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# Machine Learning Techniques for Energy Reconstruction in JUNO experiment

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The Jiangmen Underground Neutrino Observatory (JUNO) is a neutrino experiment under construction with a broad physical program. The main goal of JUNO is the determination of the neutrino mass ordering by precisely measuring the fine structures of the neutrino energy spectrum. Precise reconstruction of the event energy is crucial for the success of the experiment.

The JUNO detector is equipped with a huge number of photomultiplier tubes (PMTs) of two types: 17 612 large PMTs (20 inches) and 25 600 small PMTs (3 inches). The detector is designed to provide an energy resolution of 3% at 1 MeV. Compared to traditional reconstruction methods, Machine Learning (ML) is significantly faster for the detector with so many PMTs.

In this work we study ML approaches for energy reconstruction from the signal gathered by the PMT array and present fast models using aggregated features: fully connected deep neural network and boosted decision trees. Consideration of the problem of the domain adaptation of a model trained on Monte Carlo (MC) data for real data will be also presented. The dataset for training and testing is generated by the full detector MC method using the official JUNO software.

## Collaboration

JUNO Collaboration

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