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

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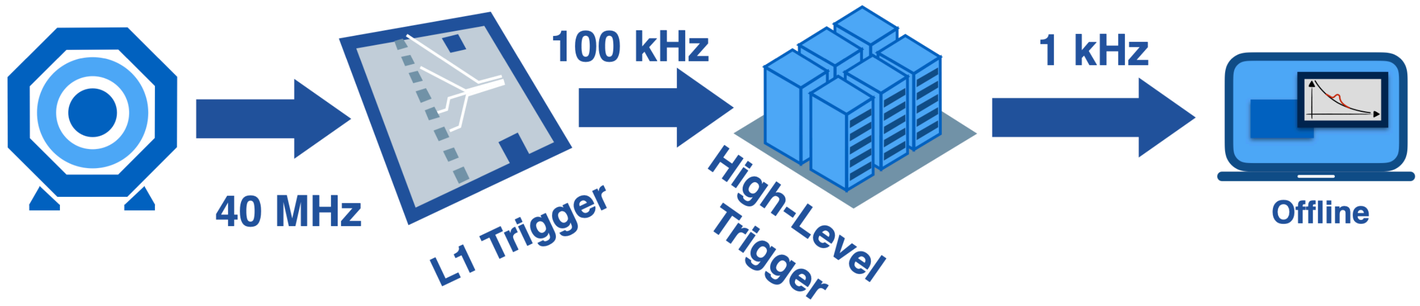
The ATLAS Trigger & Calorimeter

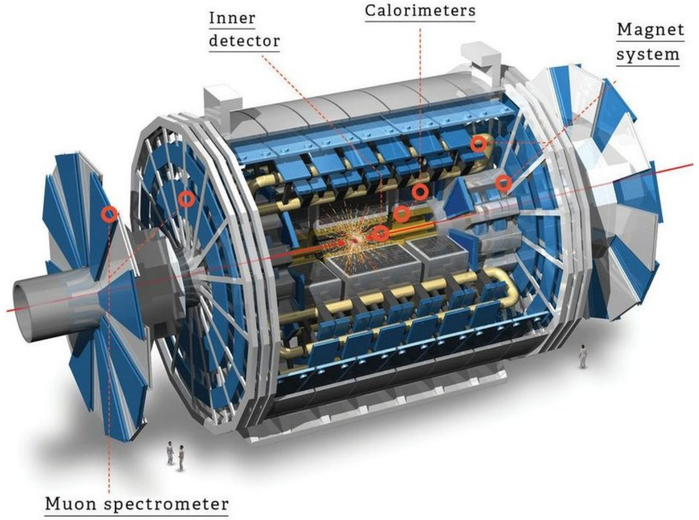
Trigger decisions in the ATLAS experiment operate in sequential steps of increasing complexity. Often occurs in two-tiered systems (hardware → software).



Trigger algorithms become progressively more complex. The latency requirements decrease at each subsequent level.

The ATLAS calorimeter geometry is complex and *highly* irregular. Cell clusters are produced across the calorimeter sub-detectors.

These form the building blocks of jets and play a crucial role in trigger decisions.



