Transfer Learning for Low-Dose CT Scan Analysis in Lung Cancer Screening.

Summary:

Lung cancer is one of the leading causes of cancer-related deaths globally, and early detection is key to improving survival rates. Low-dose computed tomography (LDCT) has become a common screening method for early-stage lung cancer due to its ability to reduce radiation exposure while still identifying lung nodules.

However, LDCT scans are often of lower image quality compared to standard-dose CT scans, making accurate lung nodule detection and classification challenging . the use of transfer learning to enhance the performance of deep learning models in analyzing LDCT scans for lung cancer screening. Transfer learning involves pre-training a deep learning model on a large dataset of standard-dose CT scans and then fine-tuning it on LDCT scans to improve detection accuracy. By leveraging pre-trained models, the goal is to mitigate the challenges posed by the lower resolution and noisier images typically associated with LDCT.

Aims:

Aim 1: Develop a Baseline Deep Learning Model for Standard-Dose CT Scans
Aim 2: Apply Transfer Learning to Enhance LDCT Analysis.
Aim 3: Evaluate the Impact of Transfer Learning on False Positives.
Aim 4: Explore Model Generalizability Across Datasets.

Links:

Datasets

https://www.kaggle.com/datasets/hamdallak/the-iqothnccd-lung-cancer-dataset

https://www.kaggle.com/datasets/justinkirby/the-cancer-imaging-archive-lidcidri?select=LIDC-XML-only

https://www.cancerimagingarchive.net/collection/lidc-idri/#citations