Wire-Cell ProtoDUNE Local Meeting

Yujin Park
Chung-Ang University
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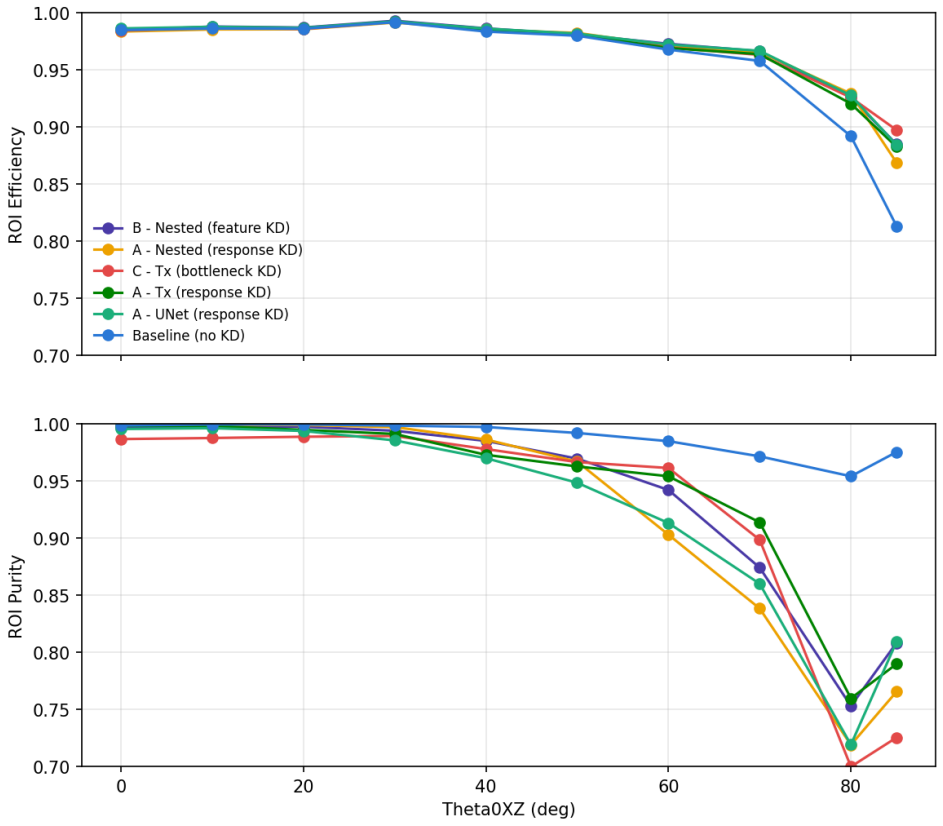
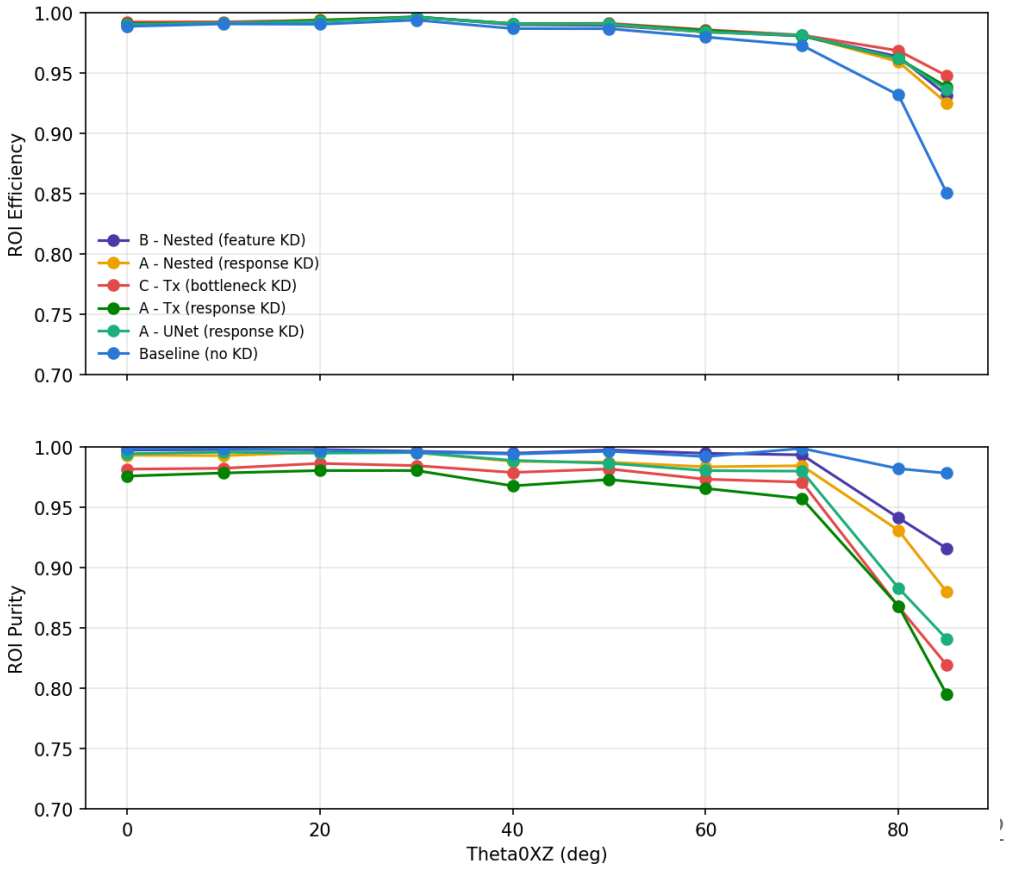
Wire-Cell DNNROI

