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An Ensemble of Neural Networks for Online Electron Filtering at the ATLAS Experiment.

The ATLAS experiment implemented an ensemble of neural networks (NeuralRinger algorithm) dedicated to improve the performance of filtering events containing electrons in the high-input rate online environment of the Large Hadron Collider at CERN, Geneva. This algorithm has been used online to select electrons with transverse energies above 15 GeV since 2017 and is extended to electrons with transverse energies below 15GeV in 2018. The ensemble employs a concept of calorimetry rings. The training procedure and final structure of the ensemble are designed to keep flat detector response with respect to particle energy and position. A detailed study was carried out to assess profile distortions in crucial offline quantities through the usage of statistical tests and residual analysis. These details and the online performance of this algorithm during the Run 2 data-taking will be presented.

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