Lung Cancer Detection Using Image Processing Techniques

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Detection of Lung Tumours in CT Images Using Matlab Software-Ramya Sirram 2014-10-08

Medical Image processing is one of the prominent detection analysis and goes hand in hand with Cancer detection, diagnosis and treatment. Early detection, diagnosis and treatment are of utmost importance and can improve chances of survival. Filtering, morphology, statistical analysis of the malignant tumours after automatic detection or segmentation of the suspected area of the lungs are some of the basic techniques of study adapted in any radiological imaging techniques. Lung cancer is the leading cause of cancer-related death in both men and women. This work is concerned with the analysis and classification of bright spots in the tumour. Bright Spots ratio of the tumour is an important ratio, which is nothing but the ratio of number of bright spots and the area of the tumour that is detected. A key problem in finding the number of bright spots is that the images need to be pre-processed.

Lung Cancer Detection and Classification Using SVM-Sheetal Neelagiri Dayanand 2018

Lung cancer seems to be a common cause of death among people throughout the world. Lung cancer is the leading cancer killer in both men and women in the U.S. In 1987, 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.

Lung Imaging and CADs-Ayman El-Baz 2019-04-24

Developing an effective 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 nodules, and diagnosis of the nodules as benign or malignant. This book overviewed the current state-of-the-art techniques that have been developed to implement each of these CAD processing steps. Overviews the latest state-of-the-art diagnostic CAD systems for lung cancer imaging and diagnosis Offers detailed coverage of 3D and 4D image segmentation Illustrates unique fully automated detection systems coupled with 4D Computed Tomography (CT) Written by authors who are world-class researchers in the biomedical imaging sciences Includes extensive references at the end of each chapter to enhance further study Ayman El-Baz is a professor, university scholar, and chair of the Bioengineering Department at the University of Louisville, Louisville, Kentucky. He earned his bachelor’s and master’s degrees in electrical engineering in 1997 and 2001, respectively. He earned his doctoral degree in electrical engineering from the University of Louisville in 2006. In 2009, he was named a Coulter Fellow for his contributions to the field of biomedical translational research. He has 17 years of hands-on experience in the fields of bio-imaging modeling and noninvasive computer-assisted diagnosis systems. He has authored or coauthored more than 500 technical articles (132 journals, 23 books, 57 book chapters, 211 refereed-conference papers, 137 abstracts, and 27 U.S. patents and disclosures). Jasjit S. Suri is an innovator, scientist, a visionary, an industrialist, and an internationally known world leader in biomedical engineering. He has spent over 25 years in the field of biomedical engineering/devices and its management. He received his doctorate from the University of Washington, Seattle, and his business management sciences degree from Weatherhead School of Management, Case Western Reserve University, Cleveland, Ohio. He was awarded the President’s Gold Medal in 1980 and named a Fellow of the American Institute of Medical and Biological Engineering for his outstanding contributions in 2004. In 2018, he was awarded the Marquis Life Time Achievement Award for his outstanding contributions and dedication to medical imaging and its management.


Lung Imaging and Computer Aided Diagnosis-Ayman El-Baz 2016-04-19

Lung cancer remains the leading cause of cancer-related deaths worldwide. Early diagnosis can improve the effectiveness of treatment and increase a patient’s chances of survival. Thus, there is an urgent need for new technology to diagnose small, malignant lung nodules early as well as large nodules located away from large diameter airways because the current technology—namely, needle biopsy and bronchoscopy—fail to diagnose those cases. However, the analysis of small, indeterminate lung masses is fraught with many technical difficulties. 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 scan angles can make comparing 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. The 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 clinicians in lung disease imaging.


Nowadays, only 10 - 15% of people diagnosed with lung cancer survive more than 5 years after the diagnostic. The main cause is the delay in detecting it. One way of early detecting nodules is to use a system over chest x-rays that can classify them. A project is being carried out in order to develop this system, but this work is a previous and necessary step: it aims to separate anteroposterior and lateral images in order to make the classifier to perform better. To do so, we have studied four deep learning methods: logistic regression, multi-layer perceptron (MLP), restricted Boltzmann machines (RBM) and convolutional networks (CNN). We applied all four methods to a random sample of our dataset and registered their accuracy, specificity, sensitivity and AUC (area under curve). With these, we observed that MLP is the one with the best performance along with CNN, but the latter requires more runtime. However, if one would like to use the simplest method, logistic regression also performs well enough.

