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Searching for Gravitational Waves in LIGO Data:Using Tools in Multivariate Analysis ARIANA MINOT, Duke University — Evidence of gravitational waves associated with gamma ray bursts(GRBs), in addition to perhaps revealing new physics, may explain the cause of these highly energetic events. In order to detect the presence of gravitational waves in association with GRB events, it is necessary to separate signal and background effectively. Different multivariate analysis algorithms using Boosted Decision Trees(BDTs) and Artificial Neural Networks(ANNs) were implemented to achieve better separation during this project. Using simulated events of gravitational wave signal and real LIGO data not associated with GRBs, trees and networks were trained and tested under many different configurations. Currently, the best classifier is a BDT that achieves a signal efficiency of $89.5 \pm 0.2\%$ at 1% background contamination.

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