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Exploring Computing Methods for Improved Cosmic Background Rejection in NOvA's Sterile Neutrino Searches

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We are witnessing a revolution happening in experimental HEP based on the current innovations in deep machine learning technologies. For example, Convolutional neural networks (CNNs) have been introduced to identify particle interactions in particle tracking detectors based on their topology without the need for detailed reconstruction and outperforms currently used algorithms. We are trying to further improve the performance of CNNs applied to the NOvA experiment by: training the algorithms to separate a single particle interaction from others (image/particle segmentation phase), classifying the specific interaction type for the separated interaction (image/particle classification phase), and finally, estimating the classification uncertainty. We are developing a new method to select particle interactions based on TensorFlow, a CNN framework released and supported by Google. In this talk, we will detail the algorithm and its performance when applied to NOvA simulation.

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Session Classification: Computing, Analysis Tools, and Data Handling

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