Status report

June 24, 2022

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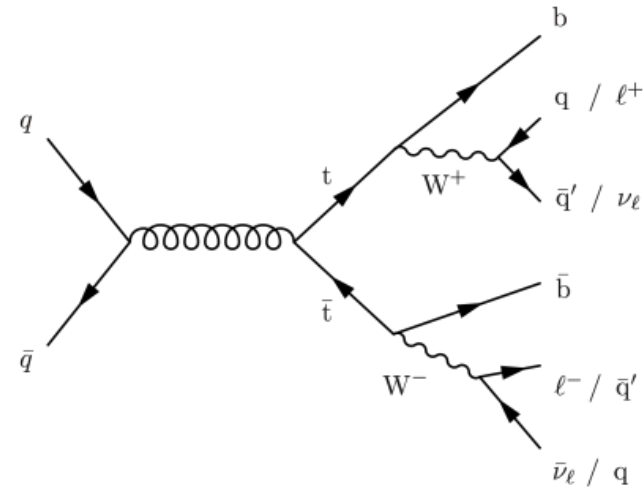
HYU / IP2I

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NN From Scratch

Samples
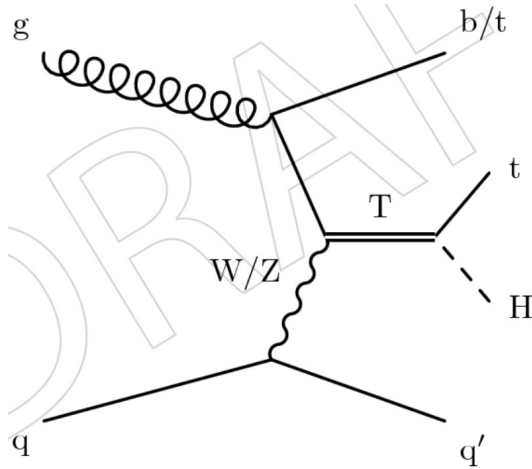
TprimeBToTH_M-700


TTToHadronic

Strategy

- Train on Tprime700 Hadronic + TTToHadronic (1:1 training)
- Selection for DNN: HLT + njets >= 6 + nbjets (DeepJet Medium) >= 3
- Compare ROC curves with cutBased (signal efficiency vs background rejection)
  - Evaluate NN at the level of Cut 0 for the pair comparison

Training sample → even odd → : After Cut 0 → for Evaluation

: After DNN Cut → for Training
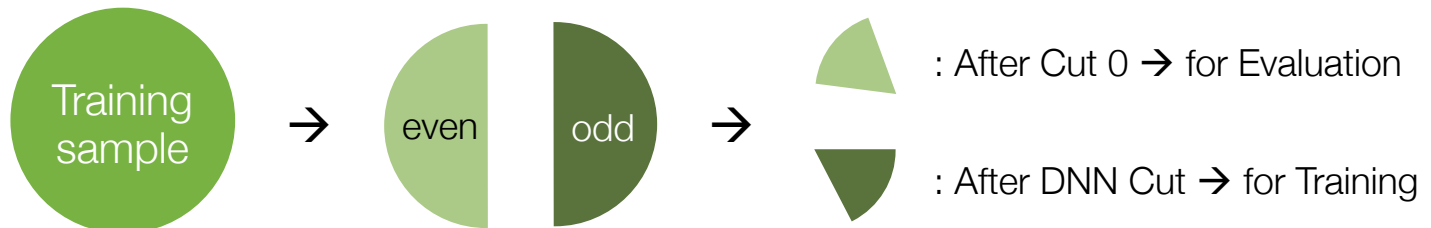
NN From Scratch

