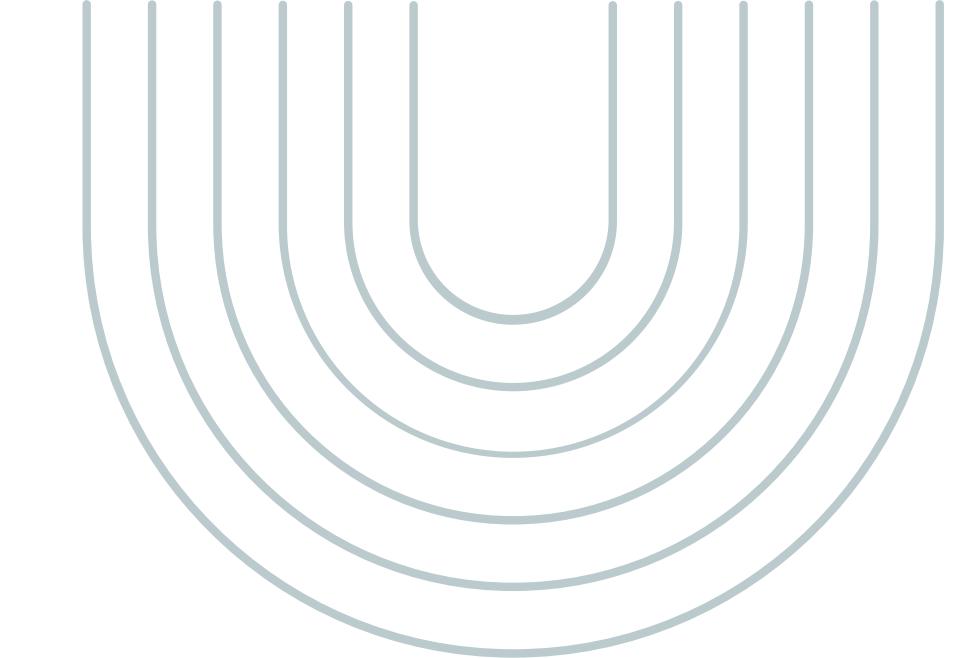




PIXEL PERFECT

*Arnav, Andy, Isi, Kashir,
Rami*

Project Lead: Ermina



- 01. THE PROBLEM**
- 02. OUR APPROACH**
- 03. ENTROPY**
- 04. IMAGE PREPROCESSING/ EDGE DETECTION TECHNIQUES**

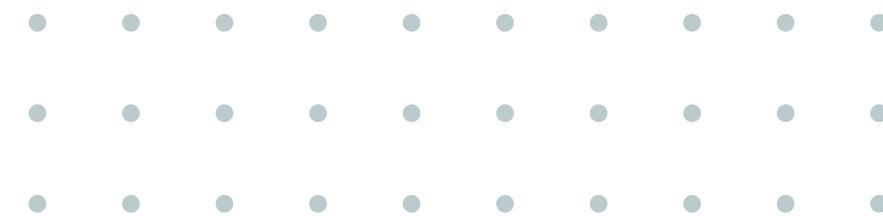


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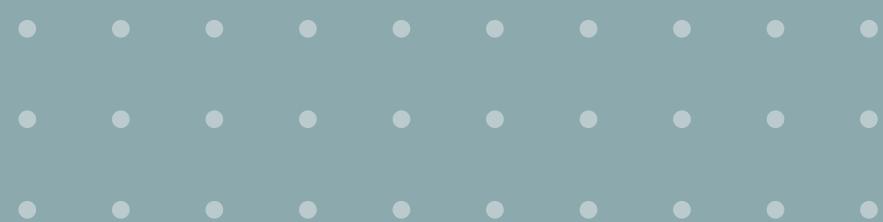


Why Pneumonia?

