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## HEP and Machine Learning Synergy - an overview of ML initiatives in the HEP field

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The HEP agenda of exploring new physics beyond the standard model requires the identification of rare signals immersed in huge backgrounds. Substantially increased levels of pileup make this identification a great challenge. Neural Networks (NN) and Boosted Decision Trees (BDT) have been used in HEP for quite a long time, for instance in particle identification algorithms. The Deep Neural Networks (DNN) revolution has made significant impact on HEP and it is particularly promising when there is a large amount of data and features, as well as symmetries and complex nonlinear dependencies between inputs and outputs. Nowadays, there are a lot of R&D in this area, particularly in speeding up computationally intensive pieces of the workflows, enhancing physics reach by better classifying the events, improving data compression by learning and retaining only the most relevant ones, anomaly detection for detector and computing operations as well as simulation. In this talk we intend to give a brief overview on how Machine Learning is being used in the HEP field as well as show some initiatives being conducted by the SPRACE project.

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