Semantic Segmentation of LArTPC tracks

2018-08-06, Oxford

Andrey Ustyuzhanin

NRU HSE

YSDA
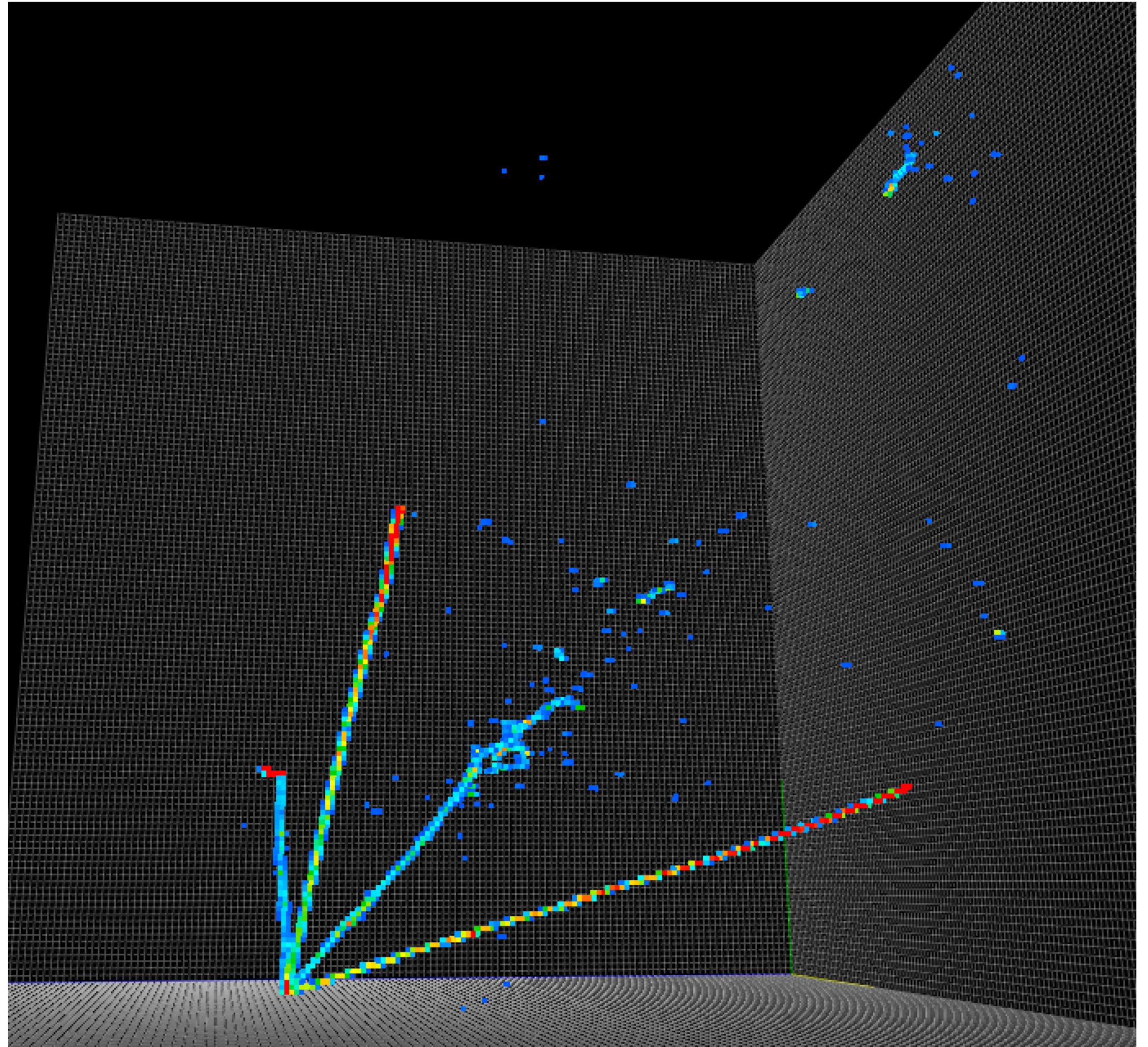
ICL

Liquid Argon Detectors

› DUNE

› SBND

› WA105

› LARA

Joint effort with

› http://deeplearnphysics.org

Competition Setting

Objects:

> Tracks of particles

> EM-showers

Data:

