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Anomaly detection for automated Data Quality Monitoring and Certification at the CMS experiment

Maintaining high data quality in large HEP experiments like CMS at the LHC is essential for obtaining reliable physics results. The LHC high-luminosity phase will introduce higher event rates, requiring more sophisticated monitoring techniques to promptly identify and address potential issues. The CMS protocols for Data Quality Monitoring (DQM) and Data Certification (DC) rely on significant human intervention and have limited time granularity, which may lead to transient anomalies going undetected. To address these challenges, unsupervised machine learning techniques have been deployed for anomaly detection with per-lumisection granularity. Given the complexity and diversity of CMS subdetectors, multiple tools are being developed in parallel and maintained by subsystem experts. In this contribution, we discuss the development of automated workflows with per-lumisection granularity for online DQM and DC across different CMS subdetectors, and their integration into a common interface.
Speakers

AI keywords

Signal identification reconstruction, inference, ML classifiers

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