

Update on Optimal Transport Displaced Track Classification

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3/19/24



Pileup AD Summary

- Institutions
 - University of Geneva, Lund University
- Overall quite supportive of merging efforts
- Current Timeline
 - Inclusive Search (Already Started)
 - Resonant AD
 - CWoLa/SALAD/CURTAINS
 - Non-resonant AD (~5-6 months)
 - Aligns well most likely to our standalone studies

Updates

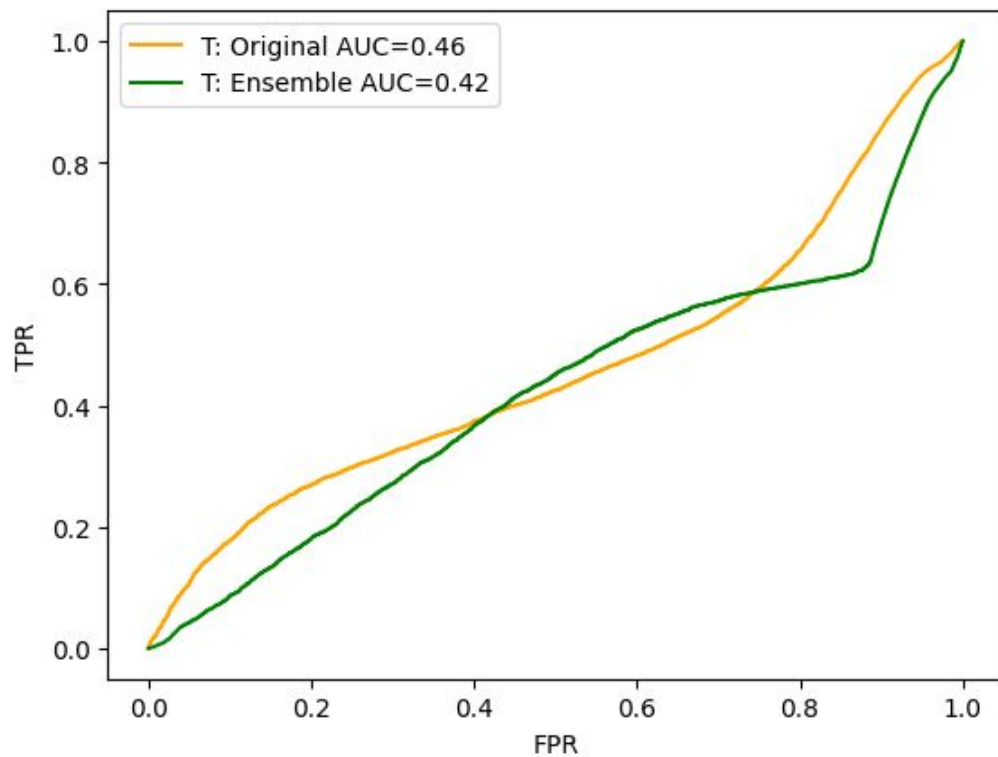
- Data
 - Plots using old files (20k events for DV and QCD)
- Training (AE)
 - Basic implementation to ensure that it would work as intended

Model: "autoencoder"

