PHYS-815

7th Machine learning in HEP Summer School

Various lecturers

Cursus	Sem.	Type
Physics		Opt.

Language of teaching	English
Credits	4
Session	
Exam	During the semester
Workload	120h
Hours	**82**
Courses	54
Exercises	28
Number of positions	

Frequency

Every year

Remark

July 15 to 30th 2021 The school will be held online. The details and registration are available at the link: https://indico.cern.ch/event/1025052/

Summary

The school will cover the relatively young area of data analysis and computational research that has started to emerge in High Energy Physics (HEP). It is known by several names including "Multivariate Analysis", "Neural Networks", "Classification/Clusterization techniques"

Content

The school will cover the relatively young area of data analysis and computational research that has started to emerge in High Energy Physics (HEP). It is known by several names including "Multivariate Analysis"##, "##Neural Networks"##, "Classification/Clusterization techniques"##. In more generic terms, these techniques belong to the field of "##Machine Learning"##, which is an area that is based on research performed in Statistics and has received a lot of attention from the Data Science community.

There are plenty of essential problems in high energy physics that can be solved using Machine Learning methods. These vary from online data filtering and reconstruction to offline data analysis.

Students of the school will receive a theoretical and practical introduction to this new field and will be able to apply acquired knowledge to solve their own problems. Topics ranging from decision trees to deep learning and hyperparameter optimisation will be covered with concrete examples and hands-on tutorials. A special data-science competition will be organised within the school to allow participants to get better feeling of real-life ML applications scenarios.

The expected number of students for the school is about 110. The school is aimed at PhD students and postdoctoral researchers, but also open to masters students.

Contact: Prof. Lesya Shchutska (IPHYS LPHE-LS)

Note

School materials will be available on github.

Learning Prerequisites

Required courses

python programming experience (e.g. http://nbviewer.jupyter.org/gist/rpmuller/5920182, https://www.codecademy.com/learn/learn-python)

Learning Outcomes

By the end of the course, the student must be able to:

- formulate a HEP-related problem in ML-friendly terms
- select quality criteria for a given problem

Resources

Websites

- https://indico.cern.ch/event/1025052/