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AGN Selection in LSST Through Machine Learning

We explore the use of machine learning for AGN selection from data akin to the anticipated LSST survey (e.g., Savic et al. 2023). The data is gathered from the AGN Data Challenge which comprises of two primary sources: SDSS Stripe 82 and XMM-LSS. We also utilize data from the DECam Local Volume Exploratoration Survey (DELVE). We employ unsupervised clustering techniques, distinguishing our approach from conventional methods that rely on labeled data by leveraging all of the data. We further visualize the photometric, astrometric, time-domain, and morphology data in real space in order to better understand the latent space produced when passing the data through an autoencoder. The comparative effectiveness of TensorFlow and PyTorch in constructing autoencoders is explored – aiming to provide a foundational comparison of these frameworks to help guide us in choosing the most suitable framework. Using the full parameter space, a selection efficiency/completeness baseline is created using a Random Forest. Our goal then is to improve upon this baseline by iterative application of improvements to the algorithm(s) and feature space choices.

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