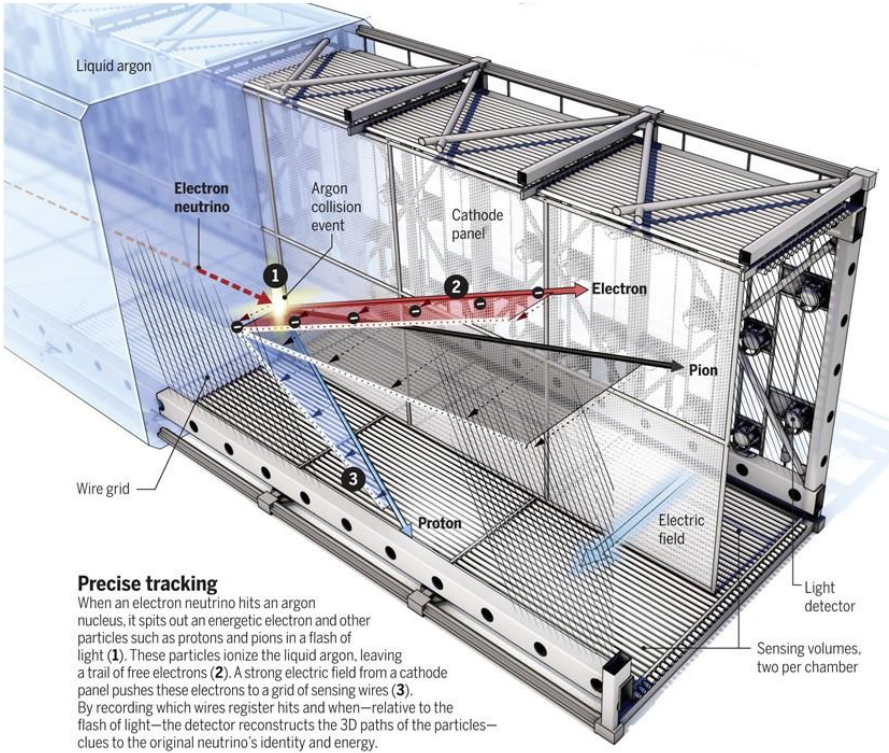
Geometric Machine Learning with DUNE

Katie Edwards

https://svgprinted.com/wp-content/uploads/2019/09/Iowa-State-Cyclones1.jpg

Background

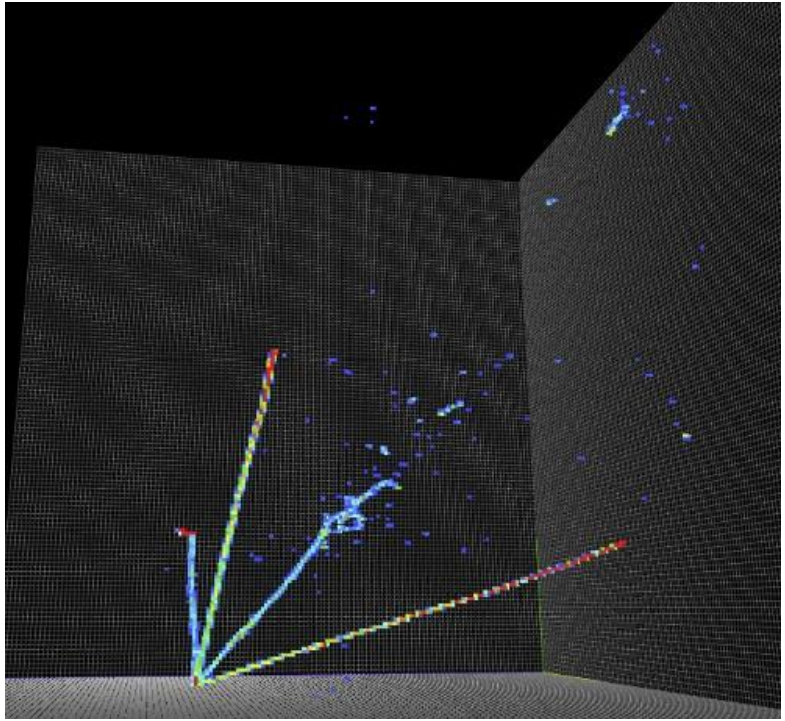
- Neutrinos have weak interactions which makes them hard to detect
- LArTPC is a particle imaging detector used to detect neutrino interactions
- DUNE-ND and DUNE-FD will be used in DUNE project



https://github.com/DeepLearnPhysics/lartpc_mlreco3d_tutorials/blob/master/book/Physics/lartpc.jpg

Background

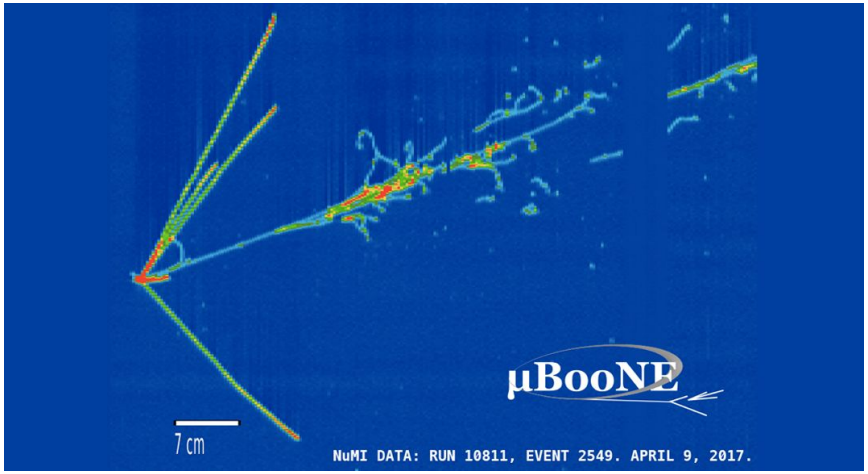
- ML algorithms seek to identify tracks, showers, michels from muon decay, delta rays, and ‘ghost points’
- Ghost points occur when transforming 2D images into one 3D image



http://deeplearnphysics.org/DataChallenge/

Project Goals

- Improve tracking algorithms used in ND-LAr ML reconstruction using data from LArTPCs
- Compare performance of GML to CNN since they use different strategies of analysis



https://www.innovationnewsnetwork.com/wp-content/uploads/2020/08/INN3-BERNUN10-26585-image-1.jpg