Application of Deep Learning in Top Pair and Single Top Quark Production at the Large Hadron Collider

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Abstract : We demonstrate the performance of a very efficient tagger applies on hadronically decaying top quark pairs as signal based on deep neural network algorithms and compares with the QCD multi-jet background events. A significant enhancement of performance in boosted top quark events is observed with our limited computing resources. We also compare modern machine learning approaches and perform a multivariate analysis of boosted top-pair as well as single top quark production through weak interaction at $\sqrt{s}$ = 14 TeV proton-proton Collider. The most relevant known background processes are incorporated. Through the techniques of Boosted Decision Tree (BDT), likelihood and Multlayer Perceptron (MLP) the analysis is trained to observe the performance in comparison with the conventional cut based and count approach

Keywords : top tagger, multivariate, deep learning, LHC, single top
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