DNN Structure:
3 layers with 100 nodes
Dropout: 0.2
Activation: relu+sigmoid
Optimizer: Adam
Loss: binary_crossentropy
Batch size: 2048
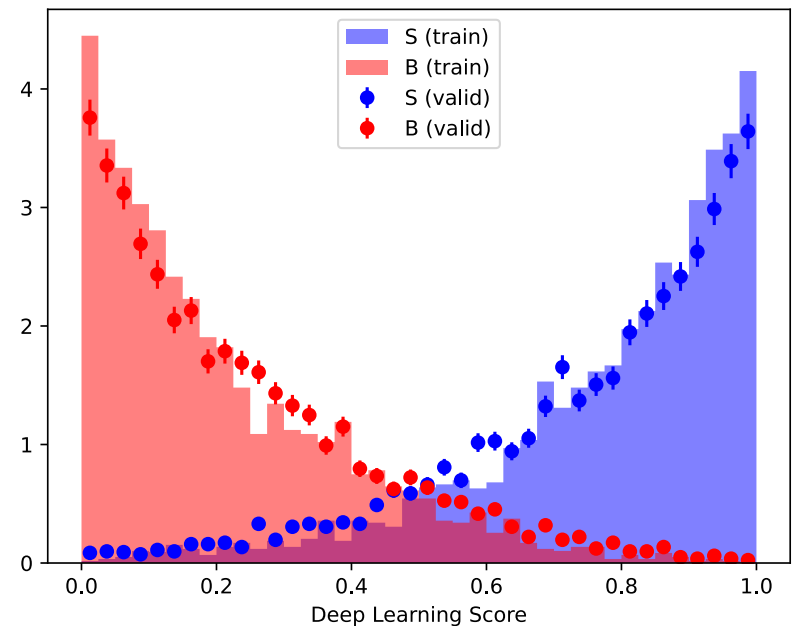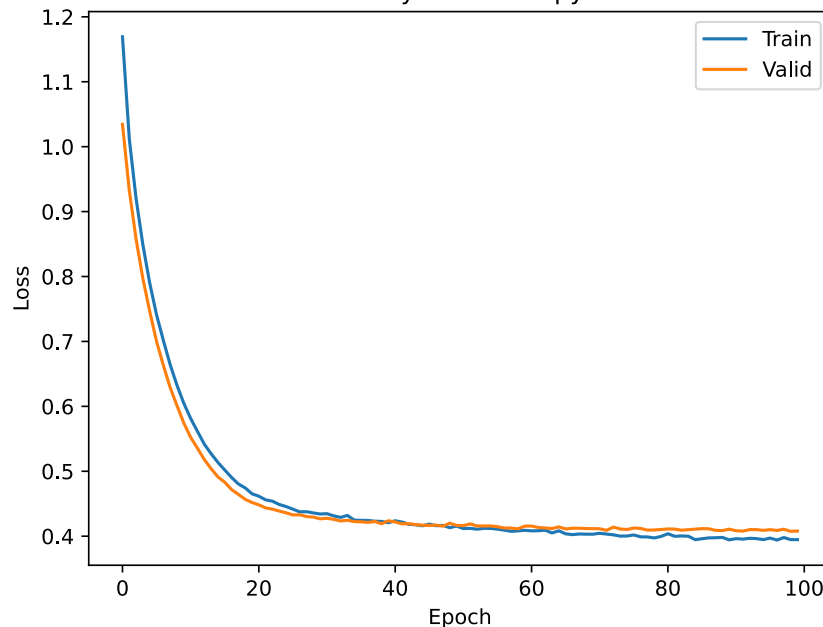
Detail

