Contribution ID: **7** Type: **Flashtalk with Poster**

Quark/gluon discrimination and top tagging with dual attention transformer

Tuesday, 30 April 2024 18:11 (3 minutes)

Jet tagging is a crucial classification task in high energy physics. Recently the performance of jet tagging has been significantly improved by the application of deep learning techniques. In this talk, we introduce a new architecture for jet tagging: the particle dual attention transformer (P-DAT). This novel transformer architecture stands out by concurrently capturing both global and local information, while maintaining computational efficiency. Regarding the self attention mechanism, we have extended the established attention mechanism between particles to encompass the attention mechanism between particle features. The particle attention module computes particle level interactions across all the particles, while the channel attention module computes attention scores between particle features, which naturally captures jet level interactions by taking all particles into account. These two kinds of attention mechanisms can complement each other. Furthermore, we incorporate both the pairwise particle interactions and the pairwise jet feature interactions in the attention mechanism. We demonstrate the effectiveness of the P-DAT architecture in classic top tagging and quark–gluon discrimination tasks, achieving competitive performance compared to other benchmark strategies.

Primary authors: Dr HE, Minxuan (University of Chinese Academy of Sciences); WANG, Daohan (OeAW HEPHY)

Presenter: WANG, Daohan (OeAW HEPHY)

Session Classification: 3.4 Foundation models and related techniques

Track Classification: Session B