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Detecting Shell Contours in ICF Images using Neural Networks BRADLEY WOLFE, ELIZABETH MERRITT, JOHN KLINE, JOSHUA SAUPPE, BENJAMIN TOBIAS, ZHEHUI WANG, Los Alamos National Lab — X-ray imaging as a diagnostic is important in understanding the dynamics of ICF targets. Accurate Edge detection algorithms based on x-ray images are essential to constrain numerical models and predictions. Traditional edge detection methods are often hard to scale up to large datasets and are prone to error due to small signal-to-noise ratio and human biases. Neural networks such as Holistic Edge Detection are able to process large datasets systematically and therefore are less susceptible to ad hoc errors due to analyst bias. These networks are trained using deep supervision which generates hierarchies of edges. An issue with deeply supervised neural networks is that they require a large amount of labeled images for training. In order to compensate for small experimental data sets available from ICF, we use neural networks trained on standardized datasets. In some circumstances, the context of the images tend to drastically differ from ICF experiments. We plan on compensating this deficiency using simulation data corrupted with different noise levels.

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