- LArWC simulation with 1GeV muon tracks events
- anode 1
- 10 events per angle

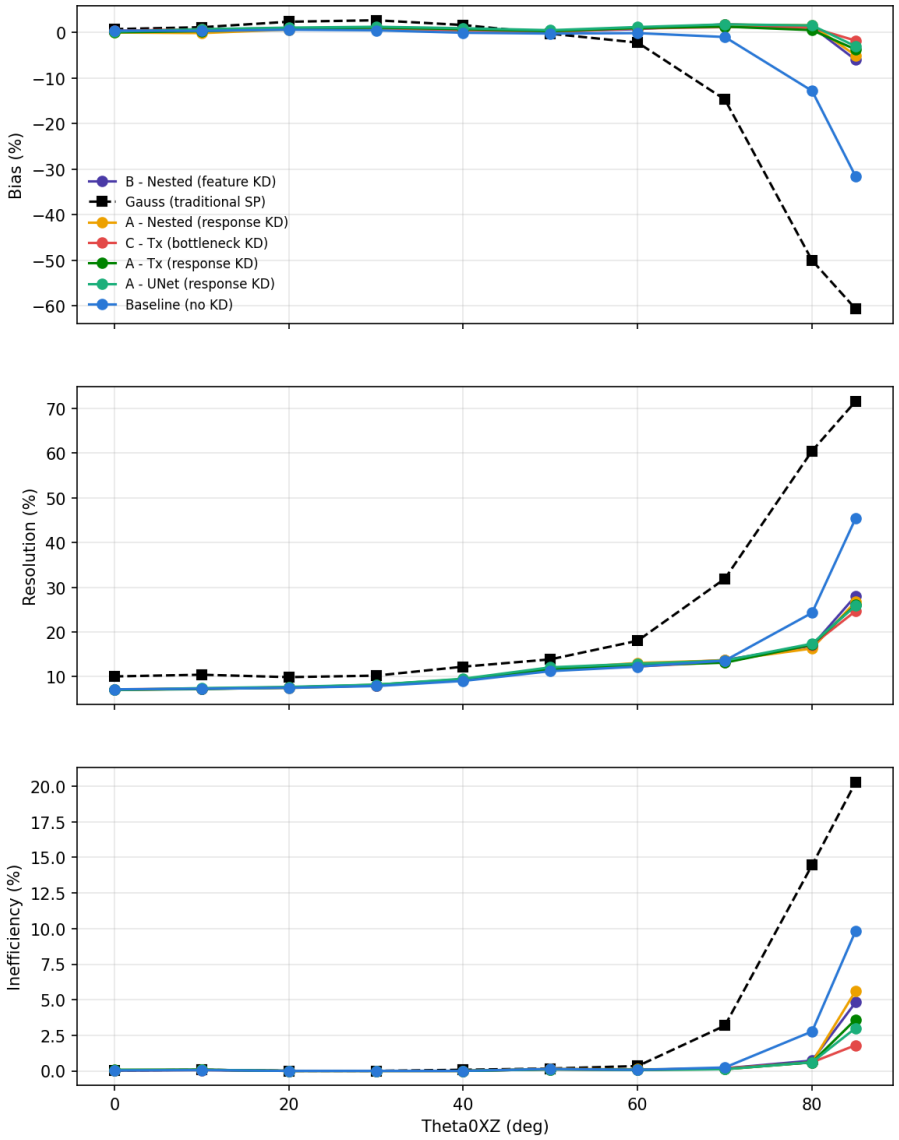
run	Dice	eff_roi	pur_roi	F2	Rank
baseline	0.9069	0.7179	0.9689	0.7570	6
A-UNet	0.9101	0.7345	0.9594	0.7708	5
A-Nested	0.9099	0.7444	0.9503	0.7781	4
A-Tx	0.9116	0.7562	0.9365	0.7865	2
B	0.9068	0.7545	0.9347	0.7848	3
C	0.9129	0.7592	0.9408	**0.7897**	**1**



