

06/18/2020

[Indico](#)

Attendees:

- I. Action Items from last meeting
 - A. List existing and desired metrics for graph construction and GNN evaluation (Gage+Savannah)
 1. First version finished, see Savannah's update
 - B. Suggest blueprint or similar meeting (Mark+Isobel)
 1. No updates
 2. We should take point on it, reach out to David (Lindsey+Mark)
 - a) Want an overall outline of what we want to talk about
 - b) Start a google doc
 - (1) Who we want to participate
 - (2) What are the goals
 - (3) Discussion topics/agenda
 - (4) Add other folks to the google doc (Lauren, etc)
 - c) Scope: FPGA accelerators for HEP
 - C. Incorporate existing models into SaneTrain (Savannah+Markus+Gage)
 1. Not started :(
 2. Lindsey needs us!
 3. Add functionality to incorporate torch geometric datasets (Markus)
 - a) Looked into TrackML dataset a bit, will keep pushing
 - D. Add presentations to IRIS web page (Mark)
 1. Will look at this week
 - E. Reach out to Lauren Tompkins about their work putting HEPTrkX GNN on FPGA (Savannah)
 1. Sent email
 - F. Block diagram of EC1 Network (Gage)
 1. See Gage's update
- II. New Updates
 - A. Giving talk on IN in ExaTrkX Meeting on Monday (Savannah + Gage)
 1. Can turn off 'secret batching' in training for tracking (or don't need to implement)
 - a) Markus too
 - B. Potentially onboarding summer fellow to work on FPGA component (Isobel)
 1. Jann Kiesler looked at doing by hand implementations of edge convolution message passing layers (GravNet)
 - a) If you trade of tensor-copying for more execution time, you can shrink size of GNN in memory by factors of 10
 - b) Do math to keep gradient updates by hand instead of in Pytorch
 - c) Lindsey will share work (done for GPUs)
 2. Javier has a fellow looking to do GNNs for FPGAs

- a) Not specifically matching our proposal but synergy
- b) Put proposal forward to IRIS
- c) We could take both

III. Round Table

A. Markus

1. Ask for full talk with endcap best practices
2. Talk about optimizing cut
 - a) Removed deltaR cut (not precise enough)
 - (1) Replaced with line segment intersection cut
 - (2) Previously most cases like that were linking two tracks together
 - b) Can really tighten z0 and phi cut
 - (1) Except z0 didn't work
 - c) Took z0 out and got amazing results!
 - d) Looking at how this changes with pt
 - e) Sav + Gage will run EC1 and IN with Markus derived cuts
3. Next step: better tracking alg
 - a) Also understanding what 2 GeV performance means

B. Gage

1. Talk about IN progress
 - a) Adding an additional layer to Object model didn't help
 - b) Markus could consider reducing the embedding for the convolutional layer
 - c) Try changing width of relation and object models (to be larger)
 - (1) Optimize memory vs efficiency
 - d) Should we retry running really dense areas?
 - e) Produce track efficiencies with union find
 - f) Try also with cuts and phi reflections

C. Lindsey

1. Another idea for measuring tracking efficiency would be to run track finding on union find results and compare that

D. Savannah

E. Mark

1. Idea: differential plots (phi, eta bins)

F. Isobel