Contribution ID: **1545** Contribution code: **THPS073** Type: **Poster Presentation**

Developing an image classifier using synthetic data from CAD models

Thursday 5 June 2025 15:30 (2 hours)

This work investigates the potential of using synthetic images generated from CAD models to train an image classifier for identifying components of a particle accelerator. The study focuses on magnets within the ALS Accumulator Ring at Lawrence Berkeley National Laboratory. Generating large volumes of real-world training data is often challenging in such complex systems. To address this, CAD files were converted into 3D models and used to produce diverse synthetic datasets. These datasets were augmented with a smaller set of real-world images to train a YOLOv8-based model. This approach aims to evaluate whether synthetic images can effectively support the development of classifiers in environments where real data collection is limited. The study lays the groundwork for future development of real-time recognition tools to assist accelerator operations.

Footnotes

Paper preparation format

Region represented

America

Funding Agency

Author: MORATO, Alessandro (University of California at Berkeley)

Co-authors: HELLERT, Thorsten (Lawrence Berkeley National Laboratory); VEGLIA, Bianca (Deutsches Elektronen-Synchrotron)

Presenter: MORATO, Alessandro (University of California at Berkeley)

Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation and Controls,Feedback and Operational Aspects: MC6.D13 Machine Learning