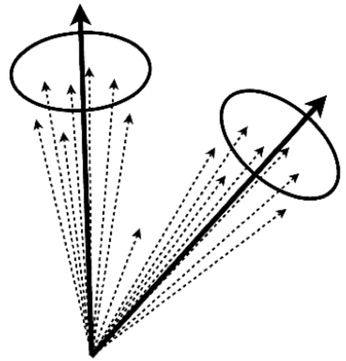


Image credit: S.Summers - https://indico.cern.ch/event/1389765/

https://atlas.cern/Discover/Detector/Calorimeter

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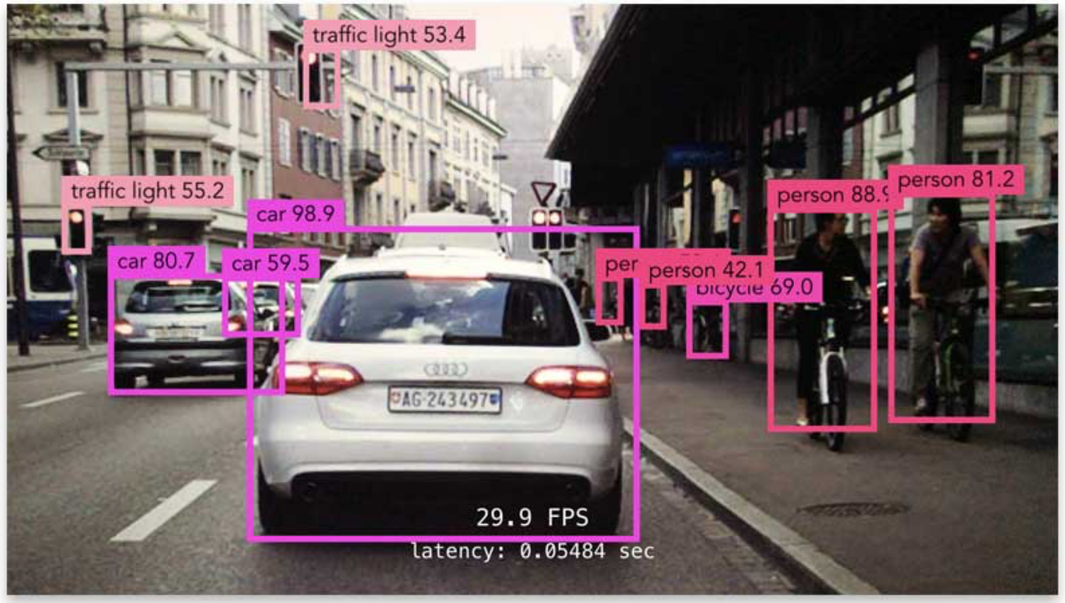
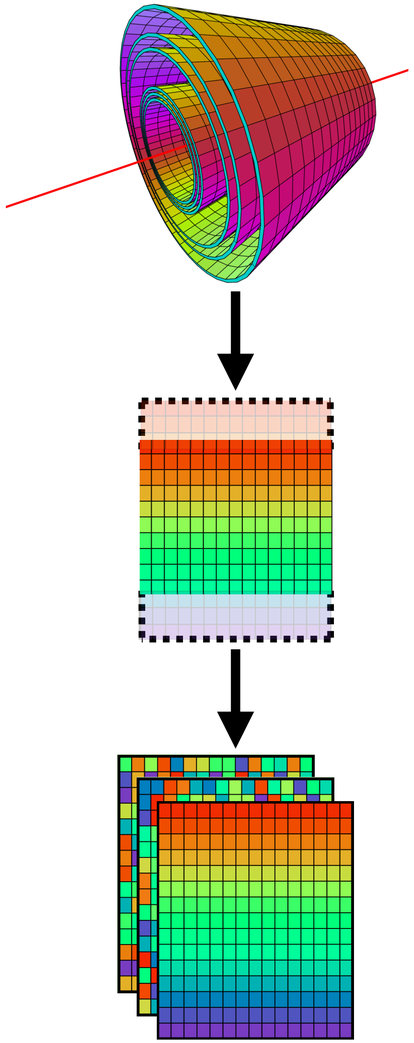
The Role of Object Detection

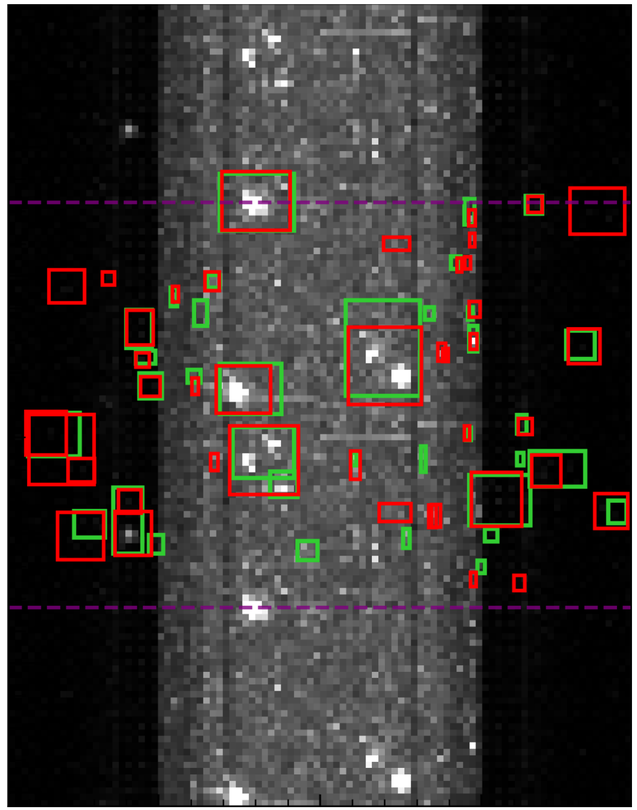
Object detection: localise and classify distinct objects in an image.



Can we use the same network architecture in the ATLAS calorimeter?



Requires calorimeter transformation into compatible 2d representation.



Come see the poster (#189)!

https://machinethink.net/blog/object-detection/