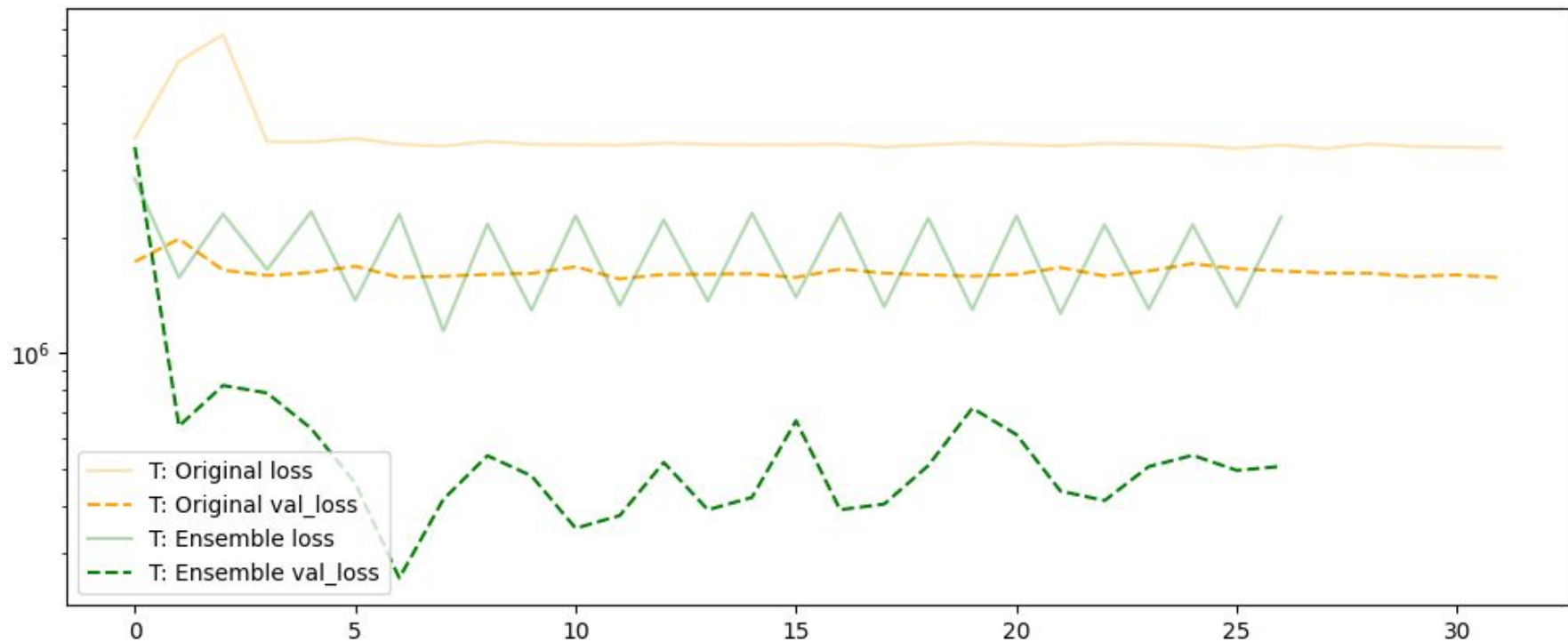
Layer (type)	Output Shape	Param #
sequential (Sequential)	(None, 64)	124864
sequential_1 (Sequential)	(None, 650, 3)	126750

=====
Total params: 251,614
Trainable params: 251,614
Non-trainable params: 0
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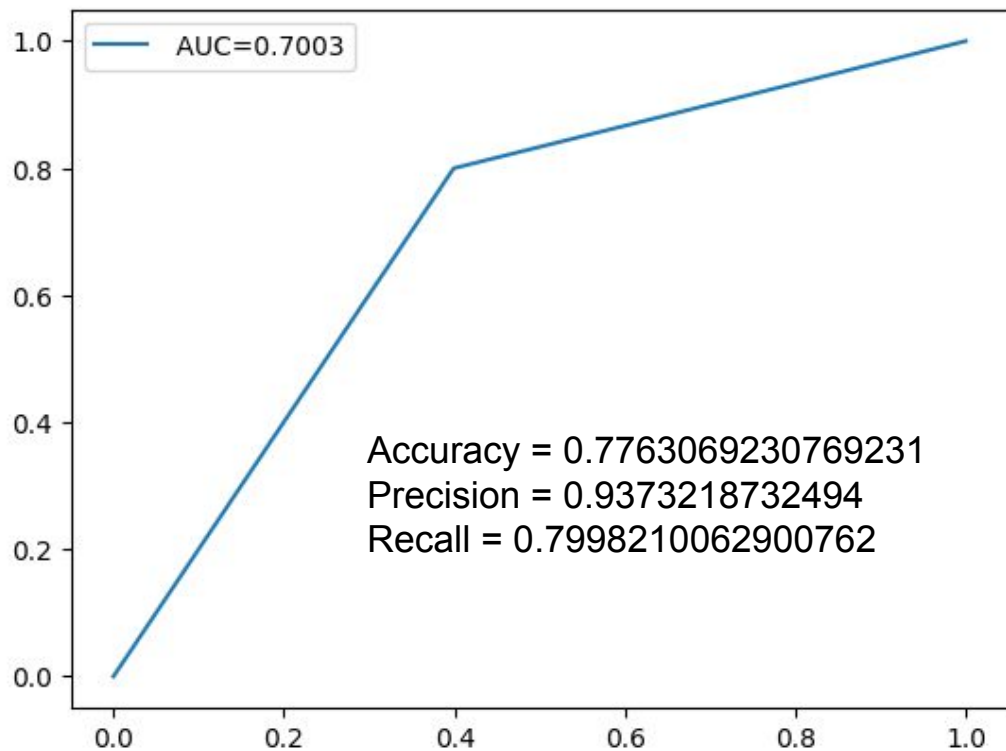
TOTAL (DV-only vs DV-inclusive)



