Update on Sparse Segmentation

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DUNE Reconstruction Workshop

Outline

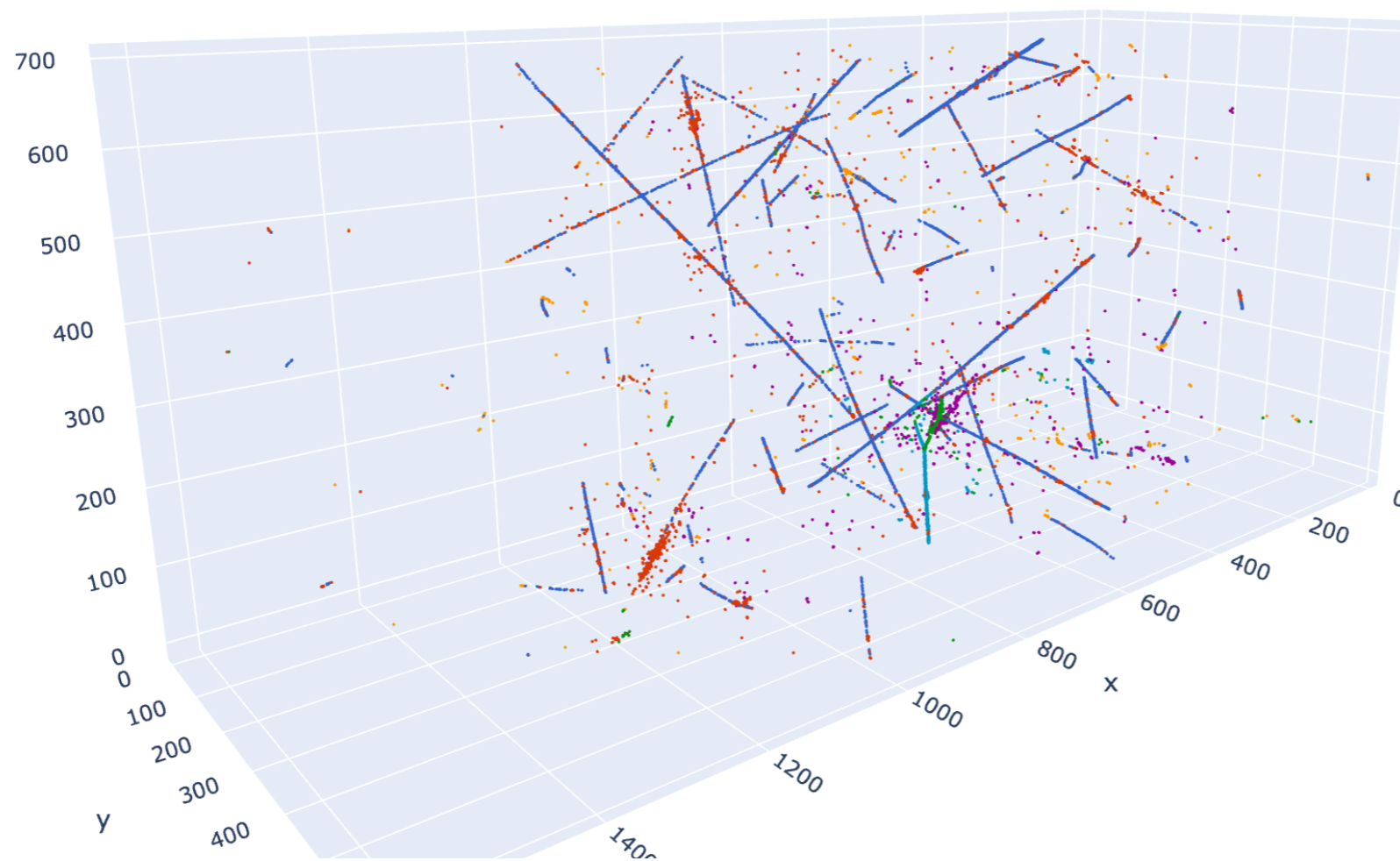- Introduction

- Preliminary Results

- Summary

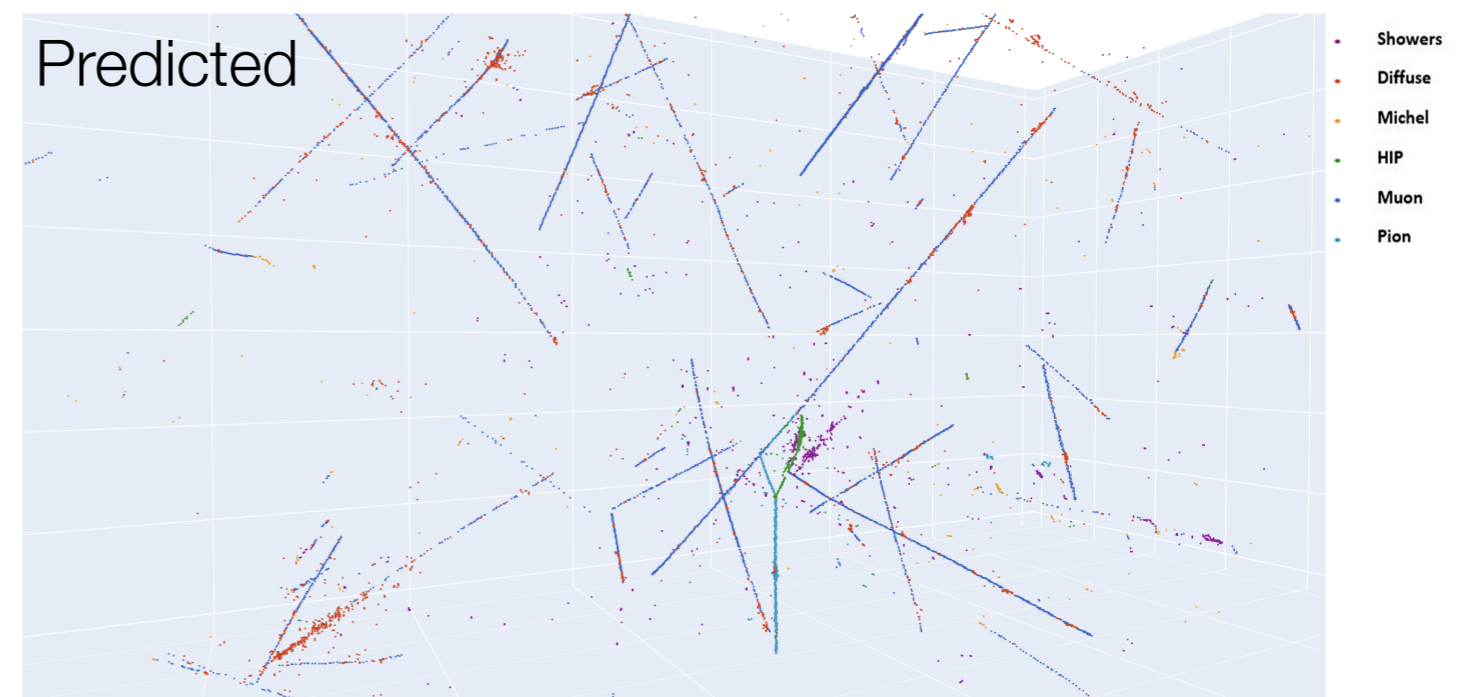