Corrected



Wire-Cell DNNROI



Plan

- Evaluate with larger samples (~100 samples per angle)
- Include quantization model result
- Shower event evaluation
- Real Data Processing

- DUNE CM slices with Hokyeong
- Both PDHD and PDVD results

Backup

Wire-Cell DNNROI

F_β score:

- A fundamental evaluation metric in machine learning that combines Precision and Recall, balancing their trade-off using a weighting parameter β
- $\beta = 1$: Balances Precision and Recall equally (Standard F_1 Score).
- $\beta < 1$ **($\beta = 0.5$)** Prioritizes precision(purity)
- **$\beta > 1$ ($\beta = 2.0$): Prioritizes recall(efficiency)**

$$F_\beta = (1+\beta^2)\frac{\text{Precision}\times\text{Recall}}{(\beta^2\times\text{Precision})+\text{Recall}}$$

Xin

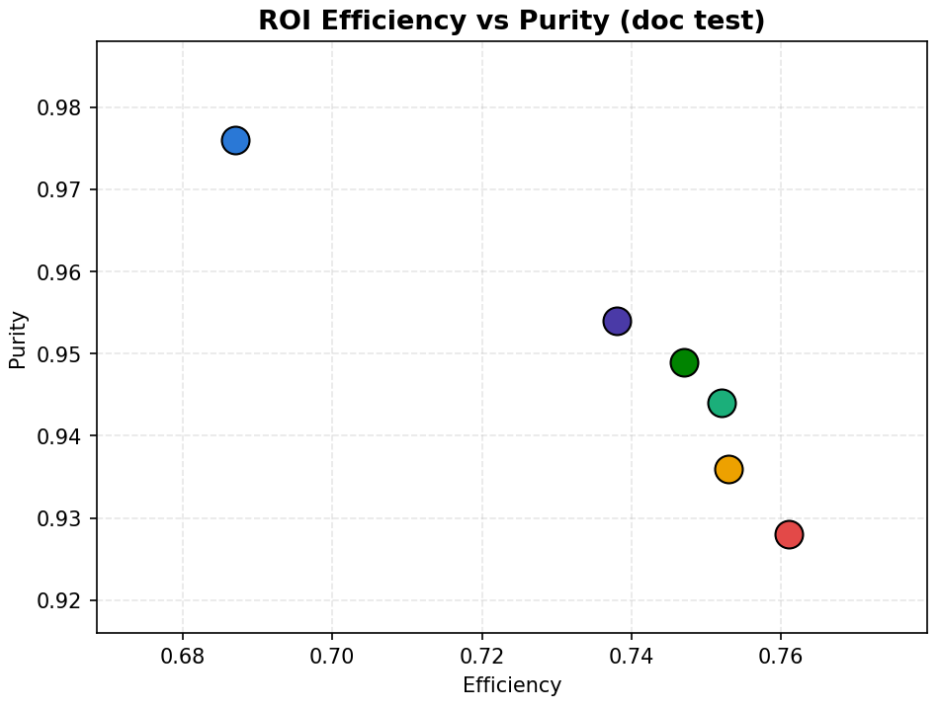
run	Dice	eff_roi	pur_roi	F2	Rank
baseline	0.8900	0.6870	0.9760	0.7302	6
A-UNet	0.9110	0.7520	0.9440	0.7839	2
A-Nested	0.9090	0.7530	0.9360	0.7835	3
A-Tx	0.9110	0.7470	0.9490	0.7803	4
B	0.9085	0.7359	0.9495	0.7706	5
C	0.9118	0.7609	0.9273	**0.7892**	**1**