Pneumonia's ambiguity in chest x-rays provide an excellent opportunity to push the boundaries of image segmentation

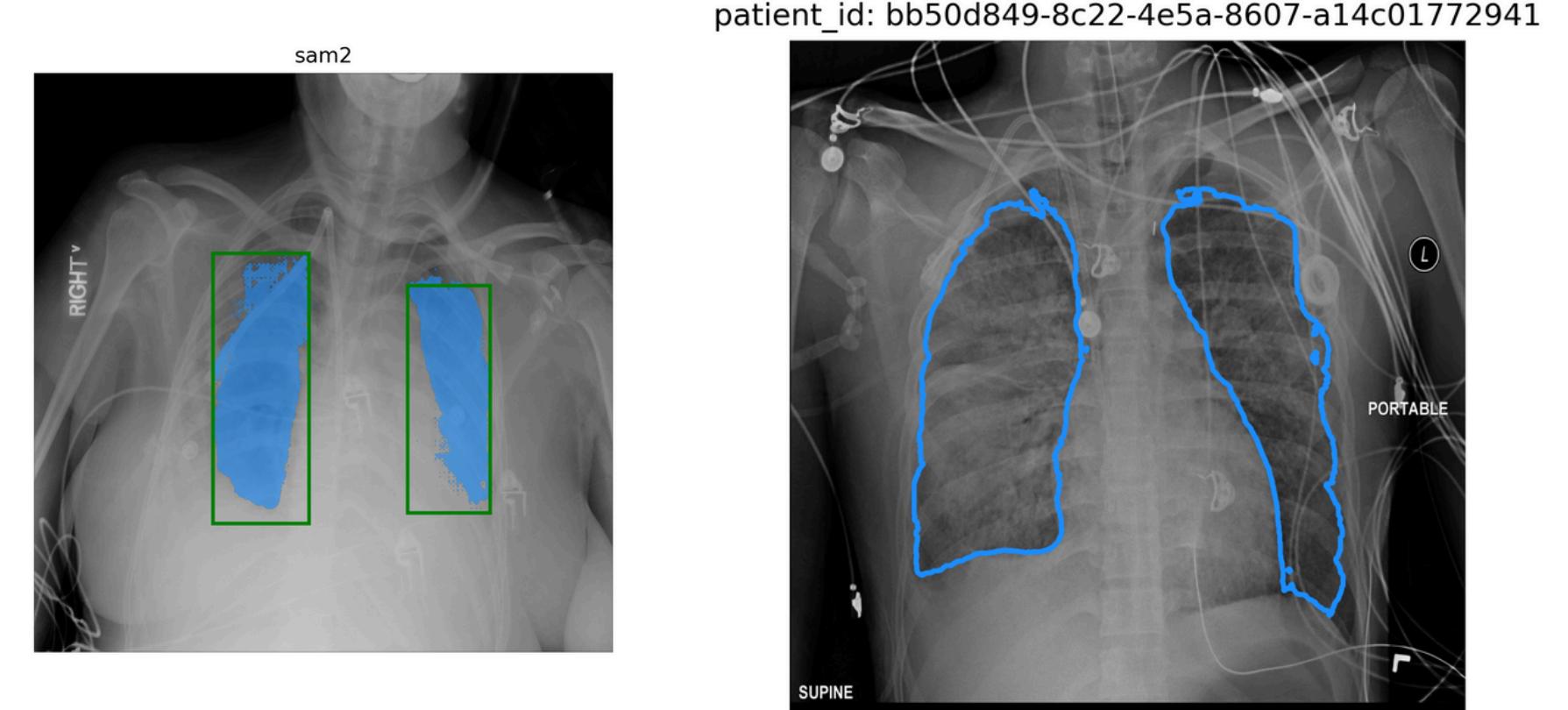
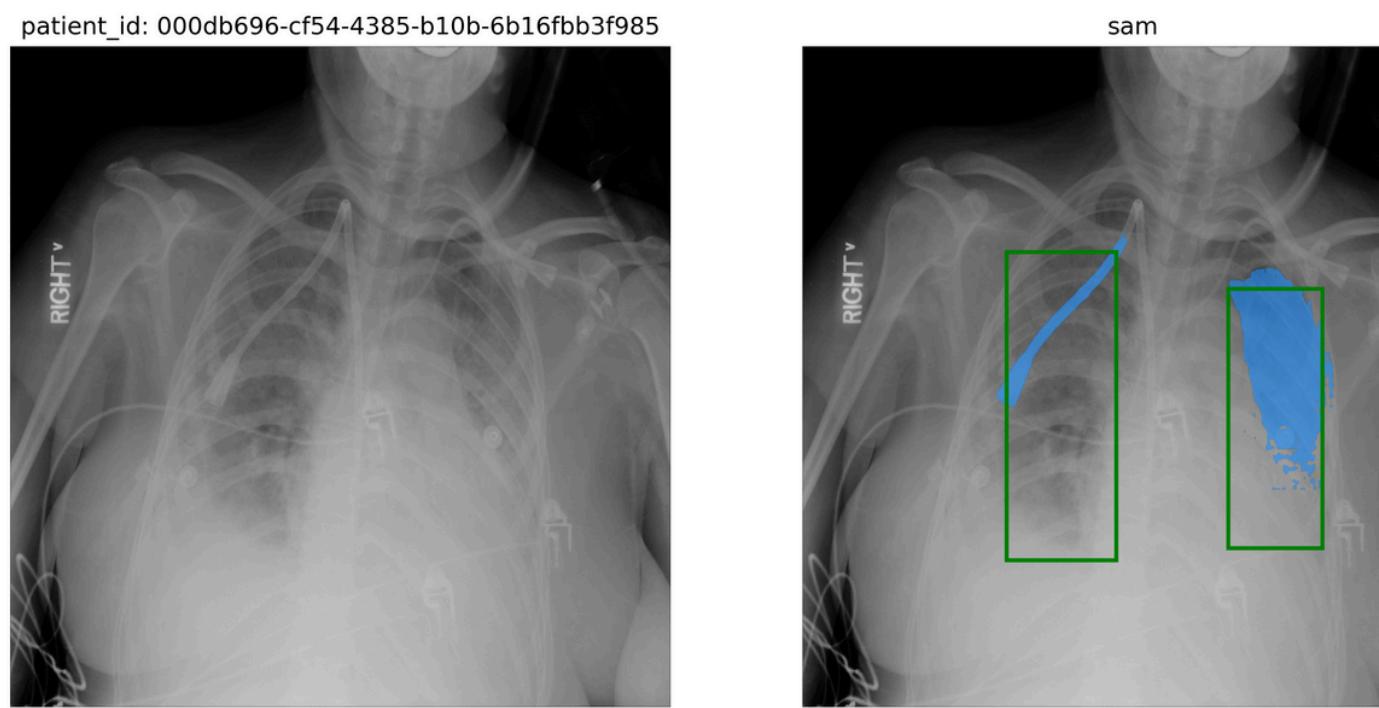
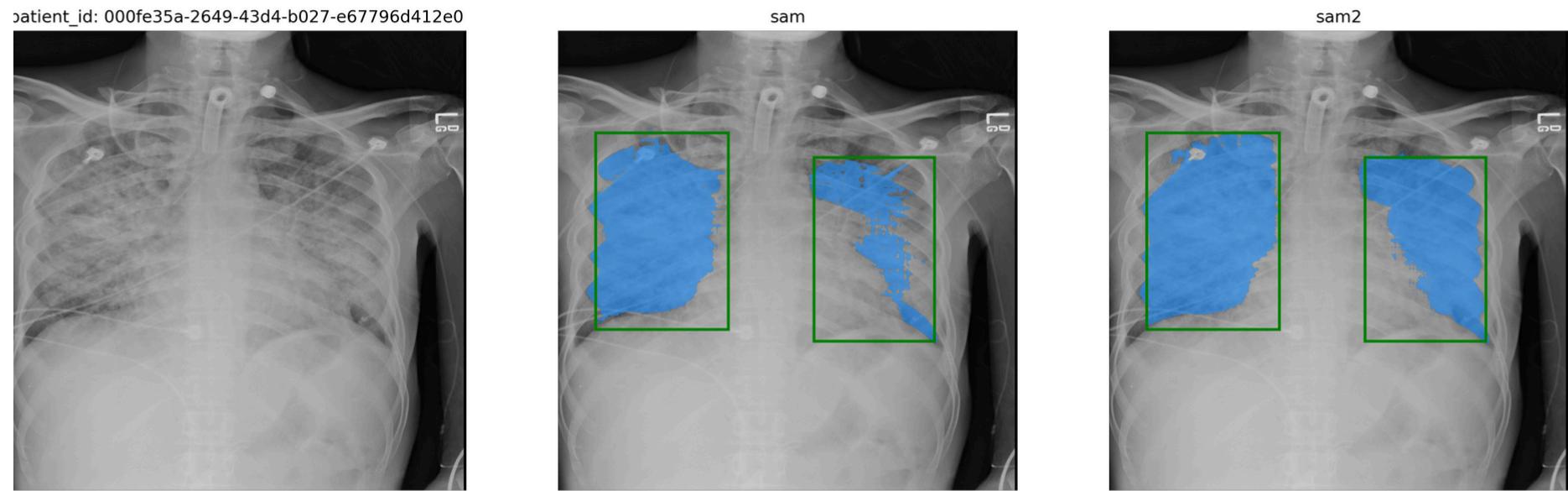
Guiding Question:

