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Identification of Jets and Regions of Interest in the ATLAS Calorimeter with Deep Convolutional Neural Networks in Real Time

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In the ATLAS trigger and data acquisition system we can use machine learning to approximate existing online algorithms and accelerate trigger decisions in real time. This will be particularly important for the ATLAS Phase II upgrade in the high-luminosity LHC which will enforce strict latency requirements in the trigger. This work introduces a novel application of a Convolutional Neural Network (CNN) to the task of identifying regions of interest and jets in the ATLAS calorimeter. We anticipate such an object detection model could be used as a preselection in the trigger to quickly produce jets directly from calorimeter cells, before proceeding with the slower iterative algorithms currently in use.

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