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GRB Redshift Classifier Using Supervised Machine Learning

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Gamma-ray bursts (GRBs) have been observed at very high redshifts, up to 9.4, and can be a crucial astrophysical object for studying the evolutionary history of the universe. However, the rapid dimming of their afterglows, combined with the constrained availability of telescope time, poses challenges in promptly observing these events. This difficulty is particularly pronounced for high-redshift GRBs, resulting in a limited number of observed GRBs with accurately determined redshifts and an even smaller subset of high-redshift GRBs. To address these observational challenges, rapid and efficient follow-up mechanisms are essential to perform spectroscopy on GRBs before their optical afterglows fade beyond detectable limits, ensuring comprehensive spectrum coverage. To facilitate this, we propose the development of a binary classifier using supervised machine learning (ML) techniques. This classifier is designed to quickly and accurately differentiate between low- and high-redshift GRBs, enabling more targeted and efficient use of telescope time for high-redshift observations.

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