

Study for jet flavor tagging by using machine learning

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In collisions like the Large Hadron Collider (LHC), a large number of physical objects, called jets, are created. They are originated from hadrons such as gluons and quarks, and it is important to identify their origin. For example, a b-jet produced from a bottom quark has features, which can be used for its identification called a “b-tagging” algorithm, enabling precise measurement of the Higgs boson and search for other new particles from the beyond standard model.

Machine learning models have been proposed by various groups to identify jet flavors, but only for specific flavor classification, e.g., classification of the bottom quark and other quarks/gluons (b-tagging), or classification of quarks and gluons (quark and gluon separation). In this study, we propose a method and show results, where we extend the classification to all flavors: b/c/s/d/u/g at once using a modern method based on recent training methods for image recognition models.

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