Pulmonary Nodules: Utilizing Semantic Segmentation to Identify Early Representations of Lung Cancer

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Radiologists and Pulmonologists identify radiographic findings of pulmonary nodules within daily clinical practice. The identification and classification of these nodules is critical, as malignant ones can be early representations of lung cancer. The term “nodule” is increasingly vague within the medicinal community, as it could denote anything from infections to congenital abnormalities. The nodules used in this study are all cancerous. With the rising popularity of Artificial Intelligence, and Machine Learning algorithms, there has been a general push towards applying algorithms into clinical settings, especially in diagnostics and medicine. Within this proof-of-concept experiment, a variation of the U-net model is used to identify pulmonary nodules within CT scans of the lung through semantic segmentation. 400 images from the Lung Image Database Consortium Image Collection (LIDC-IDRI) were used to accumulate the dataset to train the U-net model in an unsupervised fashion. The goal of this research is to not only provide a capable algorithm that can reliably detect early representations of lung cancer, but also identify malignancies by comparing CT scans over a variation of time.

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