

# Jet Finding as a Real-Time Object Detection Task

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The High Luminosity upgrade to the LHC will deliver an unprecedented luminosity to the ATLAS experiment. Ahead of this increase in data the ATLAS trigger and data acquisition system will undergo a comprehensive upgrade. The key function of the trigger system is to maintain a high signal efficiency together with a high background rejection whilst adhering to the throughput constraints of the data acquisition system. Here we propose a calorimeter-only fast preselection step to speed up the trigger decision for hadronic signals containing jets.

In this work we present the design and implementation of an object detection Convolutional Neural Network (CNN) for jet finding in the ATLAS calorimeter. The model is employed in the task of jet detection to identify and localise jets within the full calorimeter acceptance and to subsequently estimate their transverse momenta.

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 with up to 200 concurrent pile-up interactions.

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