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Development of an agnostic global particle identification tool for the ND280 near detector

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T2K is a long-baseline neutrino experiment stationed in Japan, with the primary goal of measuring $_{cp}$ via comparison of $\rightarrow_e$ and $^-\rightarrow_e^-$ oscillation. The ND280 off-axis near detector samples the neutrino beam before oscillation occurs, and allows for measurements of neutrino-nucleus interaction cross-sections. Selecting interaction samples in ND280 requires effective particle identification (PID) selection algorithms to select the correct charged particle tracks. However, there are limits to conventional selection methods, prompting the need for more powerful tools.

An agnostic global PID tool has been developed for the ND280 near detector. This exploits machine learning algorithms to accomplish multivariate analysis, with a boosted decision tree (BDT) being used to develop the PID tool. This tool makes no assumption on what selection it is being used for and utilizes information from all available sub-detectors. The performance of the BDT PID tool applied to a CC1π selection will be benchmarked against the same selection using traditional cut methods. In this poster I will present work on the development of the BDT, the current status and future plans.

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