



Contribution ID: 740 Contribution code: **contribution ID 740**

Type: **Poster**

The Open Data Detector - Tracking and Vertexing

The great success of the Tracking Machine Learning Challenges (TrackML) contracted in two phases (accuracy phase from April to August, throughput phase from September to November 2018) has proven the need of an easy accessible and yet challenging dataset for algorithm design and further R&D. The released TrackML dataset is to date heavily used by several research groups at the forefront of machine learning, heterogeneous computing and quantum computing research.

However, the detector and the dataset made accessible through TrackML had several flaws and simplifications that render it a quite idealistic setup and thus limits the available R&D possibilities.

We present a review of the TrackML dataset usage and the follow-up Open Data Tracking Detector, which is an enhanced version of the TrackML detector. It resembles to a large extent the TrackML layout, but adds significant complexity such as realistic support structure material, cable bundles and cooling pipe description, and an overall quasi realistic engineered design. It is implemented in DD4hep, and serves next to the ACTS based fast simulation (Fatras) used for the TrackML dataset also a Geant4 based full simulation for reference. It allows for custom digitisation including timing detectors and for layout modifications. Together with Fatras it builds a simulation-on-the-fly testbed for future algorithm R&D. The DD4hep based description is suitable for a future extension with a calorimeter and/or muon detectors.

Significance

This is a follow-up of the TrackML dataset which is widely used in the community.

References

Speaker time zone

Compatible with Europe

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Session Classification: Posters: Walnut

Track Classification: Track 2: Data Analysis - Algorithms and Tools