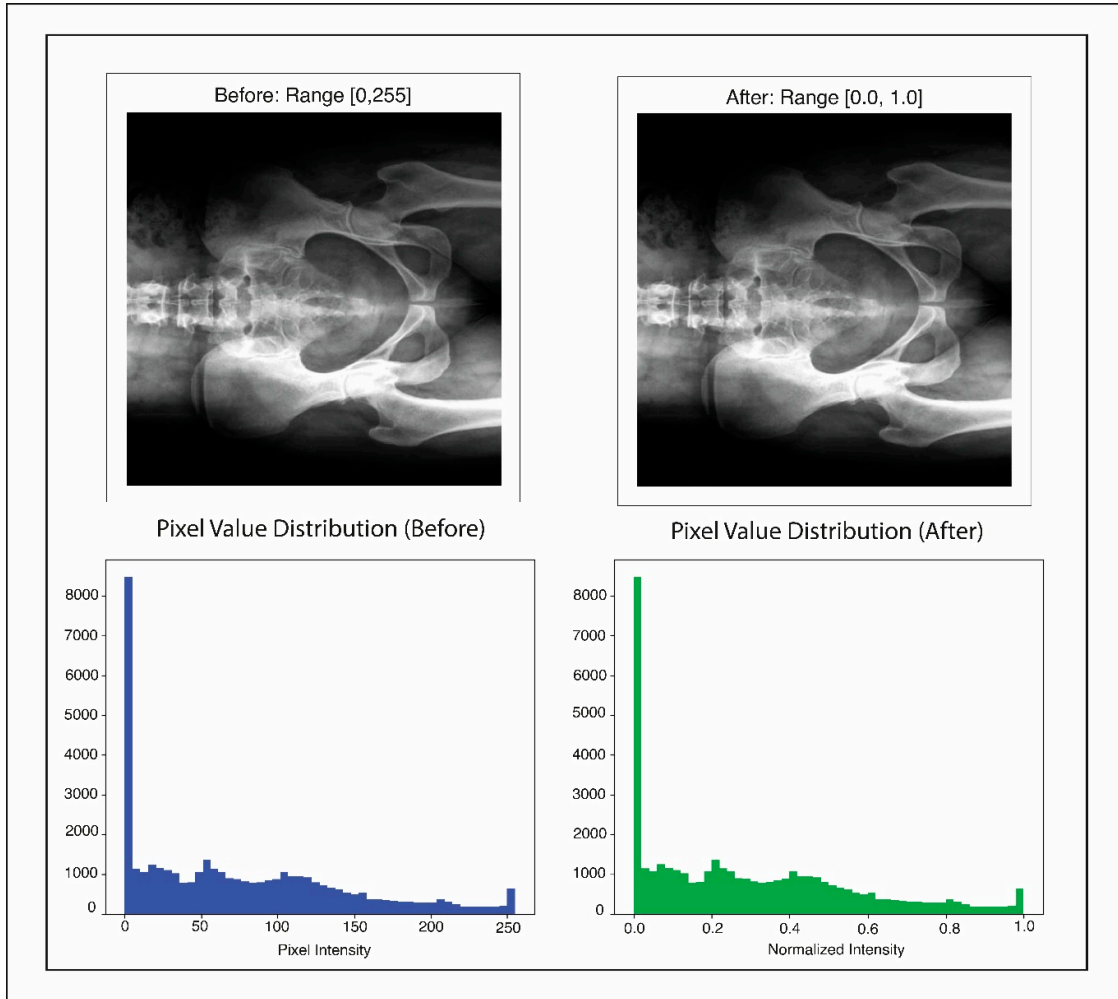
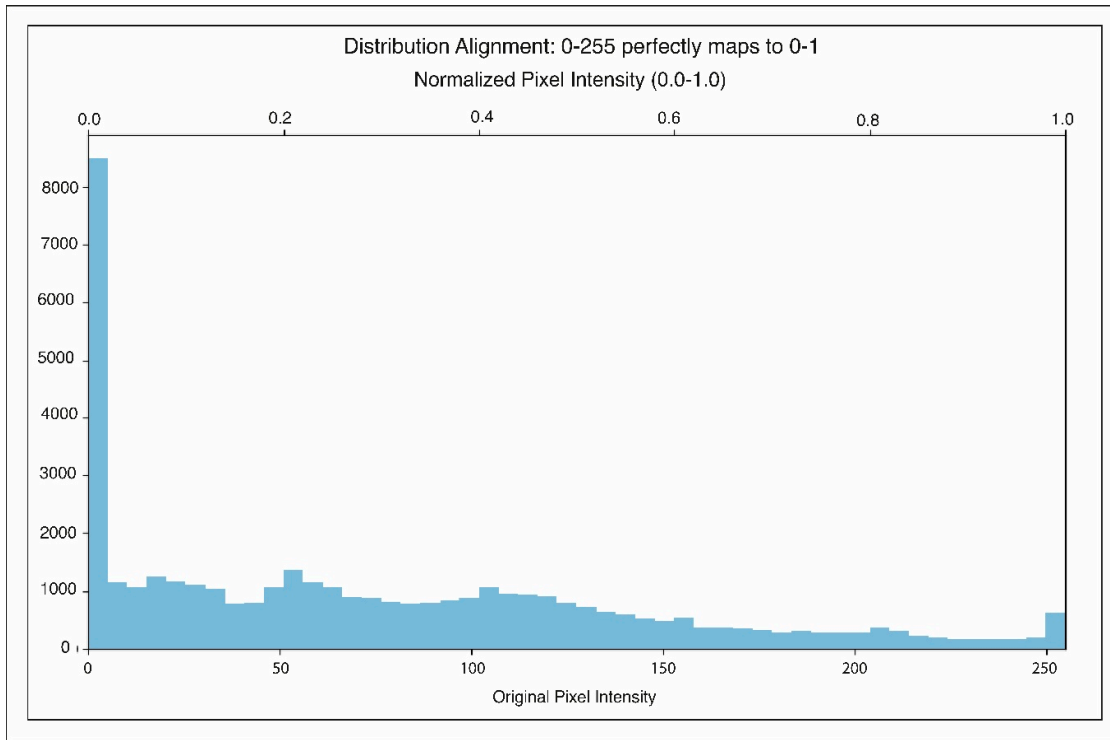




### Supplementary Figure S1: Linear Normalization Transformation

This plot illustrates the linear transformation function used to normalize pixel intensities from 8-bit integers to 32-bit floating-point values. The x-axis represents the original pixel values ranging from 0 to 255, while the y-axis shows the corresponding normalized values from 0.0 to 1.0. The direct linear relationship ( $y = x/255.0$ ) ensures that the relative contrast and information content of the image are perfectly preserved during the conversion process, facilitating numerical stability for the neural network without altering the data distribution.



### Supplementary Figure S2: Dual-Axis Pixel Intensity Distribution

A histogram displaying the distribution of pixel intensities within a sample X-ray image. The visualization employs a dual x-axis to demonstrate the alignment between the original representation and the normalized form. The bottom axis corresponds to the raw 8-bit integer values (0-255), and the top axis maps these to the normalized  $[0, 1]$  range. The identical shape of the distribution across both scales visually confirms that the normalization process is a linear scaling operation that maintains the statistical properties of the dataset, ensuring no loss of resolution or data distortion.