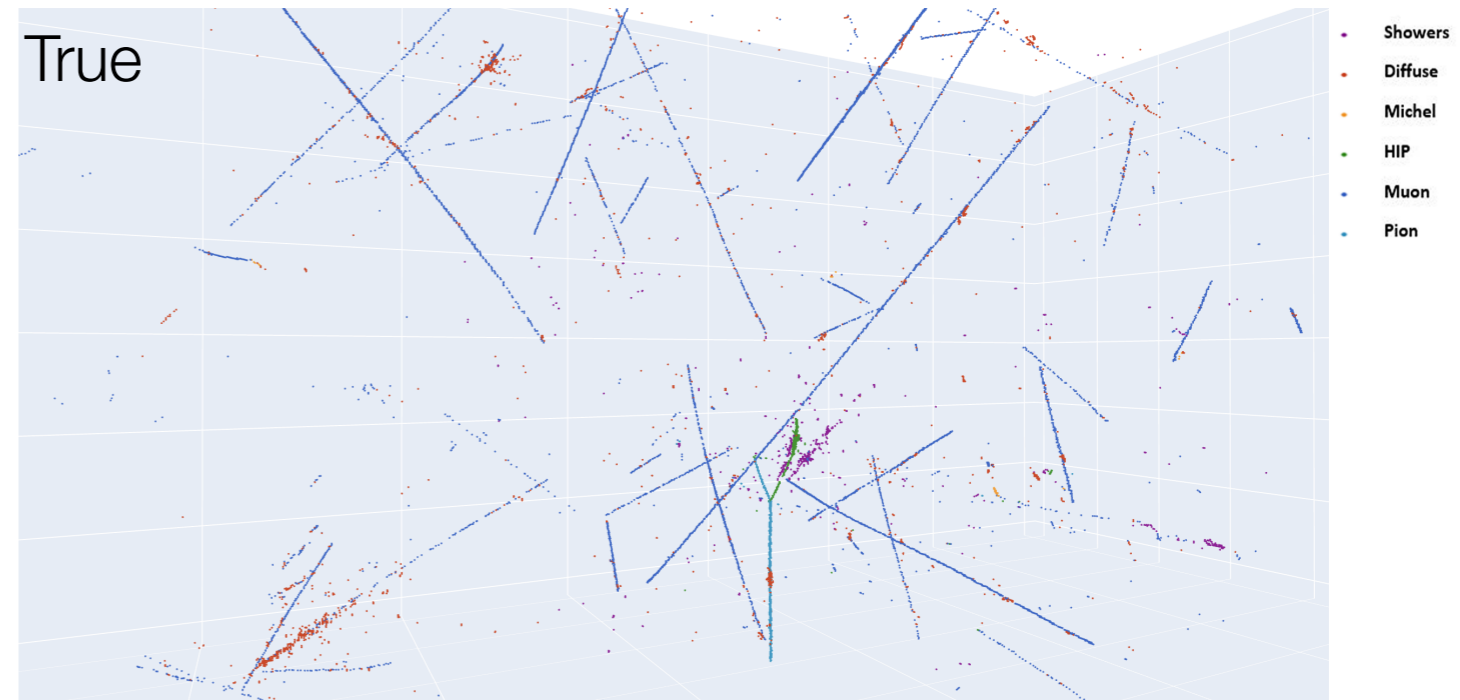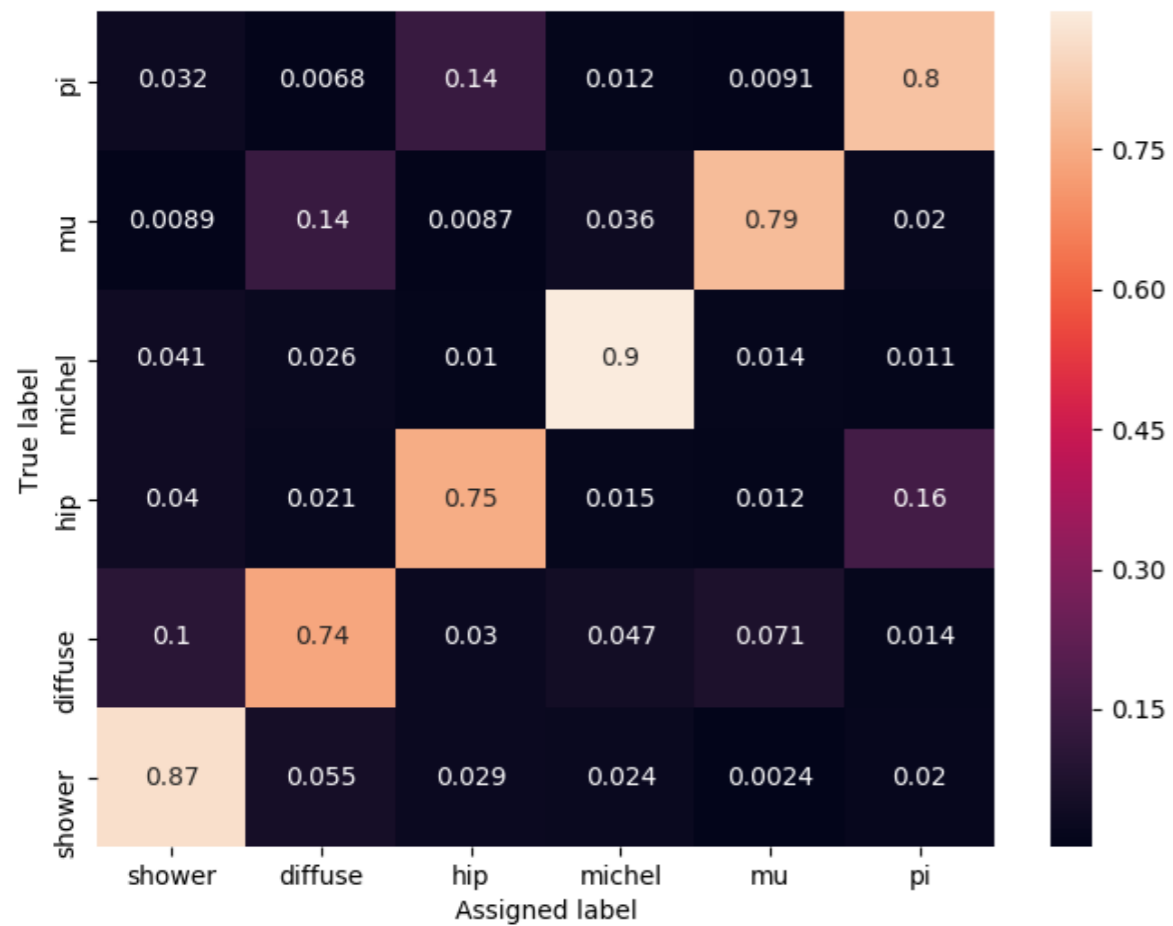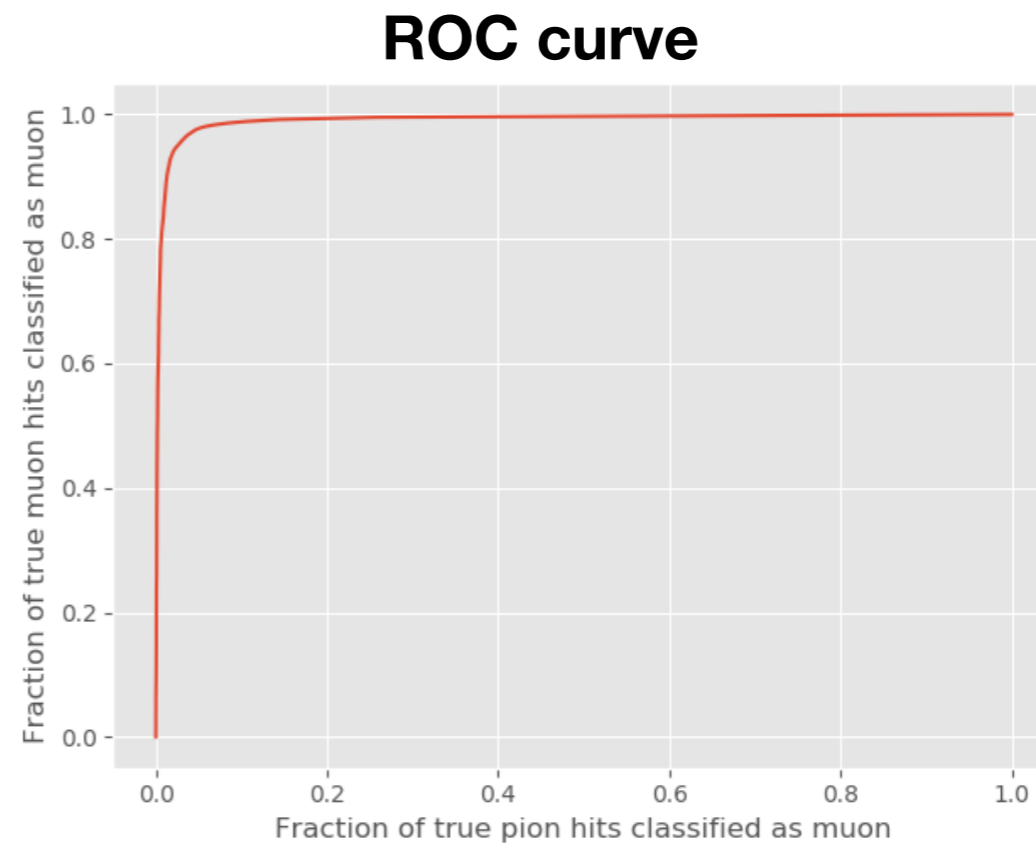