

Energy Flow Networks: Deep Sets for Particle Jets (20' + 5')

Thursday, 15 November 2018 09:30 (25 minutes)

Collider events are naturally described as sets of particles which have variable size and are inherently permutation symmetric. Machine learning architectures operating on collider events should ideally be able to handle variably sized inputs and be manifestly symmetric with respect to particle ordering. Building off of the recently developed Deep Sets paradigm, which is designed for learning from point clouds, I will introduce Energy Flow Networks (EFNs) and their more general counterparts Particle Flow Networks (PFNs), which explicitly have these desired properties. Using the task of discriminating different kinds of jets as an example, I will demonstrate how the EFNs and PFNs have excellent classification performance and allow for fascinating visual interpretations of what the model is learning.

Primary author: KOMISKE, Patrick (Massachusetts Institute of Technology)

Co-authors: METHODIEV, Eric (Massachusetts Institute of Technology); THALER, Jesse

Presenter: KOMISKE, Patrick (Massachusetts Institute of Technology)

Session Classification: Representing Jets (Chairs: Mauro Verzetti and David Shih)