An updated hybrid deep learning algorithm for identifying and locating primary vertices

Discussion session

Simon Akar¹ Thomas Boettcher² Sarah Carl¹ Henry Schreiner³ Mike Sokoloff¹
Marian Stahl¹ Constantin Weisser² Mike Williams²
on behalf of the LHCb Real Time Analysis project

¹ University of Cincinnati ² Massachusetts Institute of Technology ³ Princeton University

April, 28th 2020

Supported by:
A hybrid deep learning approach to vertex finding has been introduced

- Cluster search done by CNN with custom cost function
- Plan to develop ML algorithm for KDE generation as well

- Improved performance, driven by CNN architecture
- Privately deployed as PV finding algorithm in CPU version of LHCb’s HLT
  - More pronounced kernels using measured track covariance
  - Next: Train & benchmark with LHCb simulation & software

(Open) Source code of standalone package, including toy generation:

- https://gitlab.cern.ch/LHCb-Reco-Dev/pv-finder
- Runnable with Conda on macOS and Linux