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Applying Matrix Factorisation methods to improve specificity of fast anomaly detection algorithms

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NNL entered two teams into the SIGMA data challenge, one internal team and one in collaboration with K.Ward at the University of Lancaster. The internal team utilises the work of K.Ward and his Poisson-FoCuS algorithm, a fast online detection method to identify anomalies. As implemented in the SIGMA data challenge the method provides information on anomalies at a temporal scale but does not currently possess the specificity to attribute the anomaly to specific energy ranges. The NNL internal team used the fast identification of the Poisson-Focus algorithm to narrow the temporal ranges of interest for further analysis. Time periods containing anomalies are identified and selected from the main body of data and subjected to more computationally expensive techniques, including the matrix factorisation methods Sparse Principal Component Analysis (SPCA) and Non-negative Matrix Factorisation (NMF). This type of multivariate analysis is important to identify the nature of the anomalies in order to determine whether action is required. Findings from this multivariate approach could be used to improve the specificity of the Poisson-FoCuS algorithm when applied to the SIGMA data.

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