

HotEncoding and Tagging of the Single μ Tracks

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NMSU Update
October 11, 2022

MLP Neural Network



One Hot Encoding

- We used the `OneHotEncoder` class in `sklearn`.
- Encode categorical features as a one-hot numeric array.
- By default, the encoder derives the categories based on the unique values in each feature.

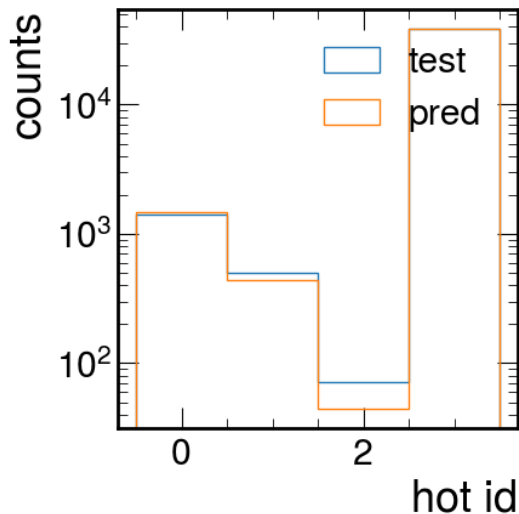
position	label	int

-800. < z < -305.	collimeter	0
-305. < z < -295.	target	1
-295. < z < -1.	other	2
-1. < z < 500.	beam dump	3

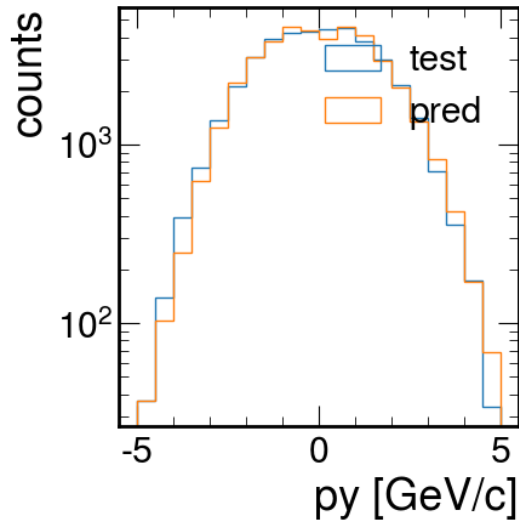
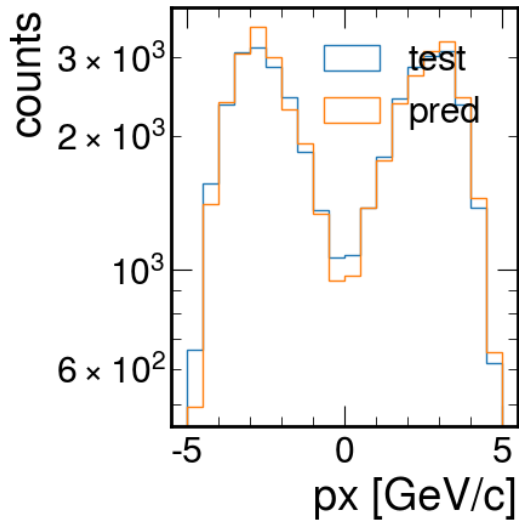
	collimeter	target	other	beam dump

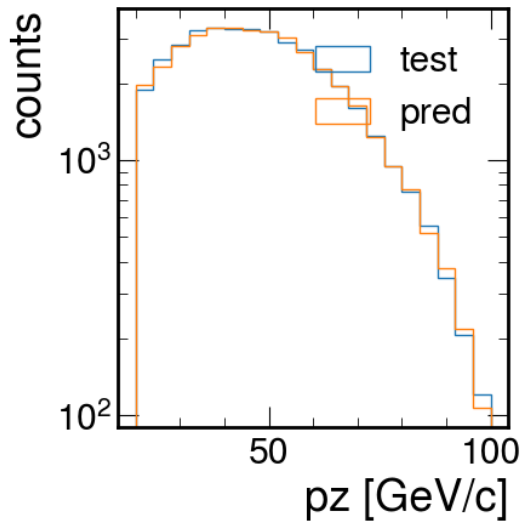
collimeter	1	0	0	0
target	0	1	0	0
other	0	0	1	0
beam dump	0	0	0	1

Tagging Task

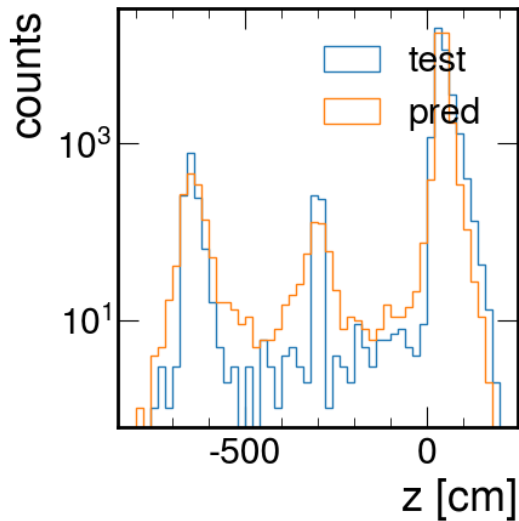


- Classification layer almost predict bins except for bin with `hot_id = 2`, with classification score = 0.9895

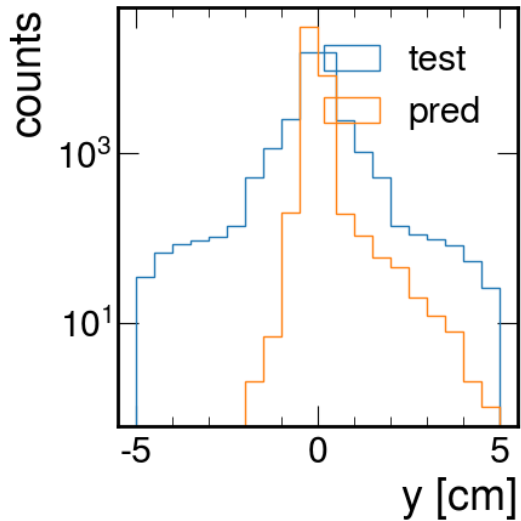
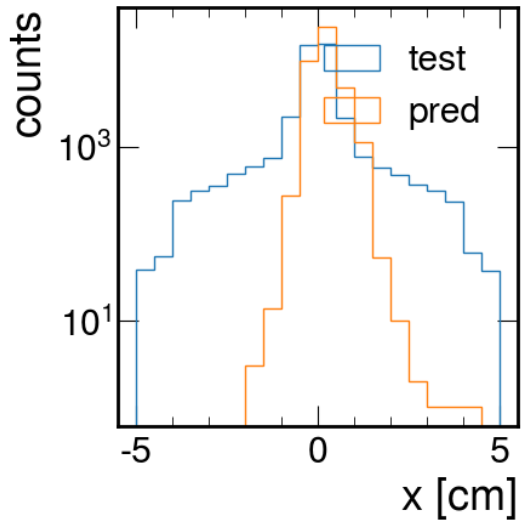




■ vpx, vpy, vpz has a good prediction.



■ With Tagging we can increase the vtz prediction.



Summary

- With tagging we can get a better z-vertex prediction ?
- This module was build using `MLPClassifier`, `MLPRegressor` classes in `sklearn` library. Therefore, saving the trained module and getting the loss values after ephocs is not straight formward.
- Since no GPU support is not included it is hard to scale up the module. Better to build the neural network with `pytorch`. (working on this)