ID de Contribution: **4**

Type: **Non spécifié**

Jet Classification with Particle Transformers: A Multiclass Learning Approach

In high-energy collisions, jets, which are collimated sprays of particles, can originate from various fundamental particles, including W and Z bosons, top quarks, and the Higgs boson. Accurately identifying these jets is crucial for studying Standard Model processes and investigating new physics beyond its framework. This study, conducted within the ATLAS collaboration at the Large Hadron Collider, focuses on multi-class jet tagging utilizing the Particle Transformer (ParT). ParT employs attention mechanisms to capture correlations among jet constituents, the particles that constitute a jet. By representing jets as unordered sets of particles, ParT achieves superior discriminative performance compared to other constituent-based architectures such as ParticleNet and PFN. Its performance is evaluated across multiple jet classes, demonstrating robustness under various Monte Carlo generators and against binary classifiers, thereby showcasing both high accuracy and stability. These findings underline the ability of attention-based transformers to efficiently process unordered data, unveil valuable insights into feature representation, and exhibit satisfactory performance when extended from binary to multi-class jet classification.

Auteur: DUQUE, Andrés (Laboratoire de Physique de Clermont Auvergne)

Co-auteurs: DONINI, Julien (Laboratoire de Physique de Clermont Auvergne); CALVET, Samuel (Laboratoire de Physique de Clermont Auvergne)

Orateur: DUQUE, Andrés (Laboratoire de Physique de Clermont Auvergne)

Classification de Session: Standard Model

Classification de thématique: Standard Model