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Machine learning applications in JUNO

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The Jiangmen Underground Neutrino Observatory (JUNO) is a next-generation neutrino experiment currently under construction in southern China. It is designed with a 20 kton liquid scintillator detector and 78% photomultiplier tube (PMT) coverage. The primary physics goal of JUNO is to determine the neutrino mass ordering and measure oscillation parameters with unprecedented precision. JUNO's large mass and high PMT coverage provide a perfect scenario for the application of various machine learning techniques. In this talk, I present an overview of the recent progress of machine learning studies in JUNO, including waveform-level and event-level reconstruction, background rejection, and signal classification. Preliminary results with Monte Carlo simulations are presented, showing great potential in enhancing the detector's performance as well as expanding JUNO's physics capabilities beyond the traditional scope of large liquid scintillator detectors.

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