Detecting Sources in Fermi Gamma-ray All Sky Maps Using Neural Networks[1] DIANA HORANGIC, University of New Hampshire, ELENA ORLANDO, Stanford University, ANDREW STRONG, The Max Planck Society — The Fermi Large Area Telescope (LAT) has been in orbit of Earth since 2008. One challenge in analyzing LAT data is localizing sources to answer how many gamma ray sources are in Fermi's view. Neural networks, a new development in data analysis, show impressive accuracy in the field of medical imaging. Application of these networks to Fermi LAT data can potentially be more successful than traditional statistical methods of source detection. We present, here, our first attempt to improve traditional methods with a region-based convolutional neural network (Faster R-CNN) and then a Mask R-CNN. We have generated three training and test datasets of simulated Fermi LAT images with different parameters such as noise and photon counts. These were used to separately train Facebook AI's Mask R-CNN model with a ResNet-50 backbone and feature pyramid network for instance segmentation of sources. Results of this analysis are presented.

Diana Horangic
University of New Hampshire

Electronic form version 1.4