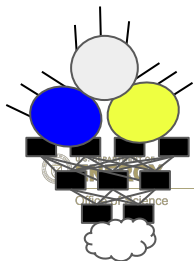




GELATO Update 3/22/24

Liam Sherman



FPGA Talk Reflections

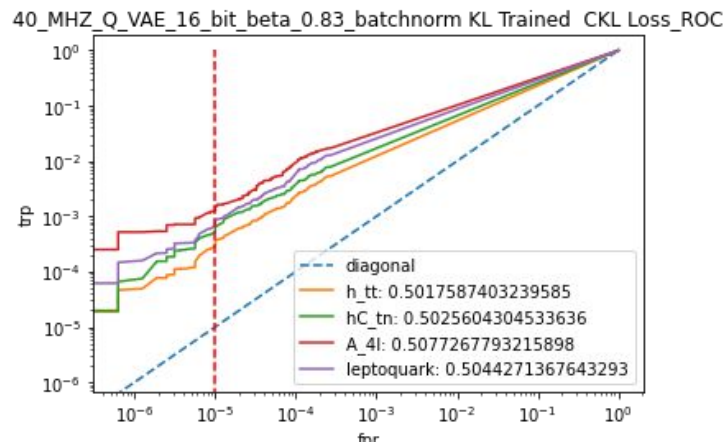
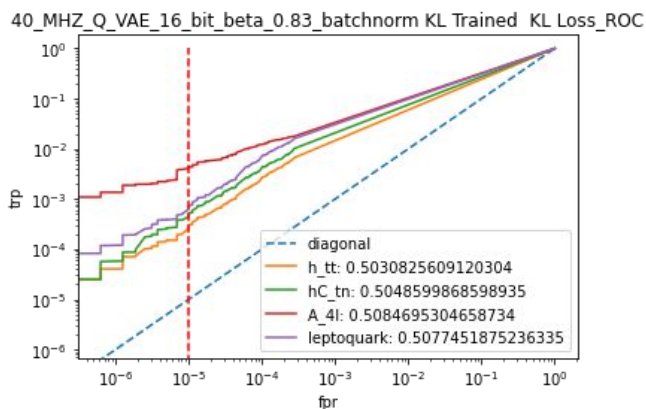
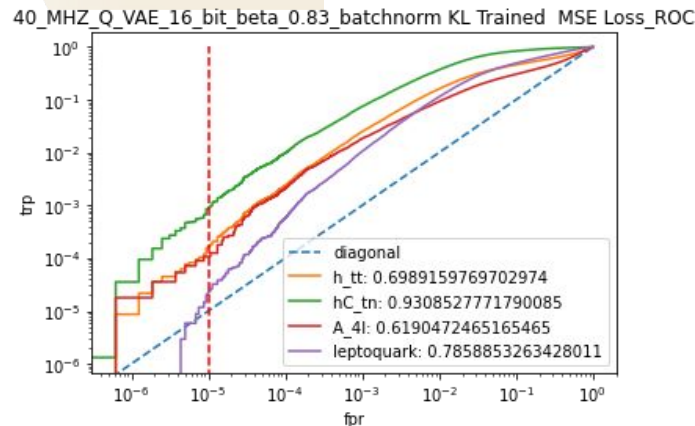


- Maybe good to do synthesis comparison of AE with MSE loss vs Clipped VAE with CKL loss in terms of resource usage
- Different, signal independent way of testing model performance?

Quantization Aware Training Early Results

SLAC

- I trained a version of the VAE with the same structure as previous versions, just replacing the existing layers with QKeras layers
- I trained it to aim for 16 bit precision



Quantization Aware Training Early Results



- Results are good but perhaps confusing
- Qkeras model does better at low fpr than the unquantized model?
- Qkeras model lacks batch normalization, maybe the culprit?

TPR at FPR 10^{-5}

Model	h_tt	hC_tn	A_4l	leptoquark
Original Unquantized	1.94e-4	9.27e-4	3.22e-4	2.94e-05
Original Quantized	2.285e-4	7.55e-4	2.68e-4	7.341e-05
Qkeras 16 bit	3.761e-4	6.774e-4	1.536e-3	8.809e-4

Continuing Work



- I'm planning on synthesizing the Qkeras model to 16 bit precision, I think naively this shouldn't affect performance much?
- I'm also planning on doing a Qkeras model with a batchnorm layer to check the efficiency
- I'm also working on testing the input/output of cosim and csim