Progress in Advanced Computing and Intelligent Engineering-Bibudhendu Pati 2018-12-17

The book gathers high-quality research papers presented at the International Conference on Advanced Computing and Intelligent Engineering (ICACIE 2017). It includes technical sections describing progress in the fields of advanced computing and intelligent engineering, and is primarily intended for postgraduate students and researchers working in Computer Science and Engineering. However, researchers working in Electronics will also find the book useful, as it addresses hardware technologies and next-gen communication technologies.

Intelligent Sustainable Systems-Jennifer S. Raj 2021

This book features research papers presented at the 4th International Conference on Intelligent Sustainable Systems (ICISS 2021), held at SCAD College of Engineering and Technology, Tirunelveli, Tamil Nadu, India, during February 26-27, 2021. The book discusses the latest research works that discuss the tools, methodologies, practices, and applications of sustainable systems and computational intelligence methodologies. The book is beneficial for readers from both academia and industry.

Advances in Medical Diagnostic Technology-Khin Wei Lai 2014-03-10

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.


The Kuala Lumpur International Conference on Biomedical Engineering (BioMed 2006) was held in December 2006 at the Palace of the Golden Horses, Kuala Lumpur, Malaysia. The papers presented at BioMed 2006, and published here, cover such topics as Artificial Intelligence, Biological effects of non-ionising electromagnetic fields, Biomedical images, Biomechanics, Biomedical Sensors, Biomedical Signal Analysis, Biotechnology, Clinical Engineering, Human performance engineering, Imaging, Medical Informatics, Medical Instruments and Devices, and many more.

Soft Computing for Intelligent Systems-Nikhil Marwila 2021

This book presents high-quality research papers presented at the International Conference on Soft Computing for Intelligent Systems (SCIS 2020), held during 18-20 December 2020 at University Institute of Engineering and Technology, Kurukshetra University, Kurukshetra, Haryana, India. The book encompasses all branches of artificial intelligence, computational sciences and machine learning which is based on computation at some level such as AI-based Internet of things, sensor networks, robotics, intelligent diabetic retinopathy, intelligent cancer genes analysis using computer vision, evolutionary algorithms, fuzzy systems, medical automatic identification intelligence system and applications in agriculture, health care, smart grid and instrumentation systems. The book is helpful for educators, researchers and developers working in the area of recent advances and upcoming technologies utilizing computational sciences in signal processing, imaging, computing, instrumentation, artificial intelligence and their applications.

Ambient Communications and Computer Systems-Yu-Chen Hu 2019-03-30

This book includes high-quality, peer-reviewed papers from the International Conference on Recent Advancement in Computer, Communication and Computational Sciences (RACCCS-2018), held at Aryabhatta College of Engineering & Research Center, Ajmer, India on August 10-11, 2018, presenting the latest developments and technical solutions in computational sciences. Networking and communication are the backbone of data science, data- and knowledge engineering, which have a wide scope for implementation in engineering sciences. This book offers insights that reflect the advances in these fields from upcoming researchers and leading academicians across the globe. Covering a variety of topics, such as intelligent hardware and software design, advanced communications, intelligent computing technologies, advanced software engineering, the web and its informatics, and intelligent image processing, it helps those in the computer industry and academia use the advances in next-generation communication and computational technology to shape real-world applications.

Intelligent System Algorithms and Applications in Science and Technology-Sunil Pathak 2022-02-03

The 21st century has witnessed massive changes around the world in intelligence systems in order to become smarter, energy efficient, reliable, and cheaper. This volume explores the application of intelligent techniques in various fields of engineering and technology. It addresses diverse topics in such areas as machine learning-based intelligent systems for healthcare, applications of artificial intelligence and the Internet of Things, intelligent data analytics techniques, intelligent network systems and applications, and inequalities and process control systems. The authors explore the full breadth of the field, which encompasses data analytics, image processing, speech processing and recognition, medical science and healthcare monitoring, smart irrigation systems, insurance and banking, robotics and process control, and more.
Artificial Intelligence and Machine Learning in 2D/3D Medical Image Processing - Rohit Raja 2020-12-22

