



Outlier Detection Method in Crossed Gage Repeatability and Reproducibility (R&R) Random Effect Model

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Abstract

Gage Repeatability and Reproducibility (R&R) is the popular method for assessing the capability of a measurement system. Appropriate action can be taken up to improve the quality of the data if measurement system shows incapable. Identification of outliers in measurement data related to manufacturing process is very important since it can affect the efficiency of the measurement system, which lead to misleading prediction and conclusion. Many work on the identification of outliers in linear regression has been explored. However, not much work is devoted to outlier detection method for measurement system data. It is now evident that the classical standardized residual method failed to correctly identify outliers because it is computed based on sample mean. Hence, we propose a new method, which we call robust standardized residual based on median as an alternative to the existing method to rectify the outlier in crossed Gage R&R. The performance of our proposed method is validate through simulation and real data. The results show that our proposed method outperformed the classical method in terms of successfully detect the outliers, without having masking and smaller swamping effects.

Keywords: outliers; robust standardized residual; crossed Gage R&R; masking; swamping.