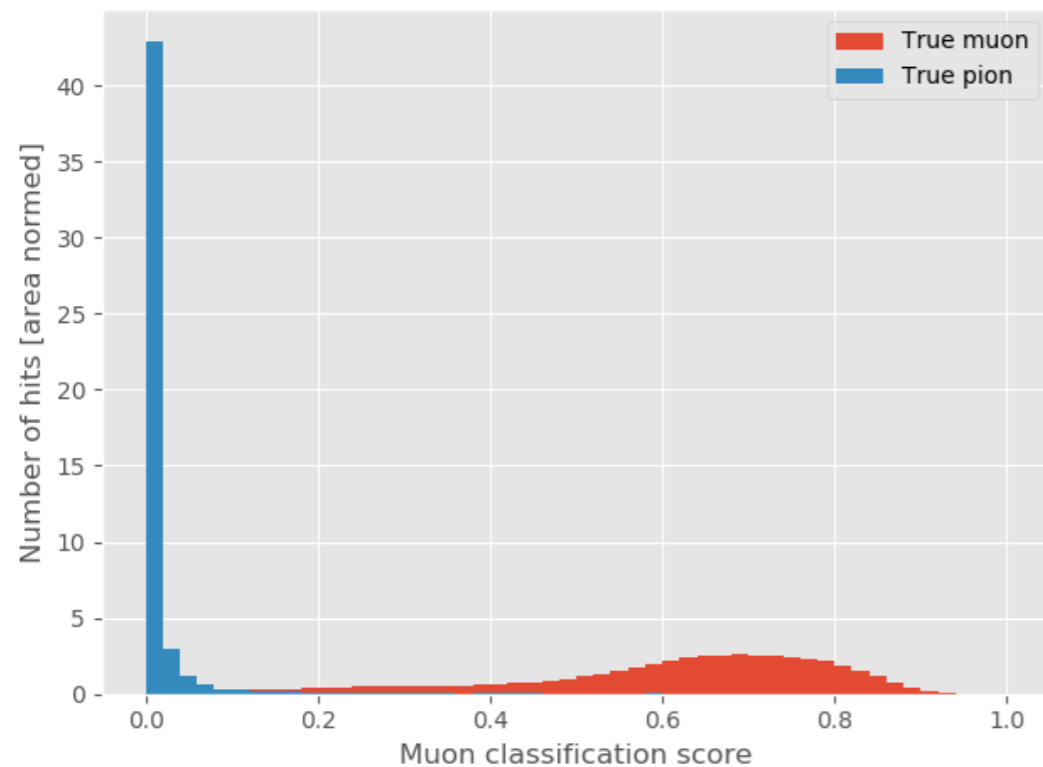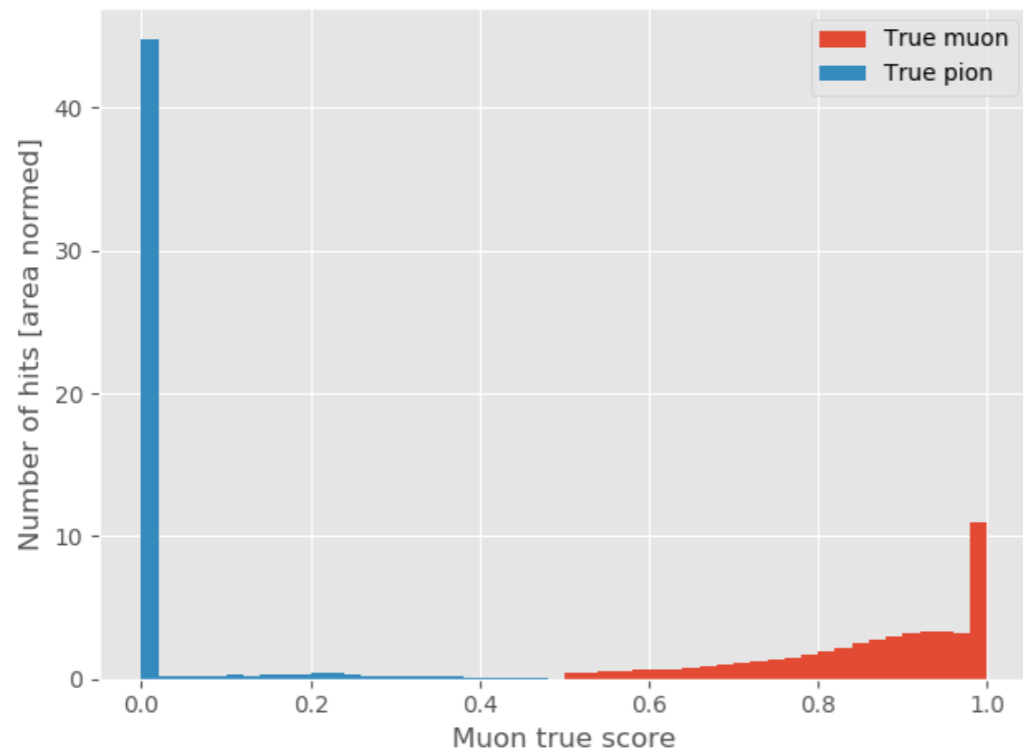# Semantic Segmentation

