

# Test... Classifying Blazar Candidates of Uncertain type in the fourth Fermi-LAT catalog by machine learning techniques

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In the Fermi-LAT Fourth Source Catalogue (3FGL) about 50% of the sources have no clear association with a likely  $\gamma$ -ray emitter. We use machine learning technique aimed at distinguishing BL Lacs from FSRQs to investigate the source subclass of uncertain (BCU) or unassociated (UCS) sources characterised by  $\gamma$ -ray properties very similar to those of Active Galactic Nuclei.

This work is a follow up of previous papers : <https://arxiv.org/abs/1607.07822> , <https://arxiv.org/abs/1705.09832>, <https://arxiv.org/abs/1808.05881> , <https://arxiv.org/abs/1602.00385> and will use the 2019 optimization of the original algorithm as described in : [Optimizing neural network techniques in classifying Fermi-LAT-ray sources](#).

The result of this study will suggest a new zoo for 4FGL  $\gamma$ -ray objects, opening up new considerations on the population of the  $\gamma$ -ray sky, and it will facilitate the planning of significant samples for rigorous analyses and multiwavelength observational campaigns.