Digital images have several benefits, such as faster and inexpensive processing cost, easy storage and communication, immediate quality assessment, multiple copying while preserving quality, swift and economical reproduction, and adaptable manipulation. Digital medical images play a vital role in everyday life. Medical imaging is the process of producing visible images of inner structures of the body for scientific and medical study and treatment as well as a view of the function of interior tissues. This process pursues disorder identification and management. Medical imaging in 2D and 3D includes many techniques and operations such as image gaining, storage, presentation, and communication. The 2D and 3D images can be processed in multiple dimensions. Depending on the requirement of a specific problem, one must identify various features of 2D or 3D images while applying suitable algorithms. These image processing techniques began in the 1960s and were used in such fields as space, clinical purposes, the arts, and television image improvement. In the 1970s, with the development of computer systems, the cost of image processing was reduced and processes became faster. In the 2000s, image processing became quicker, inexpensive, and simpler. In the 2020s, image processing has become a more accurate, more efficient, and self-learning technology. This book highlights the framework of the robust and novel methods for medical image processing techniques in 2D and 3D. The chapters explore existing and emerging image challenges and opportunities in the medical field using various medical image processing techniques. The book discusses real-time applications for artificial intelligence and machine learning in medical image processing. The authors also discuss implementation strategies and future research directions for the design and application requirements of these systems. This book will benefit researchers in the medical image processing field as well as those looking to promote the mutual understanding of researchers within different disciplines that incorporate AI and machine learning.

FEATURES
Highlights the framework of robust and novel methods for medical image processing techniques Discusses implementation strategies and future research directions for the design and application requirements of medical imaging Examines real-time application needs Explores existing and emerging image challenges and opportunities in the medical field

Development and Evaluation of Stereographic Display for Lung Cancer Screening - 2007

The main purpose of this project is to investigate the feasibility and efficacy of using a stereo display workstation for lung cancer screening on CT images. The tasks included in this project are development and evaluation of stereo image projection and display for chest CT image observer performance evaluation for the stereo display, and stereo feature analysis and comparison to the conventionally used display methods for lung cancer detection. In the previous report periods, we have built a stereo display workstation for chest CT images, then conducted and analyzed a pilot observer performance study. In this annual report period, we have conducted a main observer performance study as scheduled in the proposal, and investigated spectrophotometric characteristics for further understanding and improving stereo display. The tasks we did in this period are: 1. Conducting a main study: the main study was organized as a prospective study of 100 lung cancer screening cases containing about 560 nodules. The cases were interpreted in each of the 3 display modes by 8 radiologists who have extensive experience in reading chest CT. Collection of the interpretation data has been completed for analysis. About 1159 suspicious lesions, including true and false positives have been found in the readings and will be used for evaluation of the 3 tested display modes. 2. Investigating spectrophotometric characteristics of stereographic image pairs: to further understand the characteristics of stereo imaging and displaying, we analyzed differences in spectrophotometric characteristics between images acquired during stereographic imaging. We found that though uniform global differences can easily be corrected by applying traditional histogram matching techniques, these methods are not capable of dealing with differences that are object or distance dependent.

Computer Vision and Machine Intelligence in Medical Image Analysis - Mousumi Gupta 2019-08-28

This book includes high-quality papers presented at the Symposium 2019, organised by Sikkim Manipal Institute of Technology (SMIT), in Sikkim from 26-27 February 2019. It discusses common research problems and challenges in medical image analysis, such as deep learning methods. It also discusses how these theories can be applied to a broad range of application areas, including lung and chest x-ray, breast CAD, microscopy and pathology. The studies included mainly focus on the detection of events from biomedical signals.

Intelligent Systems Technologies and Applications 2016 - Juan Manuel Corchado Rodriguez 2016-09-19

This book constitutes the thoroughly refereed proceedings of the second International Symposium on Intelligent Systems Technologies and Applications (ISTA’16), held on September 21-24, 2016 in Jaipur, India. The 80 revised papers presented were carefully reviewed and selected from 210 initial submissions and are organized in topical sections on image processing and artificial vision, computer networks and distributed systems, intelligent tools and techniques and applications using intelligent techniques.

Lung Cancer and Imaging - Ayman S. El-Baz 2020

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. Part of Series in Physics and Engineering in Medicine and Biology.

International Conference on Communication, Computing and Electronics Systems - V. Bindhu 2021

This book includes high-quality papers presented at the International Conference on Communication, Computing and Electronics Systems 2020, held at the PPG Institute of Technology, Coimbatore, India, on 21-22 October 2020. The book covers topics such as automation, VLSI, embedded systems, integrated device technology, satellite communication, optical communication, RF communication, microwave engineering, artificial intelligence, deep learning, pattern recognition, Internet of Things, precision models, bioinformatics, and healthcare informatics.