- Apply sparse CNN for the task of semantic segmentation at a pixel level in ProtoDUNE

Results Using MC Dataset

Muon-Pion Separation

Since most of the **muons** in the simulation come from cosmics, the network could be just doing "**beam vs cosmic**"
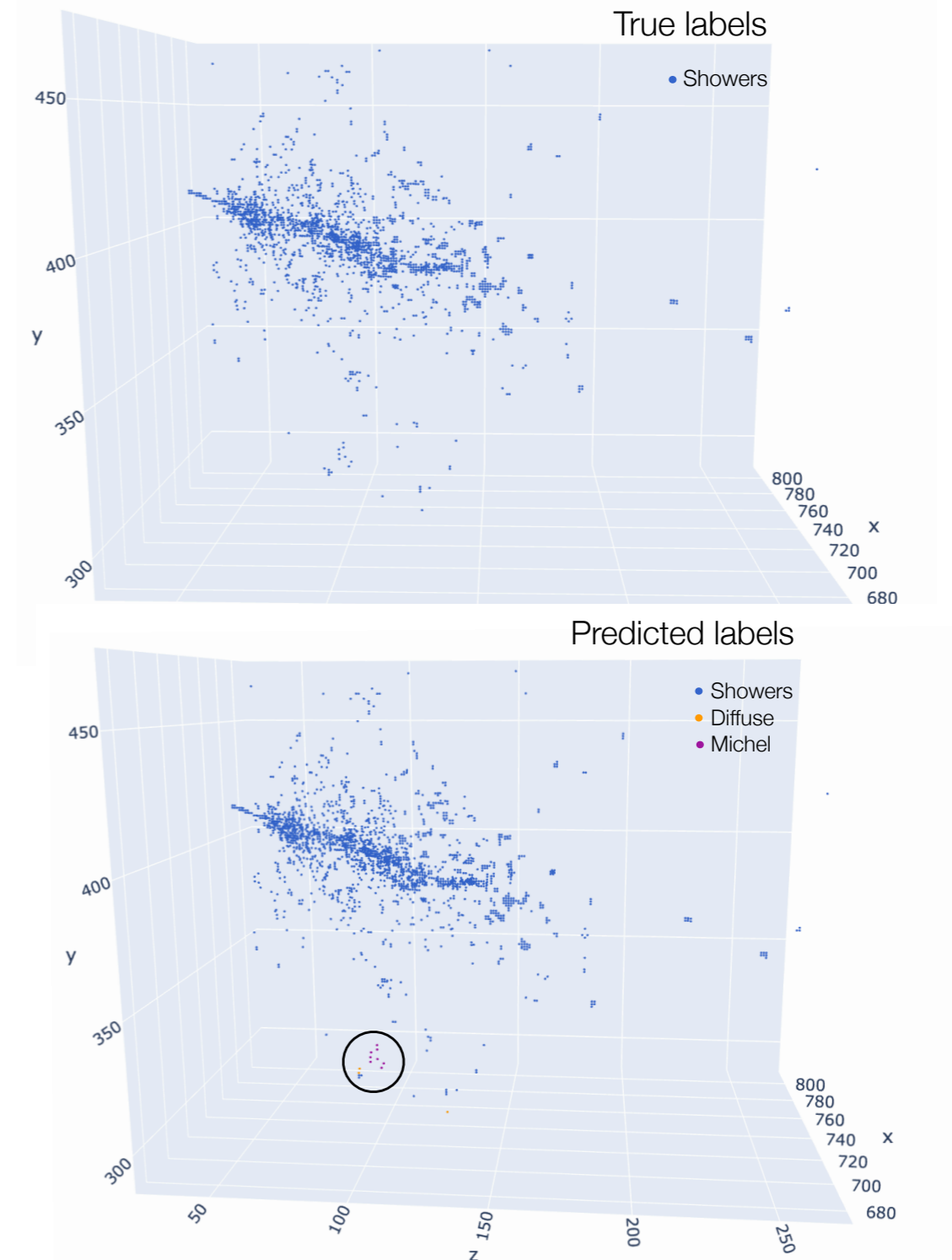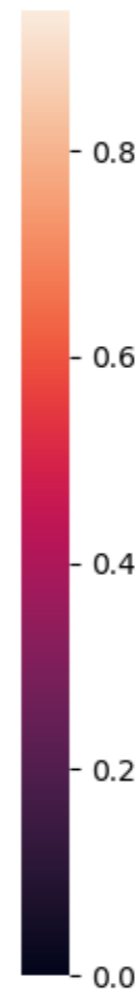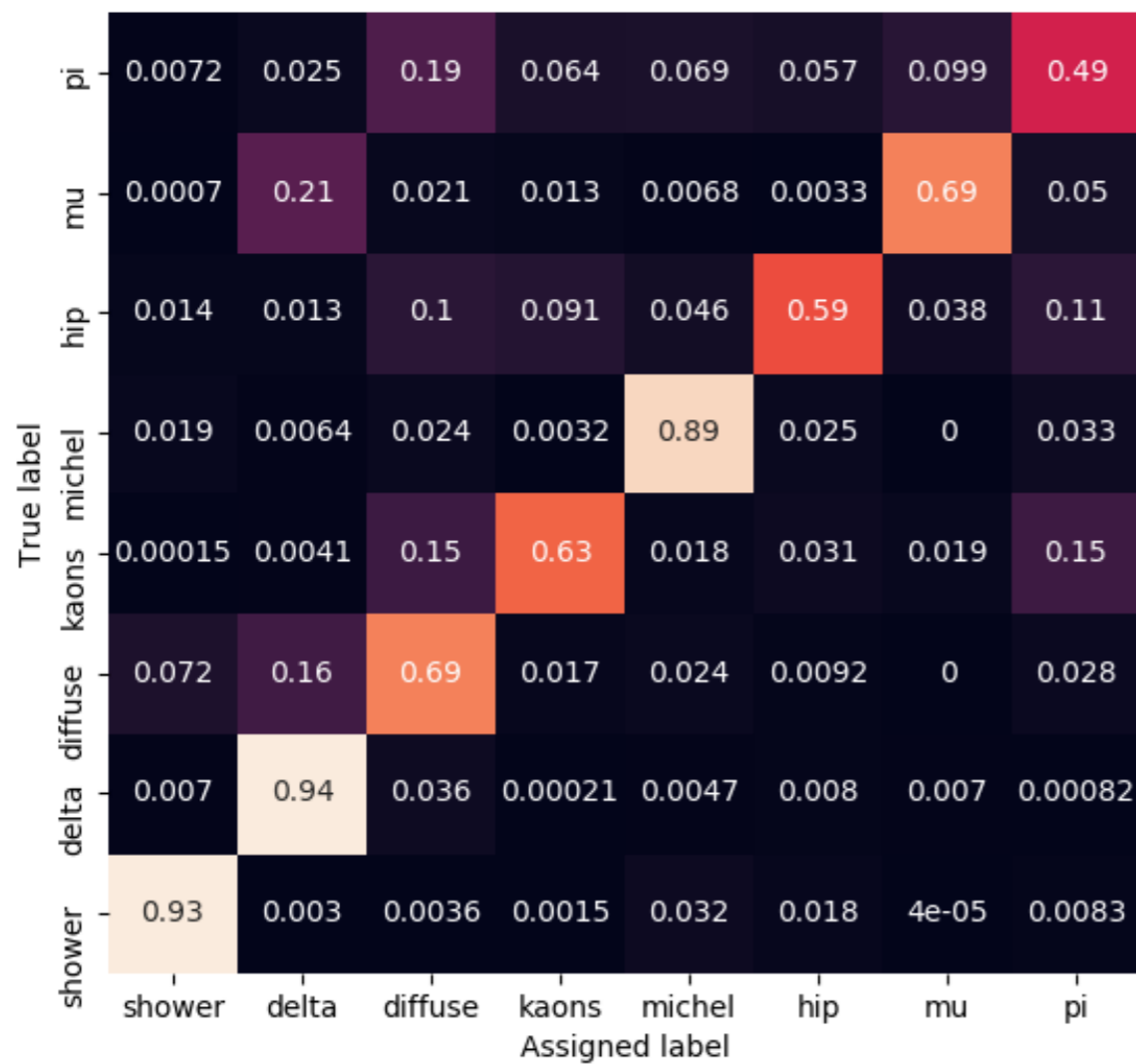
Training Using Single-Particle Dataset

