Contribution ID: **189**   Type: **Mini Oral and Poster**

Identifying Regions of Interest in the ATLAS Calorimeter with Deep Convolutional Neural Networks

Tuesday 23 April 2024 12:35 (20 minutes)

Clustering of calorimetric signals in the ATLAS detector has typically been performed using the topocluster algorithm, following cell signal-significance patterns. In this work we present a machine learning alternative to topoclustering. Using current topological cell clusters as indicators of physical significance we use a convolutional neural network (CNN) to identify regions of interest in the calorimeter. We introduce a novel data pre-processing pipeline transforming the ATLAS calorimeter into a two-dimensional representation in η,φ; building upon previous treatments of jets as images in particle physics. The performance of the object detection architecture, which targets real-time applications, is evaluated on a set of simulated particle interactions in the ATLAS detector.

Minioral

Yes

IEEE Member

No

Are you a student?

Yes

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Session Classification: Poster A

Track Classification: AI, Machine Learning, Real Time Simulation, Intelligent Signal Processing