Contribution ID: **196** Type: **Poster**

Using ML to Speed Up New and Upgrade Detector Studies

Tuesday, November 5, 2019 4:15 PM (15 minutes)

Designing new experiments, as well as upgrade of ongoing experiments, is a continuous process in experimental high energy physics. Frontier R&Ds are used to squeeze the maximum physics performance using cutting edge detector technologies.

The evaluating of physics performance for particular configuration includes sketching this configuration in Geant, simulating typical signals and backgrounds, applying reasonable reconstruction procedures, combining results into final quality metrics. Since the best solution is always a trade-off between different kinds of limitations, a quick turn over is necessary to evaluate physics performance for different technical solutions in different configurations.

Two typical problems which slow down evaluating physics performance for different detector technologies and configurations are: describing Geant geometry together with signal processing chain for an adequate description of the detector response and developing adequate reconstruction algorithm for physics reconstruction of detector response under study. Both problems may be addressed using modern ML approaches. In addition to this, the whole procedure can be viewed as a black-box optimisation, which gives access to numerous available methods.

In our presentation, we discuss the way advanced machine learning techniques allow to speed up the detector development and optimization cycle with an emphasis on the project of the calorimeter upgrade for the LHCb detector.

Consider for promotion

No

Primary authors: RATNIKOV, Fedor (Yandex School of Data Analysis (RU)); DERKACH, Denis (National Research University Higher School of Economics (RU)); BOLDYREV, Alexey (NRU Higher School of Economics (Moscow, Russia))

Presenter: RATNIKOV, Fedor (Yandex School of Data Analysis (RU))

Session Classification: Posters

Track Classification: Track 2 – Offline Computing