- Trained in CC server (CPU without slurm - Training time: 10ms/epoch)
- Input set : Half of TprimeBToTH_M-700 after selection (odd numbered event, 23210 entries)
  - 80 % for training, 20 % for validation
  - Keep even numbered event for evaluation: to avoid bias (using the same event) for performance estimation
- Input features:
  - Low level feature: {eta, phi, energy/Chi2mass} of jets / b-tagged (DeepJet M) jets
  - High level feature: variable used for cutBased
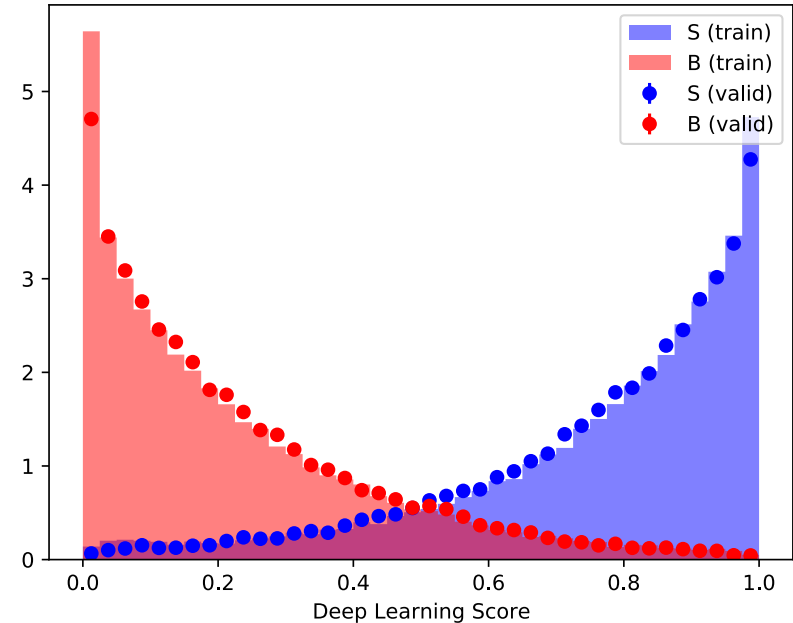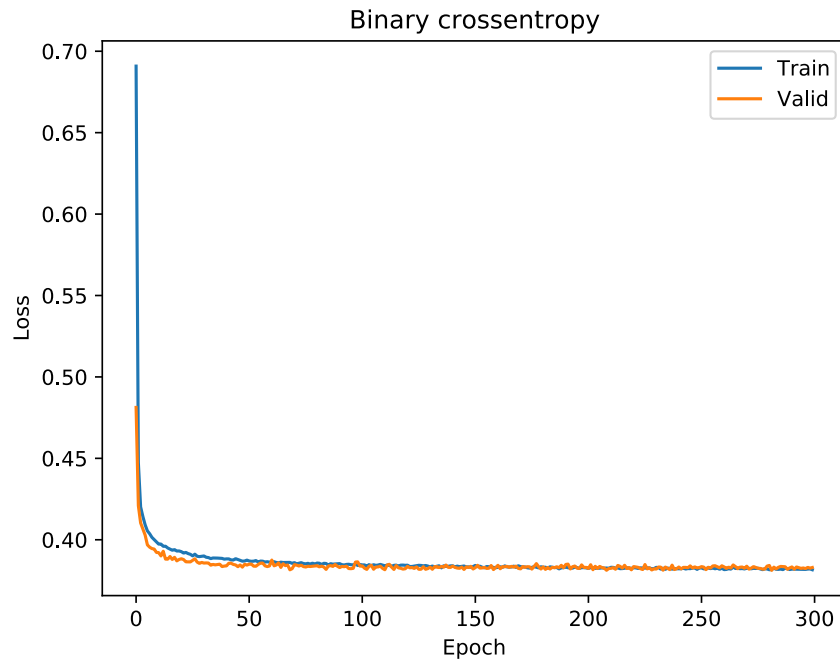- Epoch: 100 → Validation Loss / Acc are stable, does not diverge yet

ROC curve

Evaluation
- Evaluation is performed in Cut 0 with odd numbered events
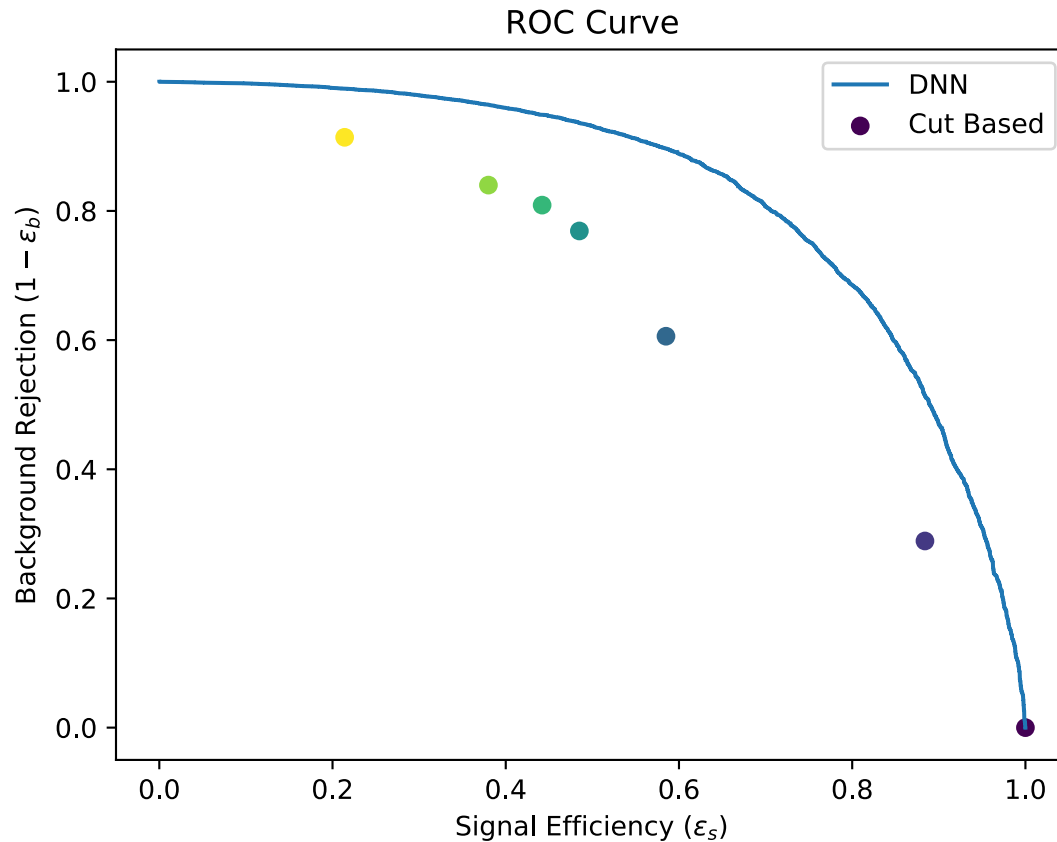
- And NN works better than cut based method without optimization