“How effectively can current segmentation models transfer their learning to datasets not seen during training, and can we further increase the efficiency of SAM with various image preprocessing techniques?”



ASSESSING THE MODEL

- Cleaned data for our uses
- Comparing SAM & SAM2
- Prepared contoured images
- Possibilities of quantifying results



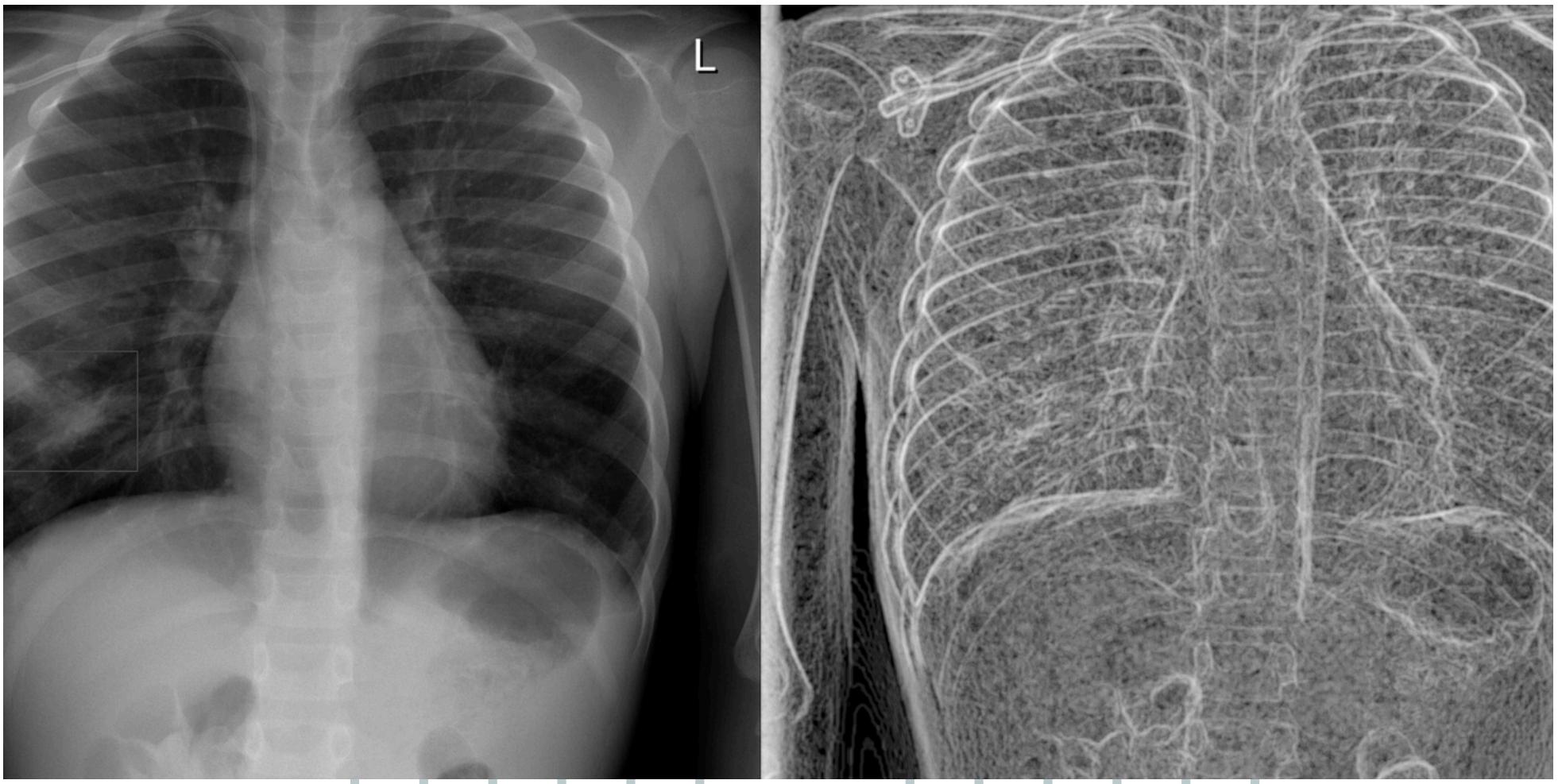
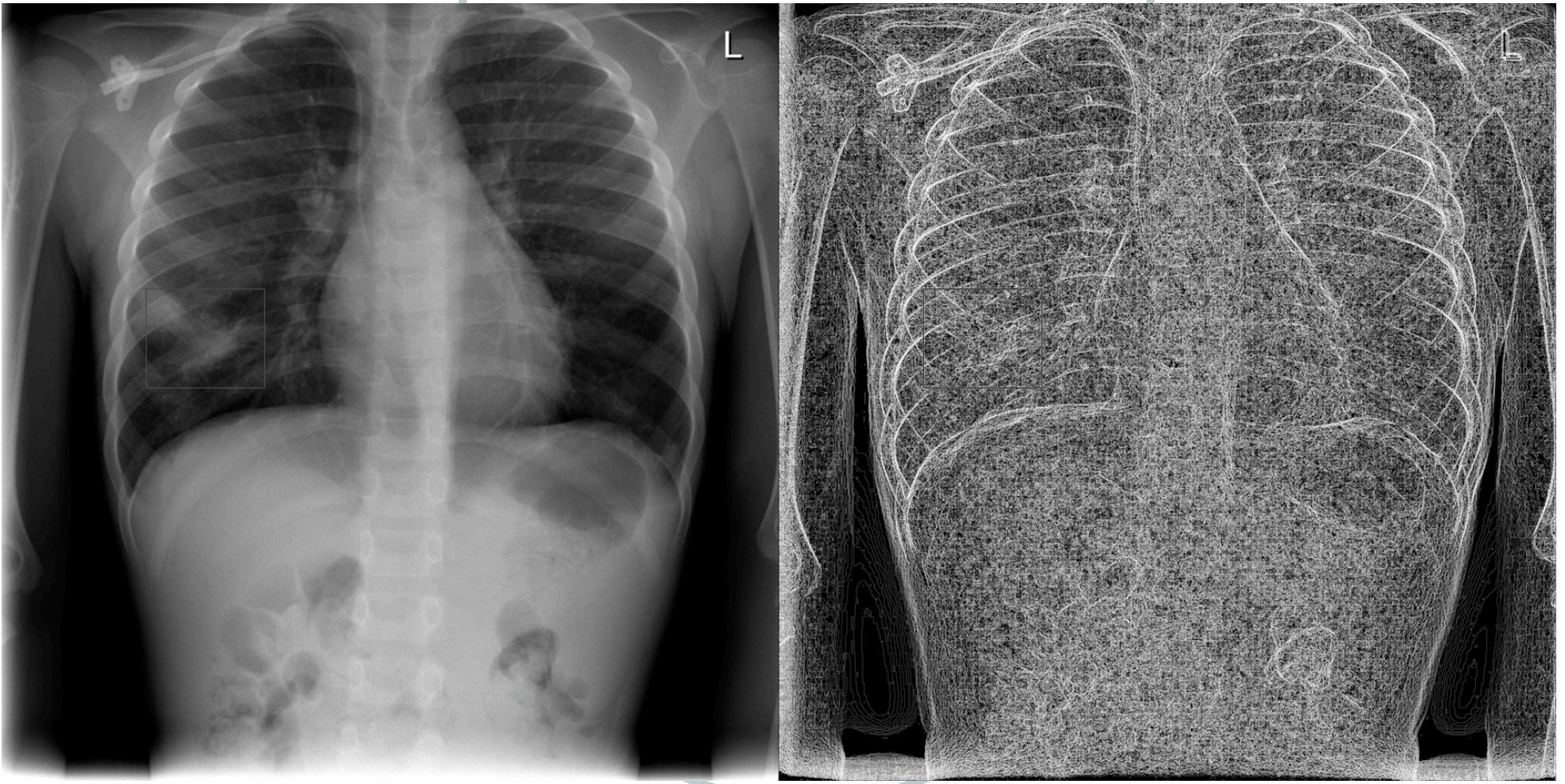
SSIM AND ENTROPY

