Revised TNM lung cancer staging, as well as the optimal imaging protocols for lung cancer staging (CT, MR and PET) are thoroughly examined. A multidisciplinary approach to tissue sampling and updated histopathologic classification of lung cancer are discussed. Image-guided ablative therapies for lung cancer are reviewed. Finally, future trends in lung cancer detection and staging and genetics are reviewed, as well as novel biomarkers for lung cancer detection. This two-volume book presents outcomes of the 7th International Conference on Soft Computing for Problem Solving, SocProS 2017. This conference is a joint technical collaboration between the Soft Computing Research Society, Liverpool Hope University (UK), the Indian Institute of Technology Roorkee, the South Asian University New Delhi and the National Institute of Technology Silchar, and brings together researchers, engineers and practitioners to discuss thought-provoking developments and challenges in order to select potential future directions. The book presents the latest advances and innovations in the interdisciplinary areas of soft computing, including original research papers in the areas including, but not limited to, algorithms (artificial immune systems, artificial neural networks, genetic algorithms, genetic programming, and particle swarm optimization) and applications (control systems, data mining and clustering, finance, weather forecasting, game theory, business and forecasting applications). It is a valuable resource for both young and experienced researchers dealing with complex and intricate real-world problems for which finding a solution by traditional methods is a difficult task. This book gathers state-of-the-art research in computational engineering and bioengineering to facilitate knowledge exchange between various scientific communities. Computational engineering (CE) is a relatively new discipline that addresses the development and application of computational models and simulations often coupled with high-performance computing to solve complex physical problems arising in engineering analysis and design in the context of natural phenomena. Bioengineering (BE) is an important aspect of computational biology, which aims to develop and use efficient algorithms, data structures, and visualization and communication tools to model biological systems. Today, engineering approaches are essential for biologists, enabling them to analyse complex physiological processes, as well as for the pharmaceutical industry to support drug discovery and development programmes. Accurate imaging of cancerous tissue is a critical step in the fight to lower cancer mortality rates, and computer-aided detection and diagnosis (CAD) technologies play a key role. Over the last three decades, the field of diagnostic cancer imaging has witnessed a remarkable evolution that has affected virtually every aspect of research and clinical management of cancer. This book discusses recent high-quality research in key technologies used in CAD systems; the 11 chapters cover different types of cancers (including skin, breast, prostate, and colon cancer) and different scientific fields (such as biomedicine, imaging, image processing, pattern recognition, and system analysis) to further the major goals of current cancer imaging: • Provide more reliable disease characterization through the synthesis of anatomic, functional, and molecular imaging information; • Refine and optimize imaging capabilities in oncology; • Establish new imaging modalities and findings, and discover the potential use of these techniques; • Find more individualized assessment of tumor biology, personalized treatments, and response to treatment; • Develop image-processing-based cancer control systems; and • Explore imaging capabilities and strategies to streamline cancer drug development. "Provides a current review of computer processing algorithms for the identification of lesions, abnormal masses, and cancer, and disease in medical images. Presents useful examples from numerous imaging modalities for increased recognition of anomalies in MRI, CT, SPECT and digital/thin X-Ray." The 10th International Conference on Computing, Communication and Networking Technologies (ICCCNT) aims to provide a forum that brings together International researchers from academia and practitioners in the industry to meet and exchange ideas and recent research work on all aspects of Information and Communication Technologies including Computing, communication, IOT, LIDAR, Image Analysis, wireless communication and other new technologies.

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