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Image Classification Applied to High Energy Physics Events[1]
JONATHAN TIMCHECK, RICHARD HUGHES, GARRETT MERZ, BRIAN WINER, Ohio State Univ - Columbus — We present a method for applying image classification algorithms to signal discrimination in high energy physics events. Deep Convolutional Neural Networks (DCNNs), state-of-the-art computational models inspired by the visual cortex, are trained to distinguish top-quark pair events from W+4jets events by looking at the electromagnetic and hadronic calorimeters of a generalized detector as an unrolled, flat image. DCNNs are capable of learning compact hierarchical representations, i.e., the important features in these events, and subsequently aggregate these features to perform classification. Our method yields performance competitive with that of traditional analyses and may be a useful tool in the upcoming higher-energy, higher-luminosity environment at the LHC due to its lack of dependence on isolated objects.

[1]Computational resources provided by the Ohio Supercomputer Center.

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