4th ATLAS Machine Learning Workshop

Report of Contributions

https://indico.cern.ch/e/amlws2019

Contribution ID: **2** Type: **not specified**

Adversarial training for ttH(bb) classification

Friday, 15 November 2019 15:35 (20 minutes)

Event classification trained on Monte Carlo data can lead to a training bias towards the generator of the training sample, typically evaluated as a systematic error by comparing to an alternative generator model.
For the case of the search for a top-quark pair produced in association with a Higgs boson decaying to bottom-quark at the LHC, we demonstrate how adversarial domain adaptation can reduce such training bias.
A signal vs background classification network is extended by a discriminator so that the classification response is more uniform for alternative background generators.

Primary authors: GLAYSHER, Paul (DESY); KATZY, Judith (Deutsches Elektronen-Synchrotron (DE)); KATKHULLIN, Ilyas

Presenter: GLAYSHER, Paul (DESY)

Session Classification: Public

Track Classification: Public

Contribution ID: **26** Type: **not specified**

Fast Machine Learning Inference on FPGAs for Trigger and DAQ with hls4ml

Monday, 11 November 2019 15:35 (25 minutes)

Invited talk

Primary author: SUMMERS, Sioni Paris (CERN)

Presenter: SUMMERS, Sioni Paris (CERN)

Session Classification: Public

Track Classification: Public

Contribution ID: **30** Type: **not specified**

A deep neural network for simultaneous estimation of b quark energy and resolution for the CMS experiment

Monday, 11 November 2019 13:45 (25 minutes)

(note that speaker has to finish before 4pm)

Presenter: CHERNYAVSKAYA, Nadezda (Eidgenoessische Tech. Hochschule Zuerich (CH))

Session Classification: Public

Contribution ID: **31** Type: **not specified**

ML Inference in CMSSW

Friday, 15 November 2019 14:00 (25 minutes)

Presenter: QU, Huilin (Univ. of California Santa Barbara (US))

Session Classification: Public

Contribution ID: **32** Type: **not specified**

A deep neural network-based tagger to search for new long-lived particle states decaying to jets

Monday, 11 November 2019 15:05 (20 minutes)

Presenter: CEPAITIS, Vilius (Imperial College (GB))

Session Classification: Public

Contribution ID: **33** Type: **not specified**

DNNLikelihood

Monday, 11 November 2019 14:10 (20 minutes)

We introduce the DNNLikelihood, a novel framework to easily encode, through Deep Neural Networks (DNN), the full experimental information contained in complicated likelihood functions (LFs). We show how to efficiently parametrize the LF, treated as a multivariate function of parameters and nuisance parameters with high dimensionality, as an interpolating function in the form of a DNN predictor. We do not use any Gaussian approximation or dimensionality reduction, such as marginalization or profiling over nuisance parameters, so that the full experimental information is retained. The procedure applies to both binned and unbinned LFs, and allows for an efficient distribution to multiple software platforms, e.g. through the framework independent ONNX model format. The distributed DNNLikelihood could be used for different use cases, such as re-sampling through Markov Chain Monte Carlo techniques, possibly with custom priors, combination with other LFs, when the correlations among parameters are known, and re-interpretation within different statistical approaches, i.e. Bayesian vs frequentist. We discuss the accuracy of our proposal and its relations with alternative approximation techniques and likelihood distribution frameworks. We apply our procedure to a pseudo experiment corresponding to a realistic LHC search for new physics already considered in the literature.

Primary authors: COCCARO, Andrea (INFN Genova (IT)); TORRE, Riccardo (CERN)

Presenter: TORRE, Riccardo (CERN)

Session Classification: Public

Contribution ID: **34** Type: **not specified**

Introduction

Monday, 11 November 2019 13:00 (17 minutes)

Primary authors: FARBIN, Amir (University of Texas at Arlington (US)); GUEST, Dan (University of California Irvine (US))

Presenters: FARBIN, Amir (University of Texas at Arlington (US)); GUEST, Dan (University of California Irvine (US))

Session Classification: Public

Contribution ID: **35** Type: **not specified**

Machine Learning for BSM

Friday, 15 November 2019 16:05 (25 minutes)

Presenter: WULZER, Andrea (CERN and EPFL)

Session Classification: Public

Contribution ID: **36** Type: **not specified**

Dark Machines

Monday, 11 November 2019 13:27 (10 minutes)

Presenter: STIENEN, Bob

Session Classification: Public

Contribution ID: **37** Type: **not specified**

Distributed training and optimization

Friday, 15 November 2019 14:35 (25 minutes)

Presenter: Dr VLIMANT, Jean-Roch (California Institute of Technology (US))

Session Classification: Public

Contribution ID: **44** Type: **not specified**

Dinner at La Potiniere

Wednesday, 13 November 2019 19:30 (4 hours)

Restaurant: https://www.lapotinieregeneve.com/

Please register:
- https://indico.cern.ch/event/844092/registrations/
- Pay at the ATLAS Secretariat before Wednesday afternoon. Price is 84 CHF per person

Contribution ID: **45** Type: **not specified**

GPUs in Reconstruction

Friday, 15 November 2019 16:40 (20 minutes)

Presenter: Dr LEGGETT, Charles (Lawrence Berkeley National Lab (US))

Session Classification: Public