Development and Evaluation of Stereographic Display for Lung Cancer Screening - 2005

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Digital images have several benefits, such as faster and inexpensive processing cost, easy storage and communication, immediate quality assessment, multiple copying while preserving quality, swift and economical reproduction, and adaptable manipulation. Digital medical images play a vital role in everyday life. Medical imaging is the process of producing visible images of inner structures of the body for scientific and medical study and treatment as well as a view of the function of interior tissues. This process pursues disorder identification and management. Medical imaging in 2D and 3D includes many techniques and operations such as image gaining, storage, presentation, and communication. The 2D and 3D images can be processed in multiple dimensions. Depending on the requirement of a specific problem, one must identify various features of 2D or 3D images while applying suitable algorithms. These image processing techniques began in the 1960s and were used in such fields as space, clinical purposes, the arts, and television image improvement. In the 1970s, with the development of computer systems, the cost of image processing was reduced and processes became faster. In the 2000s, image processing became quicker, inexpensive, and simpler. In the 2020s, image processing has become a more accurate, more efficient, and self-learning technology. This book highlights the framework of the robust and novel methods for medical image processing techniques in 2D and 3D. The chapters explore existing and emerging image challenges and opportunities in the medical field using various medical image processing techniques. The book discusses real-time applications for artificial intelligence and machine learning in medical image processing. The authors also discuss implementation strategies and future research directions for the design and application requirements of these systems. This book will benefit researchers in the medical image processing field as well as those looking to promote the mutual understanding of researchers within different disciplines that incorporate AI and machine learning. FEATURES Highlights the framework of robust and novel methods for medical image processing techniques Discusses implementation strategies and future research directions for the design and application requirements of medical imaging Examines real-time application needs Explores existing and emerging image challenges and opportunities in the medical field.

Recently Computer Aided Diagnosis (CAD) has become one of the important and major research subjects in medical imaging and diagnostic radiology. The basic concept of CAD is to provide a computer output as a second opinion to assist radiologists’ image interpretation by improving accuracy and consistency of radiological diagnosis and also by reducing the image reading time. The goal of CAD is to improve the quality and accuracy of radiological diagnosis. This book gives basic ideas of CAD and detailed information about the Region of Interest (ROI) segmentation performed on DICOM lung images to extract the lung nodules from lung portion using various edge detection operators with and without noise. The results are helpful to study and analyze the influence of noise and can be included in the CAD system based on an automatic diagnosis for early detection of lung cancer by extracting the nodules from the lung regions included in chest DICOM 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 diagnosis and staging and genetics are reviewed, as well as novel biomarkers for lung cancer detection.
Recent Trends in Computational Intelligence Enabled Research- Siddhartha Bhattacharyya 2021-07-31

The field of computational intelligence has grown tremendously over that past five years, thanks to evolving soft computing and artificial intelligence methodologies, tools and techniques for envisaging the essence of intelligence embedded in real life observations. Consequently, scientists have been able to explain and understand real life processes and practices which previously often remain unexplored by virtue of their underlying imprecision, uncertainties and redundancies, and the unavailability of appropriate methods for describing the incompleteness and vagueness of information represented. With the advent of the field of computational intelligence, researchers are now able to explore and unearth the intelligence, otherwise insurmountable, embedded in the systems under consideration. Computational Intelligence is now not limited to only specific computational fields, it has made inroads in signal processing, smart manufacturing, predictive control, robot navigation, smart cities, and sensor design to name a few. Recent Trends in Computational Intelligence Enabled Research: Theoretical Foundations and Applications explores the use of this computational paradigm across a wide range of applied domains which handle meaningful information. Chapters investigate a broad spectrum of the applications of computational intelligence across different platforms and disciplines, expanding our knowledge base of various research initiatives in this direction. This volume aims to bring together researchers, engineers, developers and practitioners from academia and industry working in all major areas and interdisciplinary areas of computational intelligence, communication systems, computer networks, and soft computing. Provides insights into the theory, algorithms, implementation, and application of computational intelligence techniques. Covers a wide range of applications of deep learning across various domains which are researching the applications of computational intelligence. Investigates novel techniques and reviews the state-of-the-art in the areas of machine learning, computer vision, soft computing techniques.