SSIM (Structural Similarity Index):

- Measures image similarity based on luminance, contrast, and structure.
- Values range from -1 to 1, with 1 indicating identical images.
- Used for evaluating image quality after transformations like compression or enhancement.

Entropy:

- Represents the amount of information or randomness in an image.
- Useful for assessing texture, noise, or image contrast.
- Employed to optimize or analyze image segmentation, compression, or thresholding processes.

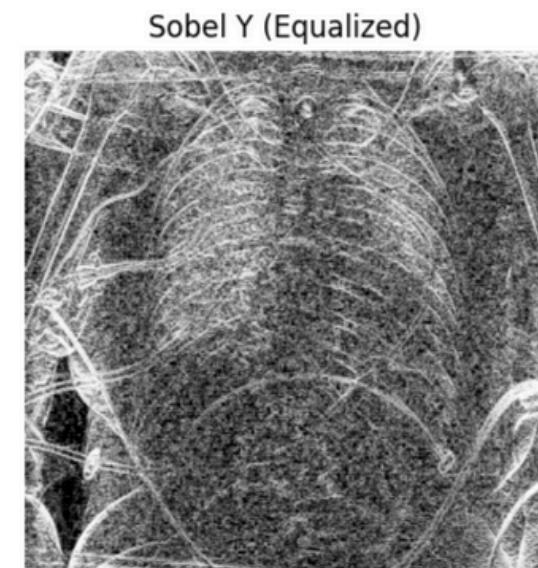
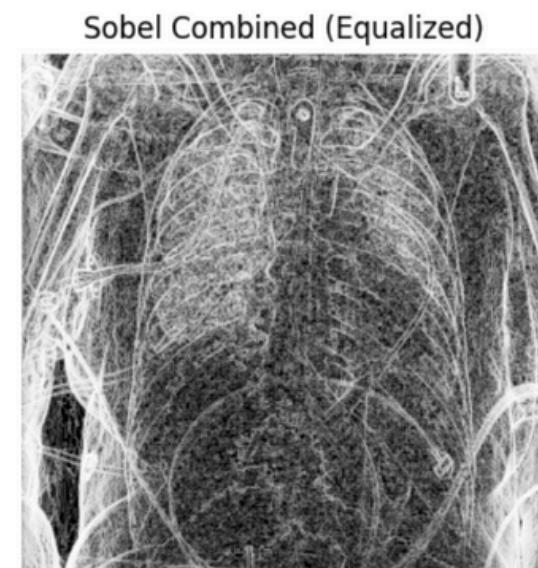
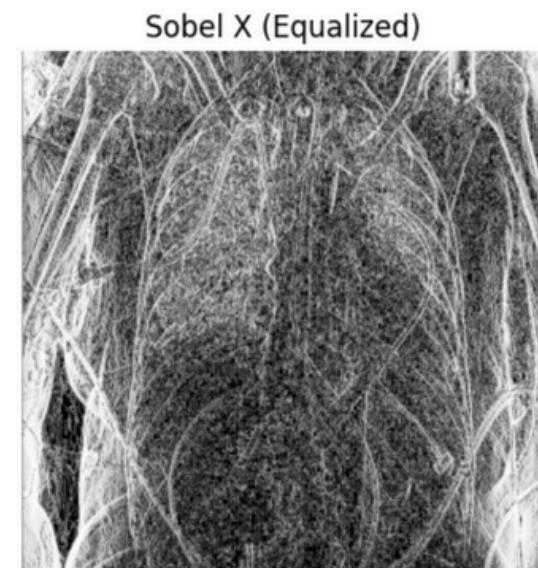
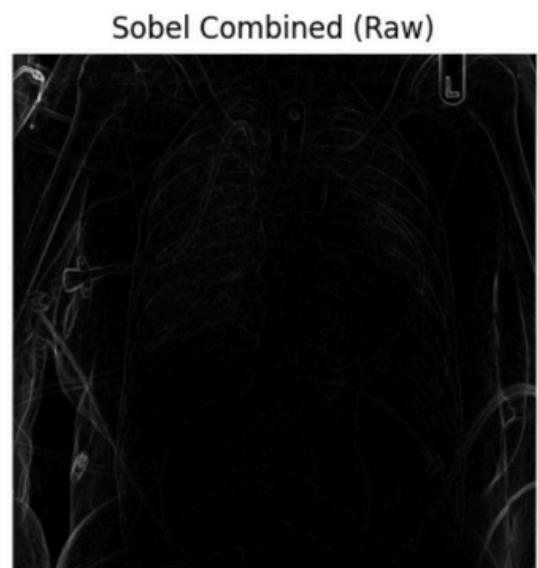


