Advanced Machine-Learning Solutions in LHCb Operations

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The LHCb detector is a forward spectrometer optimised for the reconstruction of decays of charm and bottom hadrons produced in LHC proton-proton collisions. The need to process large amounts of data efficiently within the constraints of the data acquisition and offline computing resources pushes steadily toward using advanced data analysis approaches. The machine-learning solutions developed by LHCb collaborators are used for an increasing class of essential online and offline tasks, including more precise and faster real-time classification and selection of interesting events, smarter detector-performance calibrations, and a more precise, efficient, and unbiased offline characterization of reconstructed events. In this talk, we overview recent original applications of machine-learning in the trigger, operations, and analysis of LHCb data in 2015-2016 and discuss ongoing and future developments.

Primary author(s) :   DERKACH, Denis (National Research University - Higher School of Economics);   Mr. HUSHCHYN, Mikhail (NRE Higher School of Economics, Moscow, Russia)

Presenter(s) : DERKACH, Denis (National Research University - Higher School of Economics); Mr. HUSHCHYN, Mikhail (NRE Higher School of Economics, Moscow, Russia)

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