Contribution ID: **134**   Type: **Talk**

Machine learning classification for D0 meson signal extraction in d+Au collisions

Wednesday 25 August 2021 12:00 (30 minutes)

In heavy-ion collisions at large particle colliders, such as LHC or RHIC, heavy-flavour (charm and beauty) quarks are produced mainly through initial hard scatterings. Therefore, they can serve as probes of the properties of the hot medium created in such collisions. Hadrons, that contain such quarks, could not be directly detected, thus they are measured via reconstruction of their decay products. However, due to the large number of particles produced in such collisions, separation of the decay products from combinatorial background is challenging and advanced statistical analysis is needed.

In this presentation, we present analysis of $D^0(\overline{D^0}) \to K^-\pi^+(K^+\pi^-)$ decay to investigate performance of machine learning algorithms in order to find the most effective way how to separate signal from random combinatorial background. For this study, we use HIJING and STAR detector simulation of d+Au collisions at $\sqrt{s_{NN}} = 200$ GeV embedded to the collisions recorded with the STAR. We compare deep neural network implemented using Keras with TensorFlow backend, random forest model implemented using scikit-learn and boosted decision trees implemented using The Toolkit for Multivariate Data Analysis with ROOT. Described methods might be applied on reconstruction of any two-body decay in high-energy physics experiments.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

Katerina Hladka, Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering, Czech Republic, https://www.fjfi.cvut.cz/en/

Internet talk

Maybe

Primary author: HLADKÁ, Kateřina (Czech Technical University in Prague)

Co-authors: BIELČÍK, Jaroslav (Czech Technical University in Prague); KRAMÁRIK, Lukáš (Czech Technical University in Prague); KŮS, Václav (Czech Technical University in Prague)

Presenter: HLADKÁ, Kateřina (Czech Technical University in Prague)

Session Classification: Mini-workshop on Machine Learning for Particle Physics