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Machine Learning Explorations in GRB Studies: From Classification to Extended Emission Identification

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Gamma-ray bursts (GRBs) have traditionally been categorized based on their durations. However, the emergence of extended emission (EE) GRBs, characterized by durations higher than two seconds and properties similar to short GRBs, challenges conventional classification methods. In this talk, we delve into GRB classification, focusing on a machine-learning technique (t-distributed stochastic neighbor embedding, t-SNE) for classification and the identification of extended emission in GRBs, and its hyper-parameter optimisation.

Furthermore, we introduce an innovative tool, ClassipyGRB, designed for astronomers whose research centers on GRBs. This versatile Python3 module enhances the exploration of GRBs by offering nteractive visualizations of their light curves and highlighting shared attributes. With ClassipyGRB, astronomers can swiftly compare events, identifying resemblances and exploring their high-frequency characteristics. This tool uses the power of proximity analysis, enabling rapid identification of similar GRBs within seconds.

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