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Machine assisted histogram classification

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LHCb is one of the four major experiments under completion at the Large Hadron Collider (LHC). Monitoring the quality of the acquired data is important, because it allows the verification of the detector performance. Anomalies, such as missing values or unexpected distributions can be indicators of a malfunctioning detector, resulting in poor data quality.

Spotting faulty components can be either done visually using instruments such as the LHCb Histogram Presenter, or by automated tools. In order to assist detector experts in handling the vast monitoring information resulting from the sheer size of the detector, a graph-theoretic based clustering tool, combined with machine learning algorithms is proposed and demonstrated by processing histograms representing 2D event hitmaps. The concept is proven by detecting ion feedback events in the LHCb RICH subdetector.

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