deepPP weekly meeting



21/04/2023

Updates on our pruning tool

Gitlab repository for our Pruning tool https://gitlab.fbk.eu/dmascione/pruner

main 🗸 pruner / 🕂 🗸	•
Name	
M* README.md	
🖹 Requirements.txt	
🔁 dataset.py	•
nevecute.py	
network.py	
nuner.py	
🔁 train.py	
21/04/2023	

- 3 branches:
 - main (for pruning a fully connected DNN)
 - LeNet (for pruning a LeNet-5 architecture)

Branches 3	1
LeNet	-
VGG	
✓ main default	

VGG (for pruning a VGG-16 architecture)

Structure of each branch:

- README.md for instructions
- Requirements.txt for the modules needed
- dataset.py for loading the dataset
- pruner.py for the pruning layer and losses
- network.py for the network architecture
- train.py for training, pruning and evaluating 2/10
- execute.py for launching the whole code

Updates on the Hbb/cc tagger

- Update on training optimisation
 (→ training with larger input
 statististics) during last meeting
 - GN2X was trained with datasets of different sizes for 50 epochs
 - Bigger dataset → better
 performance, but they did not
 investigate why and did not
 answer the question "Have we
 reached a plateau?"

Boosted Hbb/cc Tagger study with larger input statistics

Miaoran Lu, Punit Sharma, Weitao Wang University of Iowa

Hbb/cc Tagger Task Force and Xbb/cc Tagger meeting 17, April, 2022



Preliminary studies for Hbb/cc tagger training optimization

 Marco's thesis: if datasets of different sizes have comparable distributions of the input variables, there should be no performance imporovement if trained with equal number of backpropagation steps

First check: distribution of input variables are almost equal



Preliminary studies for Hbb/cc tagger training optimization

 Second check: no performance imporovement if different datasets are trained with equal number of backpropagation steps

<u>Marco is right!</u>

Verified performing trainings with

 $\begin{array}{ccccc} 2 & M \ jets \ \rightarrow & 15 \ epochs \\ 5 & M \ jets \ \rightarrow & 6 \ epochs \\ 10 & M \ jets \ \rightarrow & 3 \ epochs \end{array}$

Batch size: 1000 Steps: 30000

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Preliminary studies for Hbb/cc tagger training optimization

No differences also from a computational point of view



> Batch size: 1000 30000 steps

Comparable training time

Ongoing activity

• Training GN2X with new datasets (59 M jets and 30 M jets) with equal number of steps



59 M jets \rightarrow 60 epochs 30 M jets \rightarrow 118 epochs

Batch size: 1000 Steps: 3540k

Trainings performed on diclub using 3 Tesla A40 48GB GPUs

 \rightarrow 15 epochs / day

Trainings will be finished on Sunday evening (hopefully)

Info on GPUs

• Unith HPC cluster

The University's HPC cluster has some nodes equipped with GPUs, in particular:

- 2 nodes with each 2 Nvidia K80 GPUs
- 2 nodes with 1 Nvidia Tesla P100 GPU
- 4 nodes with 1 Nvidia Tesla V100 GPU

• FBK DIClub

queue	#nodes	nodes	GPUs on each node	Driver version	Cuda version
gpu- K80	7	node[6,9- 14]	4 Tesla K80 12GB GPUs	455.38	11.1
gpu- V100	2	node[5,8]	respectively 3 Tesla V100 32GB and 4 Tesla V100 16GB GPUs	455.38	11.1
gpu- 1080	1	node7	8 GeForce GTX 1080ti 11GB GPUs	455.38	11.1
gpu- A40	2	node[81,82]	8 Tesla A40 48GB GPUs	510.54	11.6

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← Preferred for training GN2X, since more than 1 GPU is needed!

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What's next

 Test new learning rate update when pruning VGG-16

• Optimize repository