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Applying Deep Learning to GPI data to analyze edge turbulence in the SOL[1] MARION E. SMEDBERG, Notre Dame of Maryland University, D. R. SMITH, University of Wisconsin-Madison, S. J. ZWEBEN, Princeton Plasma Physics Labs — Understanding the edge dynamics of magnetically confined plasmas is an important aspect of increasing confinement and, eventually, putting fusion power on the grid, especially for large fusion machines such as ITER. The aim of this project is to use deep learning (DL) methods to analyze diagnostic data of the edge and scrape-off-layer (SOL) of NSTX, both to search for unidentified patterns and lay the groundwork for future DL projects. Success of this project could encourage plasma physics to use DL more in its data analysis, to match DL's growing prevalence in other fields of physics and science. Authors will explore data from the Gas Puff Imaging (GPI) diagnostic on NSTX using various types and architectures of DL, such as convolutional neural network (CNN), hybrid recurrent neural network and CNN, and unsupervised networks with autoencoders.

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