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ML application for beam optics control in the LHC

Monday, October 10, 2022 4:00 PM (20 minutes)

Particle accelerator optimization problems deal with non-linear, multi-objective functions which depend on thousands of time-varying machine components and settings. These properties often meet the limitations of traditional optimization methods and make this problem a perfect candidate for application of ML-based techniques. In this talk I will present, how ML can improve the control of the beams on the example of the LHC and give a short outlook on the ML application to accelerator design. Main focus of the presentation will be the application of decision tree - based methods to instrumentation faults detection, reconstruction and correction of magnet errors, and supervised learning for virtual diagnostics, which enables to obtain accurate information of beam properties without time-costly measurements.

Presenter: FOL, Elena (CERN)

Session Classification: AI/ML for Design