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# Deep neural network techniques in the calibration of space-charge distortion fluctuations for the ALICE TPC

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The Time Projection Chamber (TPC) of the ALICE experiment at the CERN LHC was upgraded for Run 3 and Run 4. Readout chambers based on Gas Electron Multiplier (GEM) technology and a new readout scheme allow continuous data taking at the highest interaction rates expected in Pb-Pb collisions. Due to the absence of a gating grid system, a significant amount of ions created in the multiplication region is expected to enter the TPC drift volume and distort the uniform electric field that guides the electrons to the readout pads. Analytical calculations were considered to correct for space-charge distortion fluctuations but they proved to be too slow for the calibration and reconstruction workflow in Run 3. In this paper, we discuss a novel strategy developed by the ALICE Collaboration to perform distortion-fluctuation corrections with machine learning and convolutional neural network techniques. The results of preliminary studies are shown and the prospects for further development and optimization are also discussed.

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