Yujin

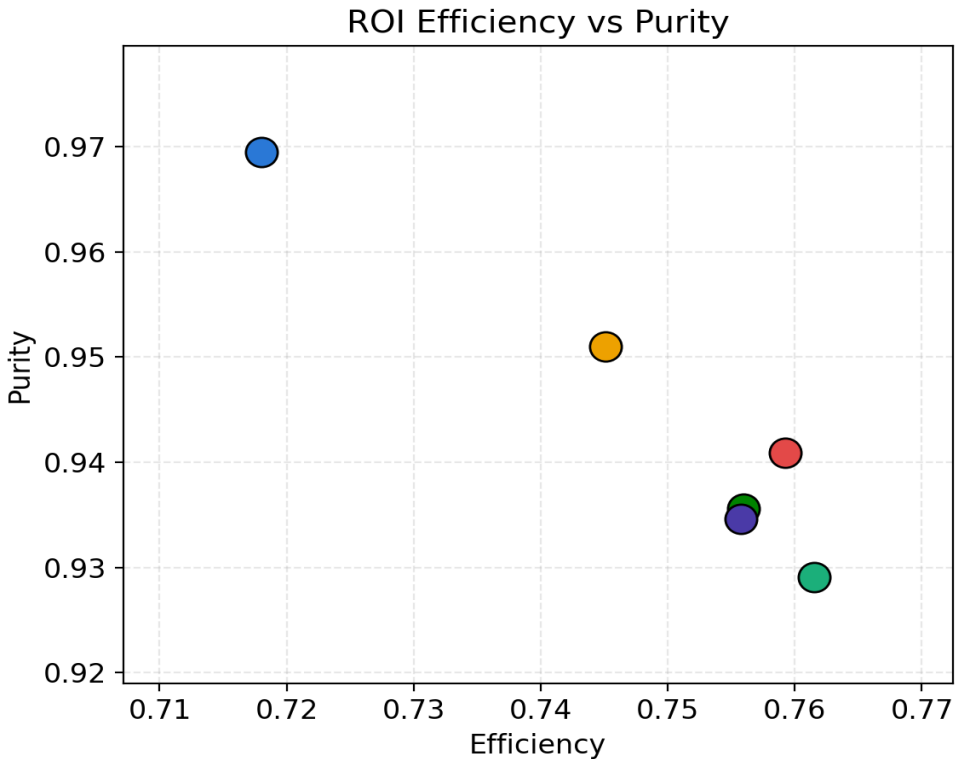
run	Dice	eff_roi	pur_roi	F2	Rank
baseline	0.9069	0.7179	0.9689	0.7570	6
A-UNet	0.9101	0.7345	0.9594	0.7708	5
A-Nested	0.9099	0.7444	0.9503	0.7781	4
A-Tx	0.9116	0.7562	0.9365	0.7865	2
B	0.9068	0.7545	0.9347	0.7848	3
C	0.9129	0.7592	0.9408	**0.7897**	**1**


Baseline (no KD)
UNet+A
NestedUNet+A
Transformer+A
NestedUNet+B
Transformer+C

xin


ROI Efficiency vs Purity (doc test)
Purity
Efficiency
0.98
0.97
0.96
0.95
0.94
0.93
0.92
0.68
0.70
0.72
0.74
0.76

yujin


ROI Efficiency vs Purity
Purity
Efficiency
0.97
0.96
0.95
0.94
0.93
0.92
0.71
0.72
0.73
0.74
0.75
0.76
0.77