Contribution ID: **472** Type: **Poster**

Classification of Gamma-Ray Burst Using Machine Learning Approach.

Friday 16 December 2022 14:00 (1 hour)

Gamma-ray bursts (GRBs) are the most luminous (events in the Universe after the big bang with $E_{\gamma,iso} \approx 10^{48} - 10^{54} erg$), the brightest and short time (lasting from few seconds to few hours) flash of very high energy electromagnetic radiation occurring at an average rate of one event per day at cosmological distance, explosions of the universe. These astrophysical events produce electromagnetic radiations from optical to very high energy gamma rays (> GeV), even ultra-high energy particles like cosmic rays, neutrinos are also expected to be produced in these sources.

Generally, GRBs classifications have been into distinct two groups, "short"and "long", based on the well established bimodal fitting of duration distribution plot and also theoretically their sources of emission GRBs as well. In general, events with a duration of less than about two seconds are classified as short gamma ray bursts(SGRBs) and long gamma-ray bursts(LGRBs). These SGRBs account for about 30% of GRBs and mainly it's source of origin are neutron-star neutron-star or neutron-star black-hole merger. Most of the observed GRBs events, about 70% have a duration of greater than two seconds and are named as LGRBs. And mainly origin of long GRBs collapse of massive star into a black hole and also from supernova explosions. However, in past many of are, have pointed the indications of third class of GRBs, which is intermediate duration in between SGRBs and LGRBs.

The aim is to investigate through the machine learning statistical approach whether a third kind of class is present in the T90 duration distributions in the intermediate time interval based on followings datasets. Here for my analysis, I have considered the dataset of more than 500 GRBs, for that I used Fermi/GBM, AstroSat/CZTI and Swift/BAT dataset. The idea is to after fitting the followings datasets, then I illustrated of a decision boundary between two Gaussian distributions.

Session

Astroparticle Physics and Cosmology

Author: Mr DHARA, Sundar (UM-DAE CEBS Mumbai, Mumbai)

Presenter: Mr DHARA, Sundar (UM-DAE CEBS Mumbai, Mumbai)

Session Classification: Poster - 4