SOBEL OPERATOR

- Edge detection technique used in image processing and computer vision.
- Highlights regions with strong changes in intensity (i.e., edges).

How Sobel Operator Works:

- Uses two convolution kernels to detect gradients:
 - Horizontal gradient (G_x) and Vertical gradient (G_y).



CANNY EDGE DETECTION

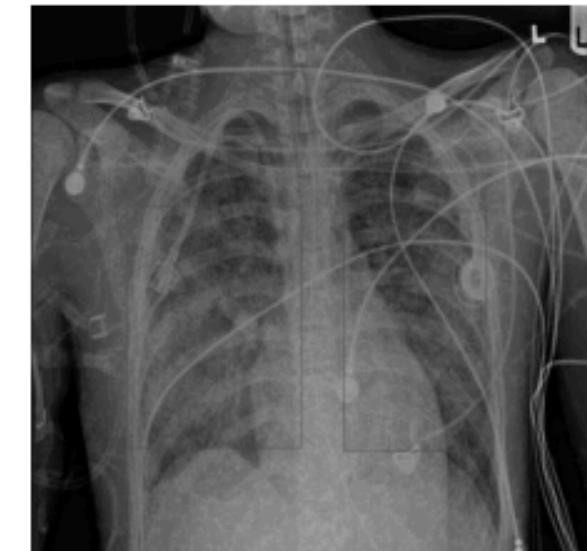
Looks for sharp changes in brightness to find image edges

Thresholds are determined by the Otsu method – helps to automate thresholds with minimal variance between high and low threshold