- **Dataset**

  - Consist of 500k simulated single particles

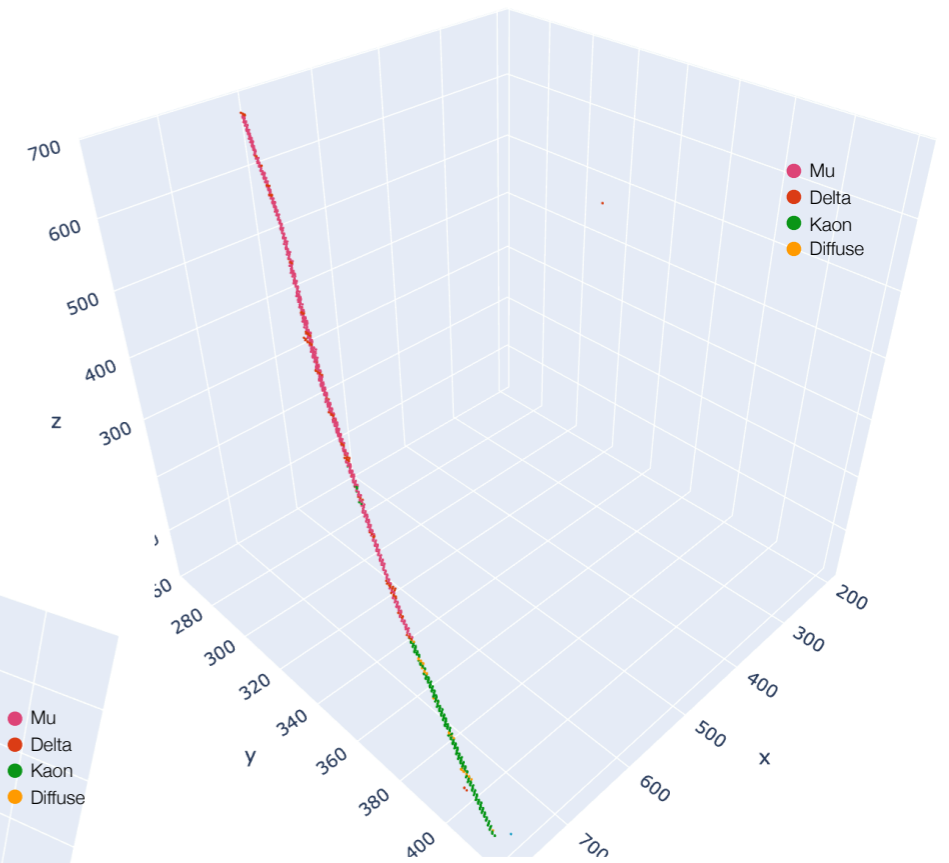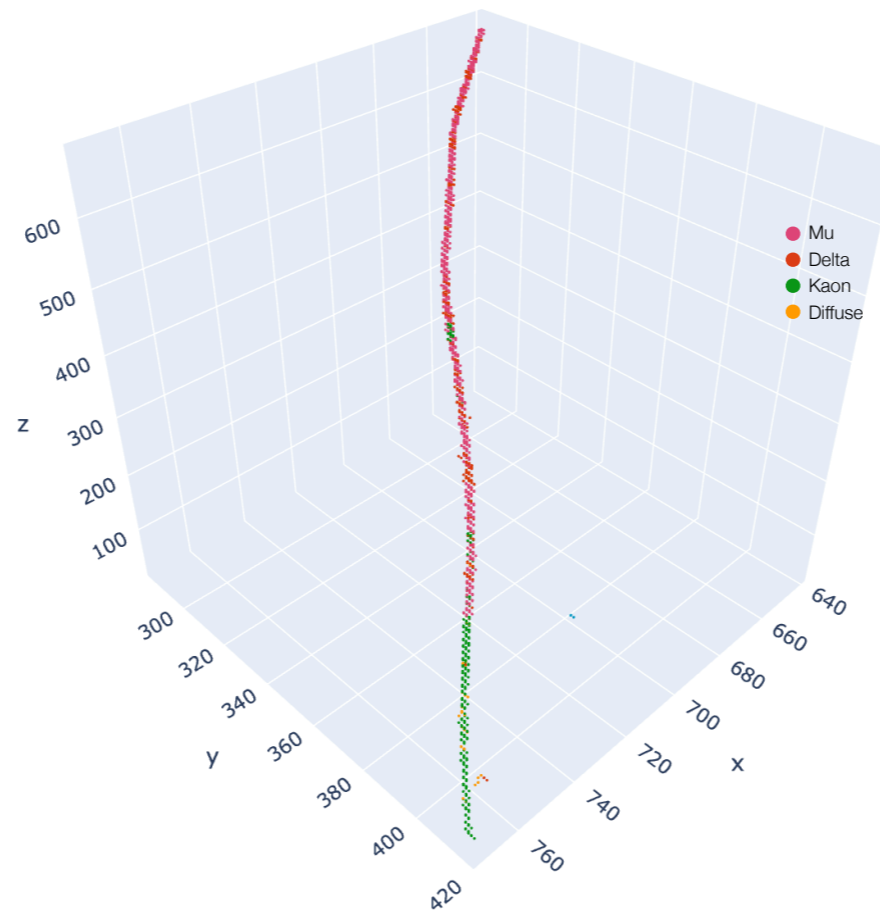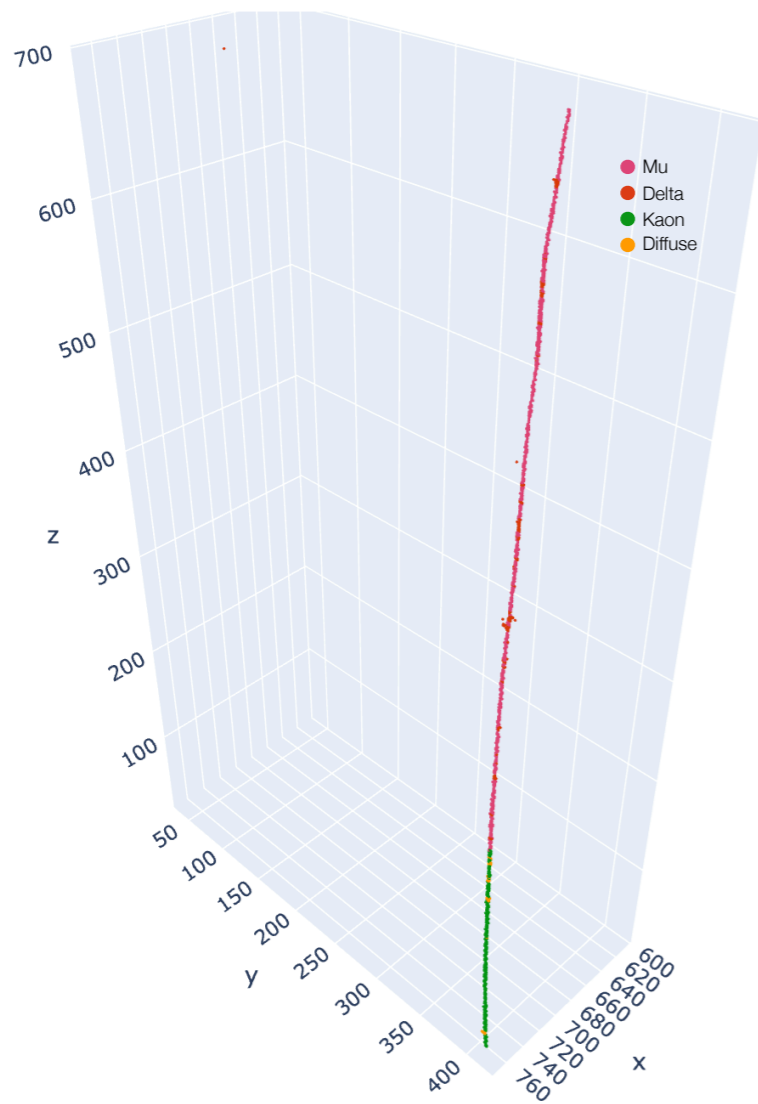   - $\mu^{\pm}$, $\pi^{\pm}$, $\kappa^{\pm}$, γ, protons, electrons

