

Title: Multi-View Soft Attention-Based Model for the Classification of Lung Cancer-Associated Disabilities

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Abstract: The detection of lung nodules at their early stages may significantly enhance the survival rate and prevent progression to severe disability caused by advanced lung cancer, but it often requires manual and laborious efforts for radiologists, with limited success. To alleviate it, we propose a Multi-View Soft Attention-Based Convolutional Neural Network (MVSA-CNN) model for multi-class lung nodular classifications in three stages (benign, primary, and metastatic). Initially, patches from each nodule are extracted into three different views, each fed to our model to classify the malignancy. A dataset, namely the Lung Image Database Consortium Image Database Resource Initiative (LIDC-IDRI), is used for training and testing. The 10-fold cross-validation approach was used on the database to assess the model's performance. The experimental results suggest that MVSA-CNN outperforms other competing methods with 97.10% accuracy, 96.31% sensitivity, and 97.45% specificity. Conclusions: We hope the highly predictive performance of MVSA-CNN in lung nodule classification from lung Computed Tomography (CT) scans may facilitate more reliable diagnosis, thereby improving outcomes for individuals with disabilities who may experience disparities in healthcare access and quality.

Keywords: Disability research; Lung cancer; Attention mechanism; Convolutional neural networks; Image classification

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