

## Heterogenous Dimensional Super Resolution of 3D CT Scans Using Transformers

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**Abstract :** Accurate segmentation of the airways from CT scans is crucial for early diagnosis of lung cancer. However, the existing airway segmentation algorithms often rely on thin-slice CT scans, which can be inconvenient and costly. This paper presents a set of machine learning-based 3D super-resolution algorithms along heterogeneous dimensions to improve the resolution of thicker CT scans to reduce the reliance on thin-slice scans. To evaluate the efficacy of the super-resolution algorithms, quantitative assessments using PSNR (Peak Signal to Noise Ratio) and SSIM (Structural SIMilarity index) were performed. The impact of super-resolution on airway segmentation accuracy is also studied. The proposed approach has the potential to make airway segmentation more accessible and affordable, thereby facilitating early diagnosis and treatment of lung cancer.

**Keywords :** 3D super-resolution, airway segmentation, thin-slice CT scans, machine learning

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