- **Hyperparameters**

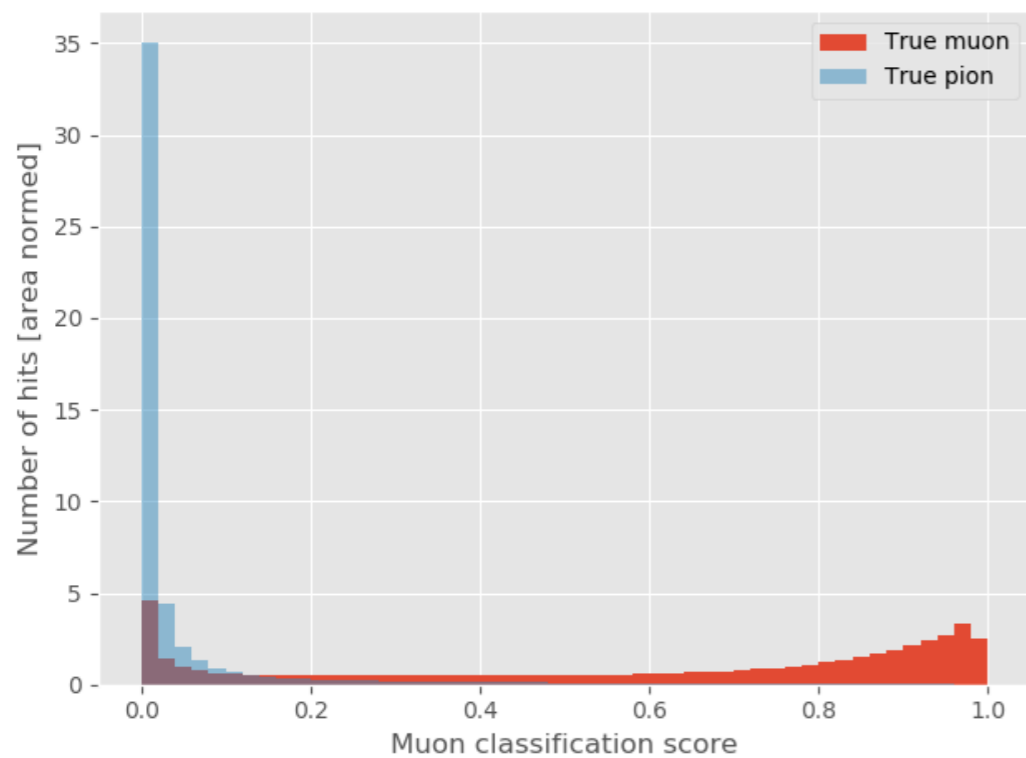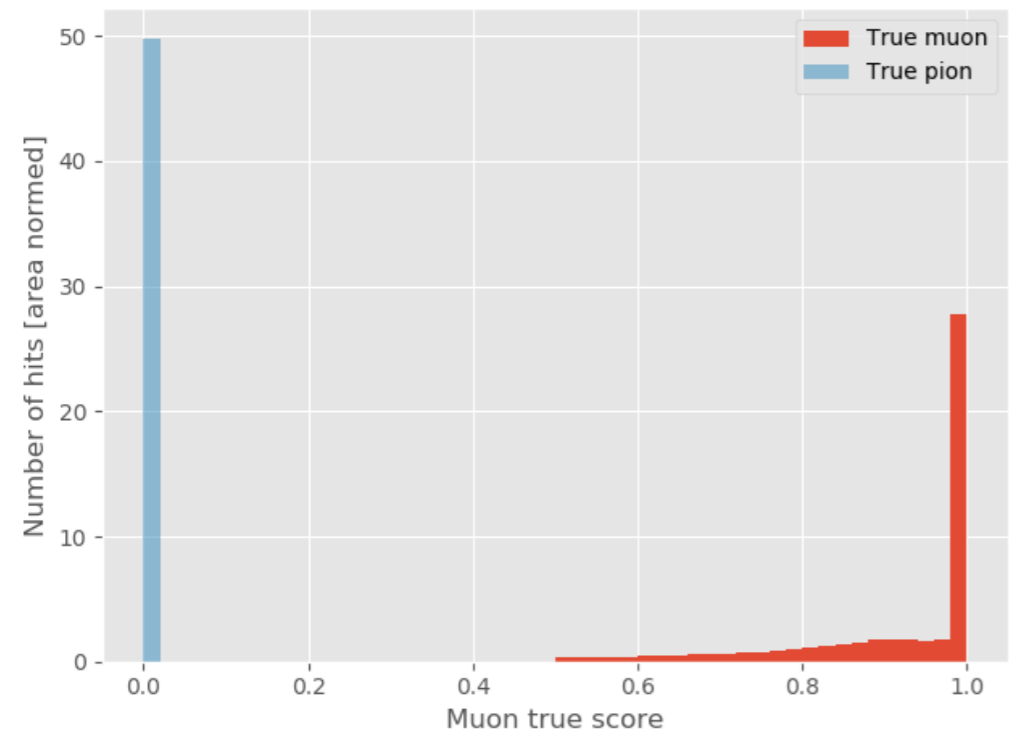 - Lr = 1e-4