> Volume of 192 x 192 x 192 with energy deposition
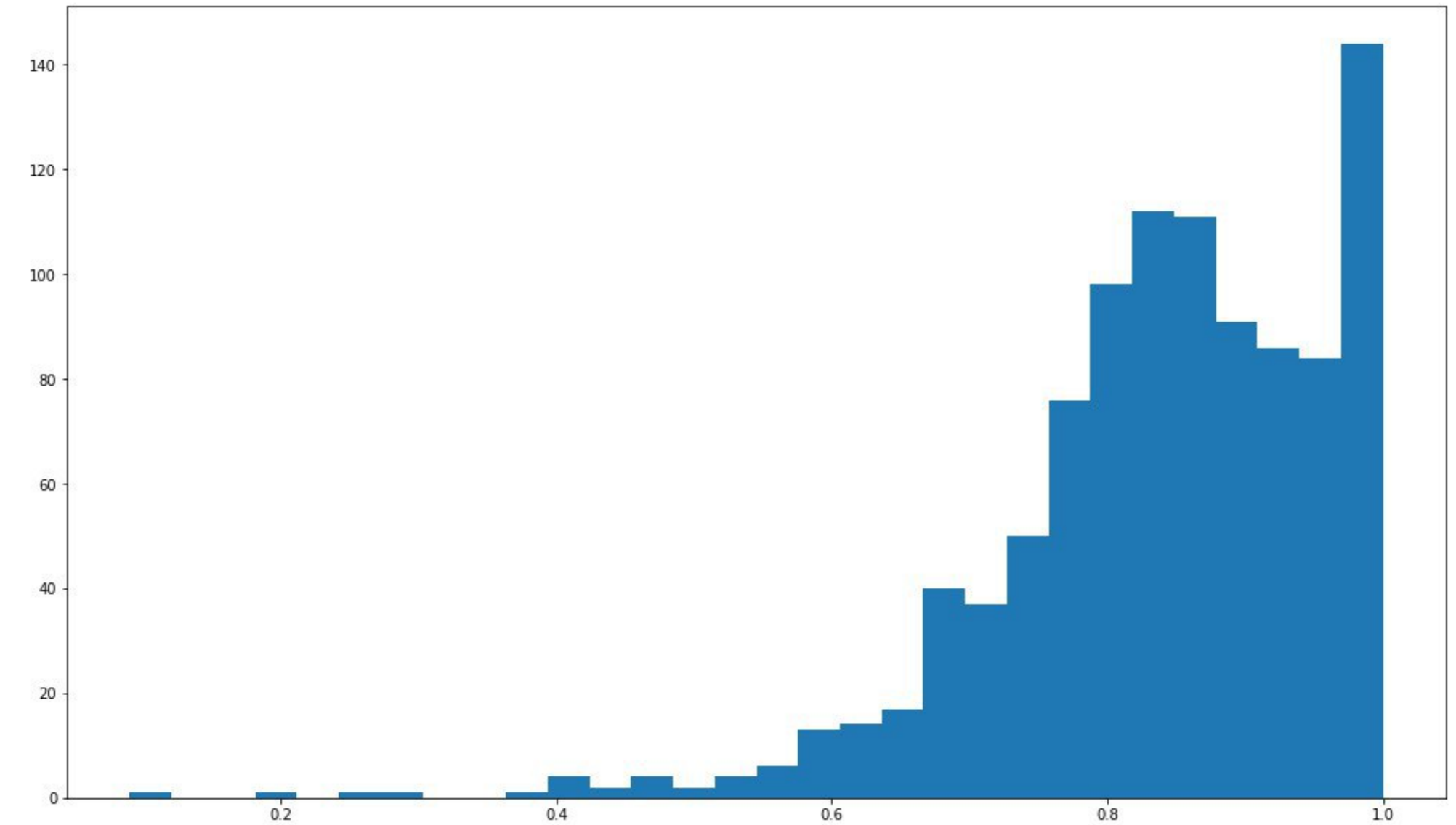
> Training sample have label

Goal:

> Track Segmentation, i.e. give correct label to every voxel in test set

Metric

Accuracy per event (volume):

› A = number of correct labels over number of non-zero labels

› M – average of A over events in data sample

› Q_50 – 50-percentile of A over events in data sample

› Q_80 – 80-percentile of A over events in data sample

CodaLab

Same as Kaggle but

> Allows to define own metric

> Allows to set challenge in phases

> Allows several metrics to be computed

> Even allows to run user submission code

> Not that expensive

Runs TrackML phase 2

Timing

▌Phase1, 3 and 5 – "public leaderboard"

▌Phase2, 4, 6 - "private leaderboard"

▌Phase 5 – goes beyond the school! Until beginning of October

▌PHYSTAT-nu

> https://indico.cern.ch/event/735431/

> 22-25 January 2019, CERN

CodaLab

Public 1
Start: Aug. 6, 2018, midnight
Description: Public leaderboard (1st Cycle)

Private 1
Start: Aug. 9, 2018, 1 a.m.
Description: Private leaderboard (1st Cycle)

Public 2
Start: Aug. 9, 2018, 1 a.m.
Description: Public leaderboard (2nd Cycle)

Private 2
Start: Aug. 12, 2018, 1 a.m.
Description: Private leaderboard (2nd Cycle)

Starter Kit

2D case:

› http://deeplearnphysics.org/Blog/2018-01-01-BrowsingSegmentationData_v0.1.0.html

› http://deeplearnphysics.org/Blog/2018-01-01-BrowsingSegmentationData_v0.1.0.html

3D case:

› Convolution networks, graph networks: https://github.com/yandexdataschool/mlhep2018-starterkit

Reminders & Links

Competition

› https://competitions.codalab.org/competitions/19818

Starter kit

› https://github.com/yandexdataschool/mlhep2018-starterkit

Download data to cluster:

› !wget –O file <URL> # get from competition -> Participate -> Files