Lung Cancer Detection Using Image Processing Techniques

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Advances in Medical Diagnostics: This book discusses major issues and advances in the diagnosis and therapy of incidentally detected early-stage lung cancer (ESLC). In Part I, pathology and radiology experts comprehensively review the state-of-the-art advances in imaging techniques and offers an update on the cross-sectional anatomy of the lung and post-processing techniques for CT imaging. Part II focuses on the imaging features, differential diagnosis and radiological treatment of lung cancer. Part III comprises contributions from international experts on the role of imaging in the management of early-stage lung cancer. Part IV introduces therapeutic management strategies for ESLCs, including surgical and nonsurgical approaches, for instance radiofrequency ablation therapy (RFA) and stereotactic ablation therapy (SABR).

X-ray that can classify them. A project is being carried out in order to develop this system, but this work is a preliminary step: it aims to separate anteroposterior and lateral images in order to make the classifier to perform better. To this end, we have studied four deep learning methods: logistic regression, multilayer perceptron (MLP), restricted Boltzmann machines (RBM) and convolutional networks (CNN). We applied all four methods to a random subset of our data and validated their performance on the test set. The results showed that the methods are able to classify the images with high accuracy. In conclusion, we can say that the deep learning methods are promising for the classification of lung cancer images.
Experiments from numerous imaging techniques have been increasingly recognized for their effectiveness in medical imaging, specifically for the early detection of cancer. One of the most promising techniques in lung cancer detection is the use of Image Processing and Artificial Intelligence (AI).

The use of Image Processing techniques, such as edge detection, filtering, and segmentation, can help to identify small nodules that might be difficult to see with the naked eye. Artificial Intelligence algorithms can then be used to classify these nodules as benign or malignant, providing a powerful tool for early detection.

However, these techniques are not without limitations. Data variability between different imaging modalities can make the process of training and validating these models challenging. Additionally, the complexity of the disease itself means that there is no one-size-fits-all approach to lung cancer detection.

In conclusion, while Image Processing and AI offer promising tools for lung cancer detection, there is still much work to be done in terms of developing robust and reliable detection systems. Further research in this area is crucial for improving patient outcomes and saving lives.
Soft Computing for Intelligent Systems

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 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).