  - Lr policy = 0.1
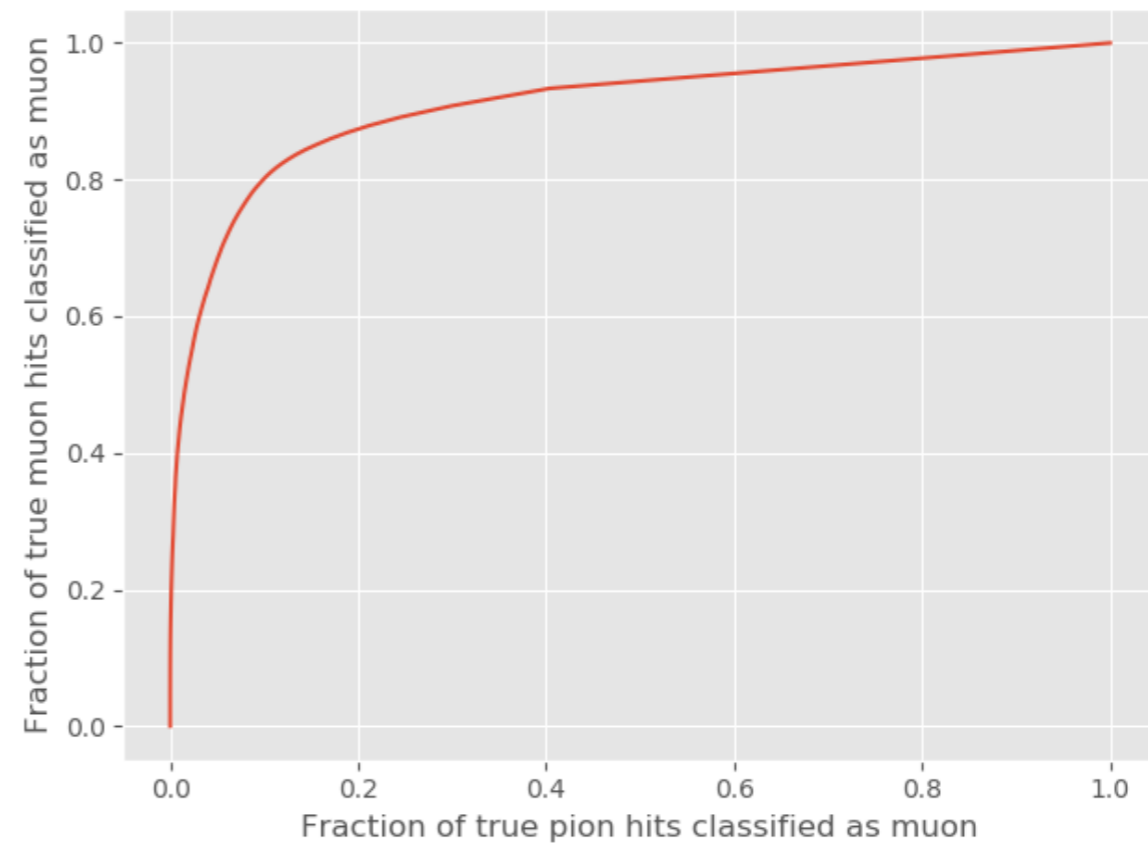
  - 5 epochs.

Preliminary Results

Misclassified Muon Hits

Muon-Pion Separation

Summary

- We have trained the network using MC and single-particle datasets

- Results for muon-pion separation seem promising even though there is a lot of room for improvement

- Comments and suggestions are more than welcome

- Thanks