Multivariate PCA-based Composite Criteria Evaluation Method for Anomaly Detection in Manufacturing Data

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***Abstract*— In recent years, manufacturing sites have become more intelligent and efficient by adopting various IT technologies. Among them, equipment and process abnormality detection is a topic of high interest for efficient factory operation. In this paper, we propose a method that can detect comprehensive abnormalities by utilizing the PCA algorithm, which is an unsupervised learning-based data analysis method that can easily analyze multivariate data and detect abnormalities in the data, the Hotelling T2 method, which is suitable for multivariate data analysis, and the Box-Pierce statistical method to increase the detection criteria of abnormality detection data. To verify the effectiveness of the proposed method, experiments were conducted and validated using a chemical product production dataset. We expect that this method can be utilized for equipment and process anomaly detection in real time at manufacturing sites.**

***Keyword*— Multivariate Analysis, Anomaly Detection, Unsupervised Learning, Principal Component Analysis (PCA), Hotelling's T2 Control Chart, Box-Pierce Test**

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