Supplementary Material

Zefan Yang[1], Jiajin Zhang[1], Ge Wang[1],
Mannudeep K. Kalra[2], and Pingkun Yan[1⋆]

[1] Department of Biomedical Engineering and Center for Biotechnology and Interdisciplinary Studies, Rensselaer Polytechnic Institute, Troy, NY, USA
[2] Department of Radiology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

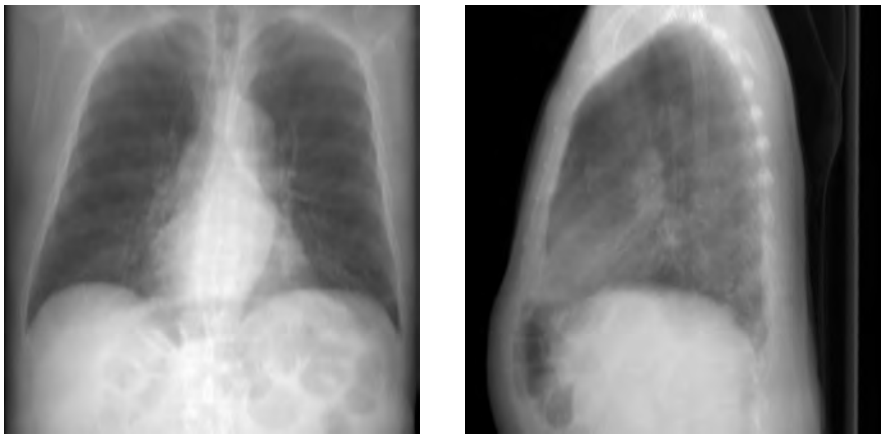
1 Simulating chest X-ray from low dose CT

Hounsfiled units (HU) in computed tomography (CT) are shifted and scaled attenuation coefficients of tissue. The attenuation coefficients μ can be recovered from HU values in CT volumes voxel by voxel by the following equations:

$$\begin{aligned} HU &= \frac{\mu - \mu_{water}}{\mu_{water} - \mu_{air}} \times 1000, \\ \mu &= \frac{HU \times (\mu_{water} - \mu_{air})}{1000} + \mu_{water}, \end{aligned} \tag{1}$$

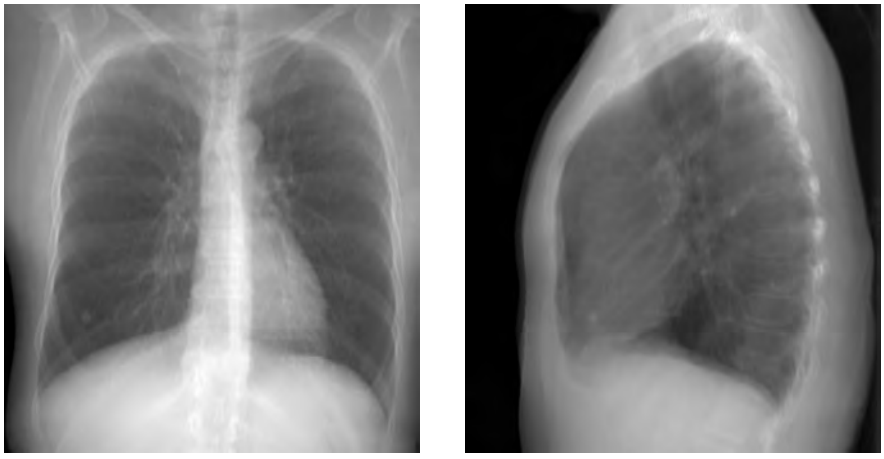
where $\mu_{water} = 0.206$ and $\mu_{air} = 0.0004$ are the attenuation coefficients of water and air respectively. The frontal and lateral chest X-rays are simulated by accumulating voxel attenuation coefficients along the anterior-posterior paths and left-to-right paths respectively. Chest X-rays are resized to be isotropic by bilinear interpolation. We illustrate chest X-rays from subjects with high cadiovascular disease risk (Fig.1) and low cadiovascular disease risk (Fig.2) respectively.

⋆ Corresponding author: yanp2@rpi.edu



(a) Frontal view (b) Lateral view

Fig. 1: Simulated chest X-rays from the subject with high CVD risk.



(a) Frontal view (b) Lateral view

Fig. 2: Simulated chest X-rays from the subject with low CVD risk.