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Autoencoder (DV-only vs DV-inclusive)



Thoughts

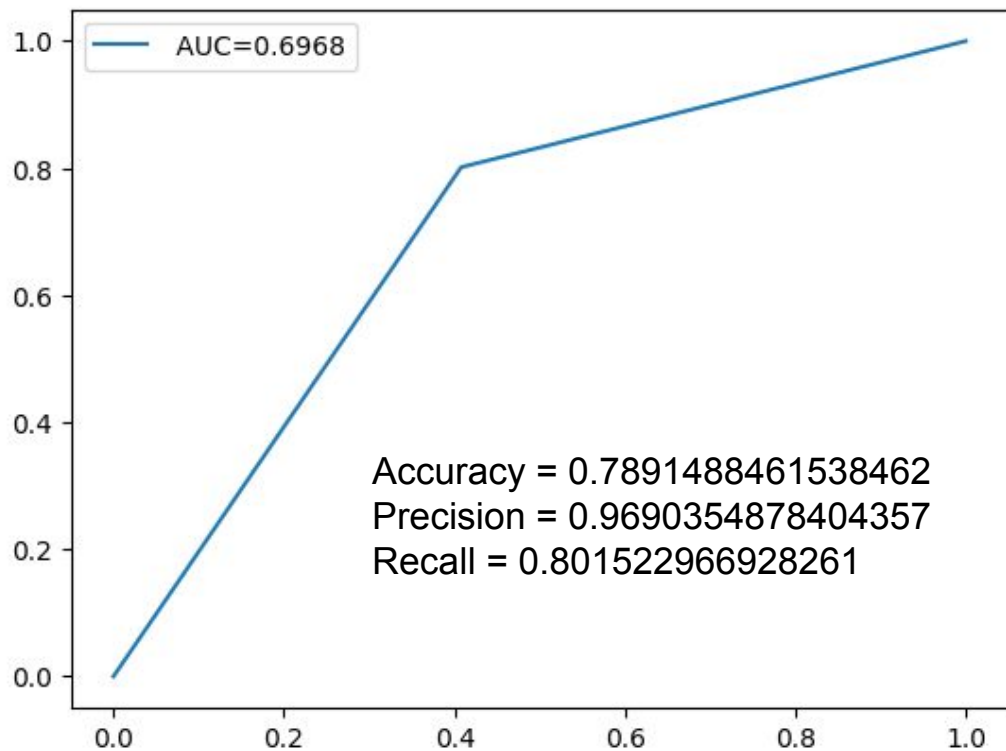
- TOTAL Optimization
 - Addition of additional features did not increase performance, worsened loss curves
 - Need to scale added features near 1
 - Log normalization of p_T
 - Find optimal balance of hyperparameters (batch size, $n_{\text{projections}}$)
 - Add more data in training
- Framework Checking
 - Use MLP/transformer code with my data processing pipeline

Tasks

- Data
 - Finish adjusting root->h5 pipeline
 - Reconfigure saving of truth information for dark photon samples
- Training
 - Autoencoder
 - Limit test AEs as a baseline for track classification
 - OT
 - Correct performance/value of current OT implementation
- Metrics
 - Confirm AE-AD setup is accurate before regression

Backup Slides

Autoencoder (QCD vs QCD+DV)



Autoencoder (QCD vs QCD+DV)

