

Exo Group meeting 14.08

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What happened lately

- ▶ Found some of bugs (thanks to Jonas)
- ▶ Misidentified antitops as tops while reading Delphes output
- ▶ Massive increase in performance
- ▶ Delphes works suspiciously better than NanoAOD

Comparison in terms of numbers

p_x :

	Delphes	NanoAOD
R^2	0.711174	0.555177
mean abs. error	41.797982	50.783532
mean sq. error	3122.732327	4918.308197
max error	509.767302	1183.064783

Comparison with plots

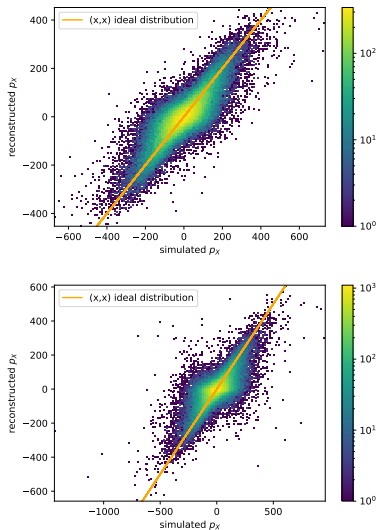


Figure: Upper plot: Delphes unsorted, lower plot: NanoAOD unsorted

Feature importances

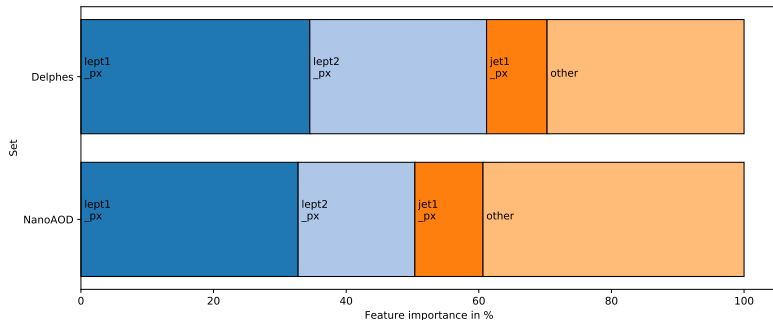


Figure: Feature importances for predicting p_x . Apparently, the second lepton is more important in Delphes than in NanoAOD. This could explain the difference in performance.

Different distributions

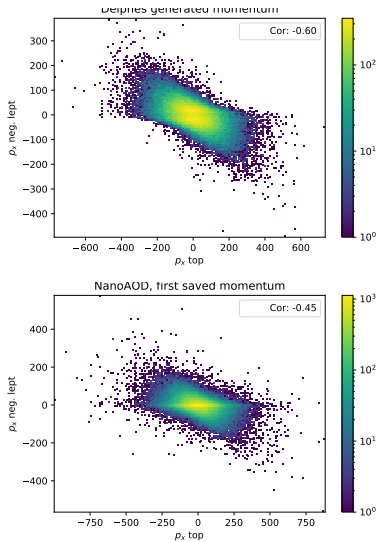


Figure: Correlation between top momentum and momentum of the negative lepton. Correlation is significantly larger in Delphes.

Lepton Energy

- ▶ NanoAOD electrons allows leptons with less energy
- ▶ Delphes requires leptons to have energy ≥ 10 GeV
- ▶ Requiring lepton to have at least 20 GeV in NanoAOD yields an increase in performance to R^2 to about 0.65/mae about 46

Which top momentum?

- ▶ So far: Momentum of the first occurring top among the generated particles
- ▶ Problem: Delphes stores generated momentum such that $p_x^{\text{top}} = -p_x^{\text{antitop}}$, NanoAOD does not store this (as far as I know)
- ▶ Using the momentum of the last top (right before decay, I think) seems yield a small performance gain (That makes sense)
- ▶ Should I switch to this momentum?
- ▶ weakens correlation with momentum of the negative lepton but increases correlation with the momentum of the positive lepton
- ▶ Anyway, Correlation between top momentum and lepton momentum is significantly stronger in Delphes output. Why?