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Change detection for Item Differences in Verification Data with Unknown Groups

This talk describes two change-detection examples that arise in Safeguards data evaluation. Example one arises in IAEA verifications, where short-term systematic errors can change over time in operator and/or inspector data. Typically, it is assumed that the short-term systematic errors change from inspection period to inspection period. In some data sets, it appears that the short-term errors have changed at other times, so change-detection methods can be used to detect the change times.
This paper introduces a simple lag-one differencing method to estimate the random error standard deviation, and then uses the estimated random error standard deviation to calculate a change-detection threshold in a moving-window method to detect shifts in the short-term error. Performance results on simulated and real data are presented. Example two arises in process monitoring data, where the background data is often challenging because it can arise from a mixture of many component effects. Therefore, some process monitoring data, such as the measured volume differences in tank-to-tank transfers, are multi-modal mixtures of distributions rather than uni-modal normal distributions. Change detection can be approached in any of several ways in such process monitoring data, depending on the type of change to be detected.
\- List item

Which ”Key Question” does your Abstract address?

TEC3.1

Topics

TEC3

Which alternative ”Key Question” does your Abstract address? (if any)

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