

Machine learning applications to maintain the NuMI neutrino beam quality at Fermilab

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The NuMI target facility at Fermilab produces an intense muon neutrino beam for NOvA (NuMI Off-axis ν_e Appearance) long baseline neutrino experiment. Three arrays of muon monitors located in the downstream of the hadron absorber in the NuMI beamline provide the measurements of the primary beam and horn current quality. We have studied the response of muon monitors with the proton beam profile changes and focusing horn current variations. The responses of muon monitors are used to develop Machine Learning (ML) algorithms. We present the progress of the ML applications and the future plans. This effort is important for many future applications such as beam quality assurance, anomaly detections, neutrino beam systematics studies and neutrino beam quality assurance. Our results demonstrate the advantages of developing useful ML applications that can be leveraged for future beamlines such as LBNF.

Attendance type

Virtual presentation

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