

AutoDQM: A Statistical Tool for Monitoring Data Quality in the CMS Detector

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AutoDQM is an automated monitoring system which implements statistical tests and machine learning (ML) algorithms to compare data runs and flag anomalies for CMS data quality. It is used in conjunction with the existing Data Quality Monitoring (DQM) software to reduce the time and labor required of shifters during collision running by identifying anomalous behavior for further review from system experts. AutoDQM was used during the end of data-taking in Run 2 of the Large Hadron Collider (LHC) and is being expanded for Run 3. The tool is currently being designed to monitor the Level-1 Trigger (L1T) and all four muon sub-detectors: Cathode Strip Chambers (CSC), Drift Tube chambers (DT), Resistive Plate Chambers (RPC), and Gas Electron Multiplier chambers (GEM). To maintain the quality of collision data in future runs of the LHC, where the data rate is expected to increase, a suite of ML techniques is being developed to be used within the AutoDQM tool.

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