

CNN in offline reconstruction

Goal: train Convolutional Neural Network (CNN) prototype for clustering and energy regression

→ Useful as baseline for later studies of graph networks (GNN)

Achieved: preprocessing input for CNN

- Define coarse grid (“pixels”) in $(\eta, \varphi, \text{layer number})$ with ≤ 6 active sensors per “pixel”

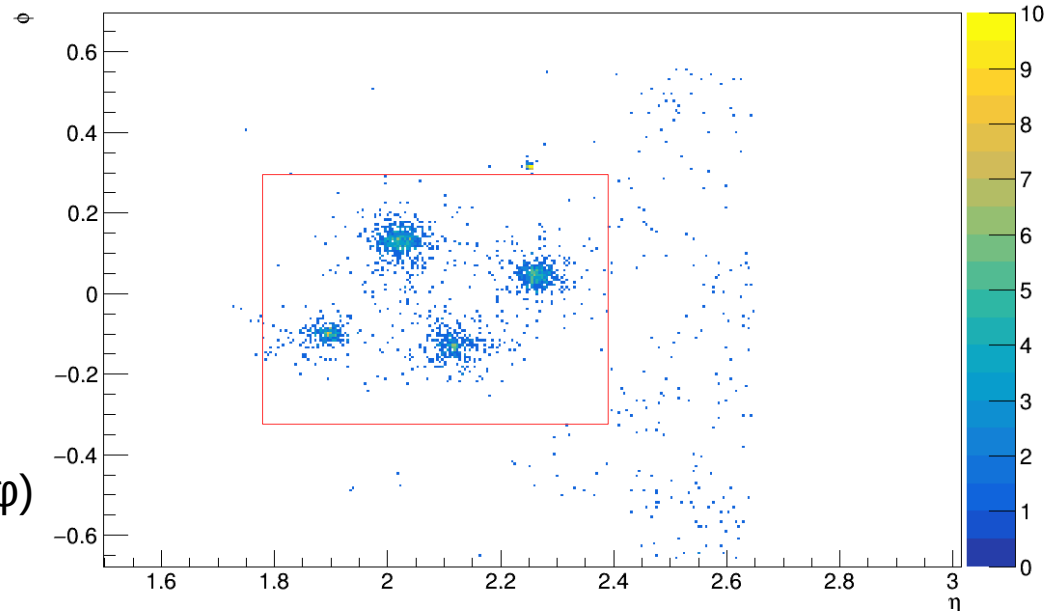
Layer number
obtained from $\text{rechet } z$

Find sensible grid in (η, φ) space:

Center: E weighted average $\text{rechet } (\eta, \varphi)$

Boundary: square in (η, φ) plane with side 0.6 around center (particles shot in cone $\Delta R = 0.3$)

Grid division: M x M pixels



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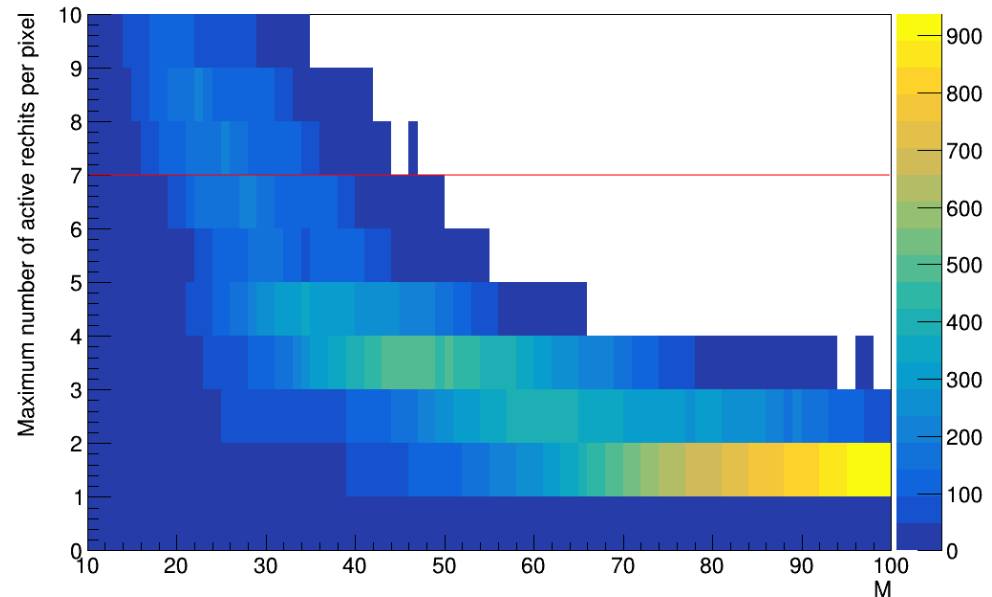
Layer number
obtained from rechart z

Find sensible grid in (η, φ) space:

Center: E weighted average rechart (η, φ)

Boundary: square in (η, φ) plane with side 0.6 around center (particles shot in cone $\Delta R = 0.3$)

Grid division: M x M pixels



Grid of 50 x 50 pixels in (η, φ) seems OK

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- **Converted** sensor information to suitable CNN input
 - **Grid info** as nested vector of pixels
 - **Pixel info** as vector(rechit1_info, rechit2_info, ..., rechit6_info)
complete with zeroes if < 6 sensors
 - **Rechit info:** list of relevant features $E, \eta, \varphi, \theta, R, t$
with relative positions of sensors within pixel

Outlook: convert larger dataset and train CNN