# Assessment of Lung Cancer by Pathologists using CT Scans with Deep Learning Methods: A Review

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## Abstract

Lung cancer remains a leading cause of cancer-related mortality worldwide, with early and accurate diagnosis being critical for improving survival outcomes. Histopathological examination of biopsy tissue continues to be the gold standard for definitive diagnosis, offering insights into tumor type and molecular markers. However, with the increasing reliance on imaging— particularly computed tomography (CT) scans—for lung cancer screening, staging, and monitoring, there is a growing need for automated, robust, and scalable diagnostic support tools. Deep learning, particularly convolutional neural networks (CNNs), has emerged as a powerful technique for the automated analysis of CT images, enabling accurate detection, segmentation, and classification of lung nodules. This review consolidates current advancements in the application of deep learning models to CT imaging, covering key methodologies, segmentation architectures (e.g., U-Net, V-Net), classification frameworks (e.g., 3D CNNs, ResNet), and radiogenomic approaches that bridge imaging features with molecular data. Key public datasets such as LIDC-IDRI and NSCLC-Radiomics have been instrumental in training and validating these models. The integration of AI into clinical workflows has demonstrated the potential to augment pathologists' capabilities by providing rapid, consistent, and quantitative assessments. Nonetheless, challenges persist regarding model interpretability, data variability, and regulatory approval for clinical deployment. This review emphasizes the synergistic role of CT-based deep learning and histopathological evaluation in achieving precise and personalized lung cancer diagnosis.

***Keywords: Lung Cancer Diagnosis, Computed Tomography (CT), Deep Learning, Convolutional Neural Networks (CNNs), Histopathology, Radiogenomics.***