Dr. Mahalingam College of Engineering and Technology

Department of Artificial Intelligence and Data Science

MINI PROJECT

Batch No: 23BADA08

Domain: Machine Learning

Title: Lung Cancer Prediction

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Lung Cancer Prediction

ABSTRACT:

In recent times, artificial intelligence has been used in various fields, including the medical field. It has opened up a lot of novel avenues for disease analysis, drug discovery, etc.Efficient and precise diagnosis is quite critical for the subsequent therapeutic treatment of patients.The utilization of machine learning (ML) and deep learning (DL) techniques can significantly expedite the process of cancer detection and stage classification, enabling researchers to study a larger number of patients in a shorter time frame and at a reduced cost. Applying the image segmentation approach herein, the multiresolution rigid registration mechanism is applied to enhance the segmentation further.

To identify and classify lung cancer efficiently, this study introduces a methodology for designing an effective ML-classification model. The model is specifically designed to extract crucial information from medical images while conserving image energy. Furthermore, this study presents novel algorithms for multiview medical image registration and fusion, specifically applied to CT scans. To accomplish this, it is crucial to train our model using a large dataset that encompasses all possible instances of cancer. As a result, our research focuses on the application of a comprehensive and well-organized dataset called LIDC–IDRI (Lung Image Database Consortium–Image Database Resource Initiative) in our proposed technique.Additionally, several preprocessing methods are applied to the datasets to enhance their quality. In order to enhance the robustness and accuracy of our model, we incorporate k-fold cross-validation during the training process. This technique allows for comprehensive validation and assessment of the model's performance. Moreover, we apply feature extraction techniques to the dataset to extract valuable information that is crucial for effective model training.To further improve the performance of cancer classification, we employ a ResNet-18 model in our implementations. By using this model, we are able to achieve enhanced predictive capabilities and overall better performance in classifying cancer cases. This approach ensures a more robust and reliable model for accurate cancer diagnosis

The performance of the proposed model relies on the effective utilization of a multilayer convolutional neural network (CNN). The ResNet-18 model is specifically designed to identify tumors accurately and classify their respective stages.This model demonstrates promising results in accurately diagnosing and classifying tumors based on their stage. During the evaluation of the models, several performance indicators to assess their effectiveness are being taken into consideration.These indicators include precision, recall, accuracy, mutual information (MI), normalized cross-correlation (NCC), peak signal-to-noise ratio (PSNR), and root-mean-square error (RMSE).

Therefore, the main proposition of this research paper is to propose and demonstrate the effectiveness of a novel approach in detecting and classifying lung cancer using advanced ML techniques. This approach involves the development of an efficient ML classification model, utilization of feature extraction methods, exploration of multiview medical image registration, fusion algorithms, and evaluation using performance indicators.

Signature of the Project Guide