

MCC10 for ProtoDUNE-SP

Dorota Stefan (NCBJ/CERN) for DRA WG

MCC10 for ProtoDUNE-SP request

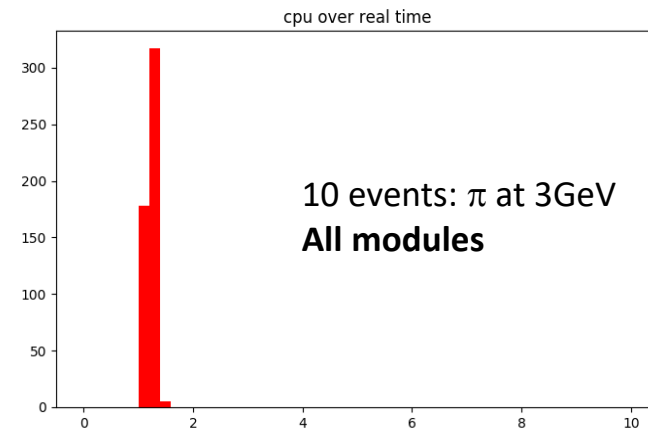
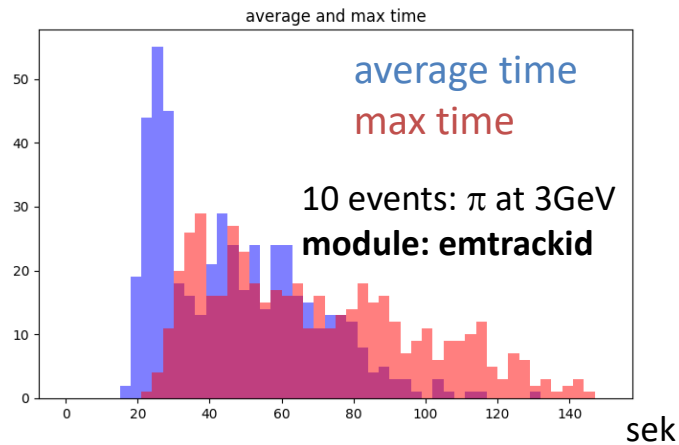
- Large progress has been made in the simulation and reconstruction for ProtoDUNE-SP.
- Need for having a larger production which includes updated sim/reco.
- Ideally, the start the production in November.
- Production would include main sim/reco developments summarized in the next slides.

MCC10 for ProtoDUNE: new developments

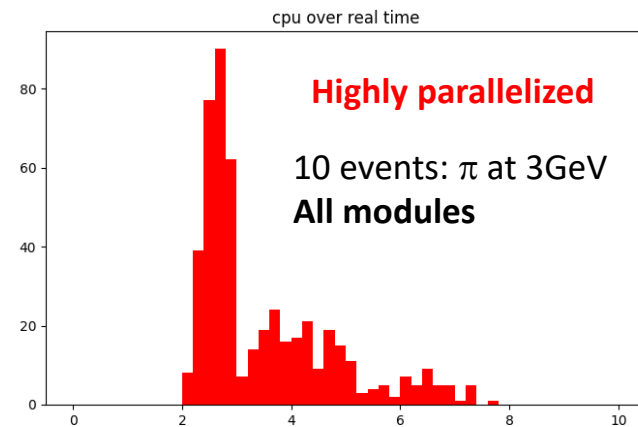
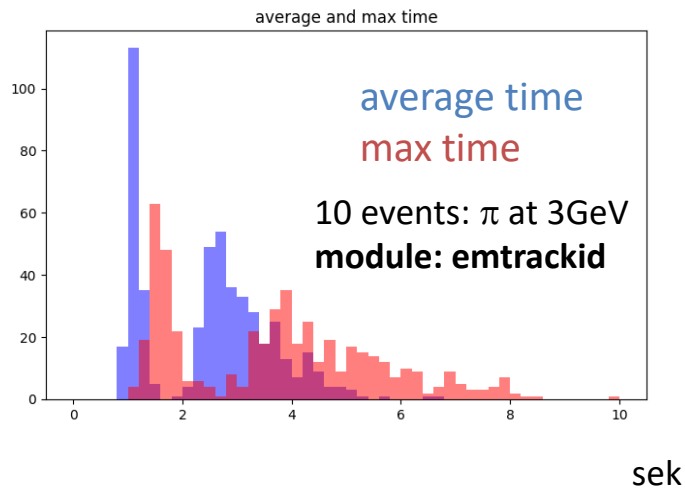
- TensorFlow as an UPS.
<https://indico.fnal.gov/event/15398/contribution/0/material/slides/0.pdf>
- Time spent on the reconstruction decreased significantly.
- Any custom architecture can be now used, so we have improved the CNN model as well.

for all tests: 4GB was requested (CPU count not specified).

OLD



NEW



MCC10 for ProtoDUNE: new developments

SIMULATION

- G4 ProtoDUNE geometry upgrade:
 - a. CRT segmentation.
 - b. Updated beam window: steel ribs of beam plug and correct foam implementation.
 - c. Details of the support structure.
 - LArSoft interface to the beam simulation update.
 - a. New (and final) beam simulation will be provided by Marcel and Nikos. They will announce new beam simulation in one of BI meetings in October.
- a. Finalizing field cage.
 - b. Validation.
- a. Prepare the configuration file according to the new name of variables and new coordination system.
 - b. Unique event timestamps.
 - c. Validation.

RECONSTRUCTION

- Improved tagging of Michel electron. Almost accomplished.
- Cosmic muons tagging / cosmic muon rejection.
- t_0 calculation of cosmic muons using geometrical condition: muons that cross the cathode, cathode-anode.

Updated noise model

Update noise model (using MicroBooNE noise) and add coherent noise simulation and removal.

ongoing



once we have updated noise model we can:

- Apply gaussian filter in the deconvolution.
- Tune the algorithms.
- Re-train the network for EM/track/Michel tagging.

MCC10 validation

A few modules to validate reconstruction:

- `dunetpc/dune/Protodune/singlephase/NearlineMonitor/PlotTrackT0_module.cc`
Leigh's module to make plot of the t0 of stitched muon tracks that cross the cathode.
- `dunetpc/dune/Protodune/singlephase/DEdx_module.cc`
Casandra/Dorota's: a simple module which calculates dE/dx of 3D reconstructed tracks.
As an input can use tracks tagged as cosmic muons.
- `dunetpc/dune/Protodune/singlephase/RecoStats_module.cc`
Robert's module to test reconstruction efficiencies.