Less sensitive to noise than other common edge detection methods

Can help to make pneumonia more visible for both naked eye and SAM

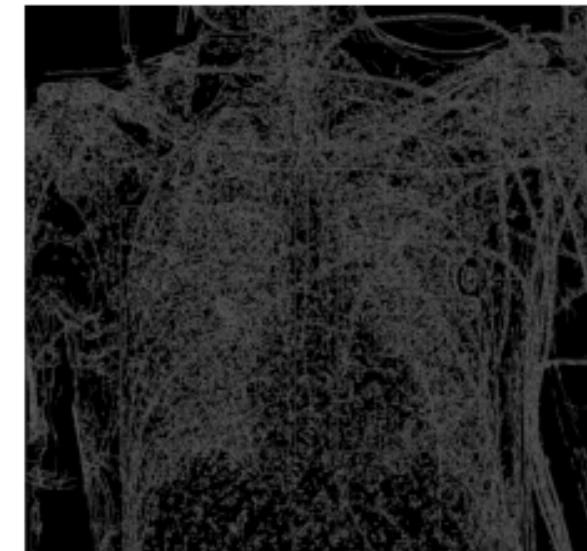
Combined Image



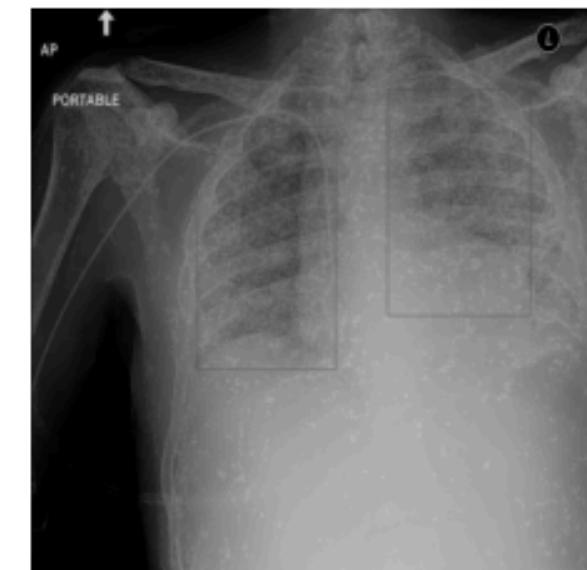
Original Image



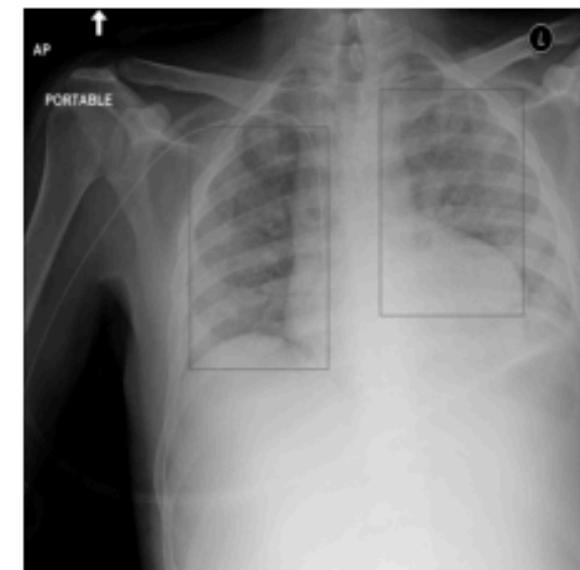
Edge Image



Combined Image

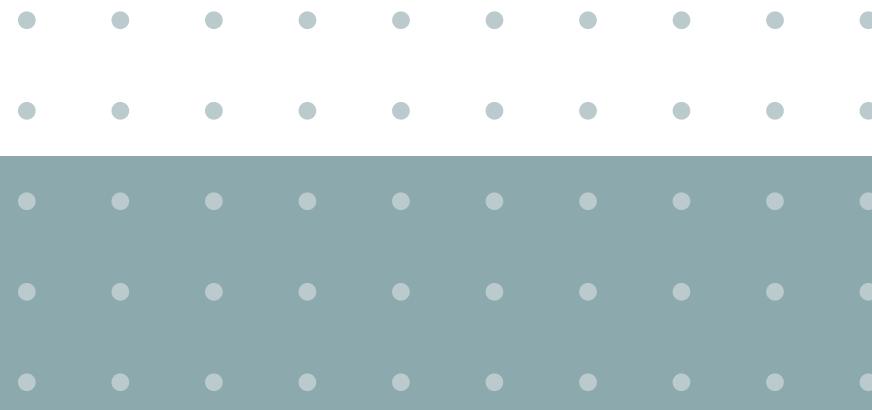


Original Image



Edge Image





THANK YOU

