

Neutrino physics with deep learning. Techniques and applications on NOvA.

The NOvA experiment has made both ν_μ disappearance and ν_e appearance measurements in Fermilab's NuMI beam, and is working on cross section measurements using near detector data. At the core of NOvA's measurements is the use of deep learning algorithms for identification and reconstruction of the neutrino flavor and energy. These algorithms, used for the first time on NOvA in 2016, yielded large improvements in selection efficiency, and will be applied to our first anti-neutrino results to be released this year.

Presented here is the extension of our deep learning efforts for identification of neutrino signal events, final state identification, single particle tagging, and reconstruction using instance segmentation techniques.

We will describe the new implementations of modified Convolutional Neural Networks for anti-neutrino events, single particles and their performance for analysis final states selection, standard candle measurements, and reconstruction.

Authorship annotation

For the NOvA Collaboration

Session and Location

Wednesday Session, Poster Wall #79 (Auditorium Gallery Left)

Poster included in proceedings:

yes

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Track Classification: Poster (participating in poster prize competition)