Data Science and Analytics- Usha Batra 2020-05-27

This two-volume set (CCIS 1229 and CCIS 1230) constitutes the refereed proceedings of the 5th International Conference on Recent Developments in Science, Engineering and Technology, REDSET 2019, held in Gurugram, India, in November 2019. The 74 revised full papers presented were carefully reviewed and selected from total 353 submissions. The papers are organized in topical sections on data centric programming; next generation computing; social and web analytics; security in data science analytics; big data analytics.

Knowledge Modelling and Big Data Analytics in Healthcare- Mayuri Mehta 2021-12-09

Knowledge Modelling and Big Data Analytics in Healthcare: Advances and Applications focuses on automated analytical techniques for healthcare applications used to extract knowledge from a vast amount of data. It brings together a variety of different aspects of the healthcare system and aims in the decision-making processes for healthcare professionals. The editors connect four contemporary areas of research rarely brought together in one book: artificial intelligence, big data analytics, knowledge modelling, and healthcare. They present state-of-the-art research from the healthcare sector, including research on medical imaging, healthcare analysis, and the applications of artificial intelligence in drug discovery. This book is intended for data scientists, academicians, and industry professionals in the healthcare sector.

Innovative Data Communication Technologies and Application- Jennifer S. Raj 2020-01-30

This book presents emerging concepts in data mining, big data analysis, communication, and networking technologies, and discusses the state-of-the-art in data engineering practices to tackle massive data distributions in smart networked environments. It also provides insights into potential data distribution challenges in ubiquitous data-driven networks, highlighting research on the theoretical and systematic framework for analyzing, testing and designing intelligent data analysis models for evolving communication frameworks. Further, the book showcases the latest developments in wireless sensor networks, cloud computing, mobile network, autonomous systems, cryptography, automation, and other communication and networking technologies. In addition, it addresses data security, privacy and trust, wireless networks, data classification, data prediction, performance analysis, data validation and verification models, machine learning, sentiment analysis, and various data analysis techniques.

Advances in Computational and Bio-Engineering- S. Jyothi 2020-07-06

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.

Image-Processing Techniques for Tumor Detection-Rohini N. Strickland 2002-04-24

"Provides a current review of computer processing algorithms for the identification of lesions, abnormal masses, cancer, and disease in medical images. Presents useful examples from numerous imaging modalities for increased recognition of anomalies in MRI, CT, SPECT and digital/film X-Ray."

Lung Cancer and Imaging- Aymen El-Baz 2019-12-30

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.

Intelligent Communication and Automation Systems- Kamal Kumar Sharma 2021-04-19

This comprehensive reference text discusses concepts of intelligence communication and automation system in a single volume. The text discusses the role of artificial intelligence in communication engineering, the role of machine learning in communication systems, and applications of image and video processing in communication. It covers important topics including smart sensing systems, intelligent hardware design, low power system design using AI techniques, intelligent signal processing for biomedical applications, intelligent robotics systems, and network security applications. The text will be useful for senior undergraduate and graduate students in different areas including electrical engineering, and electronics and communications engineering.

Artificial Intelligence, Machine Learning, and Data Science Technologies- Neeraj Mohan 2021-10-12

This book provides a comprehensive, conceptual, and detailed overview of the wide range of applications of Artificial Intelligence, Machine Learning, and Data Science and how these technologies have an impact on various domains such as healthcare, business, industry, security, and how all countries around the world are feeling this impact. The book aims at low-cost solutions which could be implemented even in developing countries. It highlights the significant impact these technologies have on various industries and
Sputum Cytometry in Early Lung Cancer Detection: Preliminary Study - Vittorio D’Urso 2014-08-25

Lung cancer is the leading cause of cancer-related deaths worldwide. Several studies have evaluated the relationship between chronic bronchitis and lung cancer. Chronic obstructive pulmonary disease refers to chronic bronchitis and emphysema, a pair of two commonly co-existing diseases of the lungs. The leading cause of both lung cancer and COPD is well recognized in tobacco use. The aim of our study is to assess the capability of Image Cytometry to identify neoplastic lesions that occur in smokers using 5cER as diagnostic parameter that could help clinicians in lung cancer’s early detection, using a noninvasive way. In our study, the sputum of 116 smokers was collected. 5cER value confirmed both cancer and no-cancer diagnosis with sensitivity and specificity of 79% and 87%. Moreover, our aim is to identify possible markers and to understand if there is a correlation with ploidy status. Preliminary data show that same genes have positive correlation (r > 0.5) and same negative correlation (r...