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Particle Tracking Classification in the CONNIE Experiment

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The Coherent Neutrino-Nucleus Interaction Experiment (CONNIE) operates at the Angra 2 Nuclear Reactor in Brazil. Using silicon Skipper-CCDs, CONNIE aims to identify and investigate coherent elastic neutrinonucleus scattering (CE ν NS). However, background particles from various sources, combined with the large volume of data, present significant challenges, making manual analysis of individual events impractical. To address these challenges, this work investigates and implements machine learning and image processing methodologies for classifying distinct CONNIE events.

A labeled dataset of real experimental events will also be created using the Annotation Redundancy with Targeted Quality Assurance (QA) method. This approach involves multiple annotators labeling the same data, enabling comparison to identify discrepancies, refine labeling accuracy, and enhance dataset reliability.

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