

Merlin Redefines Data Management and Event Detection

What is Canary Event Detection Software?

Canary is a model that analyzes water chemistry in real time to alert water providers to a hazardous level of contamination in their drinking water supply. Canary was developed by the US EPA in partnership with the Department of Energy's Sandia National Laboratories.

The CANARY software evaluates standard water quality data (e.g., free chlorine, pH, total organic carbon) over time and uses mathematical and statistical techniques to identify the onset of anomalous water quality incidents. Before using CANARY for the first time, historical utility data must be used to determine the natural variation of these water quality parameters. This allows a water utility to adapt CANARY to work accurately at multiple locations within the water distribution system and helps utility operators to understand the expected false alarm rates associated with CANARY and contamination incident detection.

How is Canary Different from Linear Thresholds?

A linear threshold is a limit that is compared to a measurement to see if it is above or below the limit. While linear thresholds can be useful to flag values that are clearly out of operational limits, they are harder to use to find anomalies within the normal operational range of an instrument.

Canary uses multiple statistical algorithms in combination with filters and pattern matching to analyze sensor data to identify and distinguish anomalous events:

- Multiple algorithms (Multi-Variant Nearest Neighbor and Linear Predictive Filter) that learn background variability and identify anomalies
- Set point alarm to determine when data is outside a fixed range
- Algorithm to indicate if “enough” alarms have occurred over a rolling window (BED)
- Pattern library to filter out recurring operational changes that affect water quality parameters

How does Merlin work with Canary?

Merlin Enterprise includes an easy to use Canary interface for creating configurations and managing both real time and batch (offline) runs. Merlin Enterprise creates structured data for Canary in real time as data is obtained from your sensors, and provides reports for viewing Canary results in a simple to understand format. Alarms generated by the real-time Canary instance are forwarded to the Merlin alarm and reporting interface for enunciation via e-mail and other means.

General Steps in Event Detection Algorithms

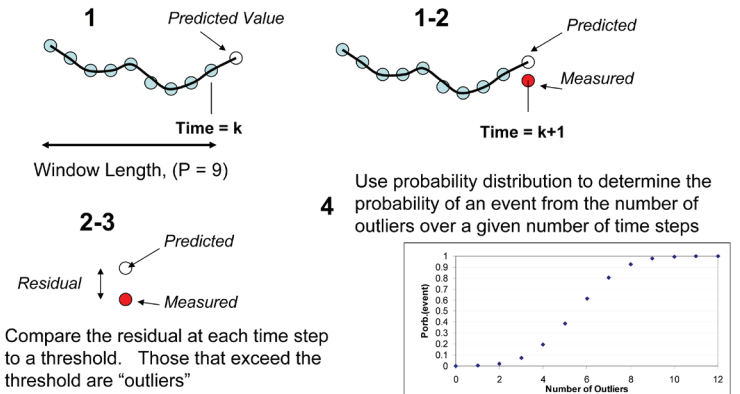


Figure 1 – The general steps in using event detection algorithms to find anomalous events (From American Water Works Association Water Quality Technology Conference 2010)