Training with more statistics

Strategy

- Trained in CC server (Training time: 1s 8ms/epoch)
- Do the same with more statistics from different mass range
- Train on signal samples M=600~1200 GeV (181724 entries (M700 entries * 7)) + TTToHadronic
- With the same input features, same architecture (but more epoches)

ROC curve

Evaluation

- Evaluation is performed in Cut 0 with odd numbered events
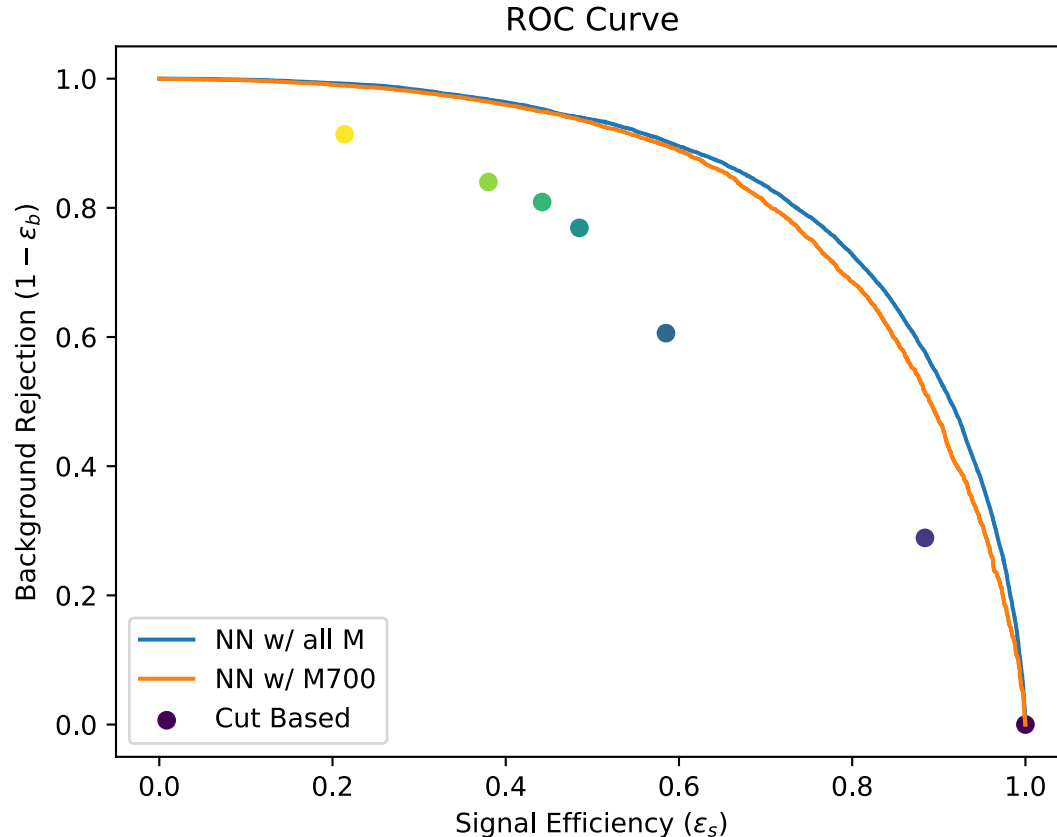
- Performance is slightly increased
- M-625/650/675 GeV samples are dropped for training yet for the moment