

EPRI DATA ANALYTICS CASE

Verifying the Correct Phasing and Measurement Values of SCADA Devices

The Data Challenge

Incorrect field wiring, the wrong association of the field measurement with the supervisory control and data acquisition (SCADA) back-office systems, or incorrect device nomenclature or multiplier can lead to erroneous display of measurements and even malfunction of a device and/or control/management system. The long-term effect may lead to poor management and system performance, especially when automatic control of the system is granted to an application, until the issue is corrected.

Solution Overview

Algorithms will be developed to automatically determine when the incorrect phasing or other measurement issue is present. The output of the algorithms should be designed to provide alerts to the system operator or engineer of the issue and the possible solution.

Potential Methods for Solving the Problem

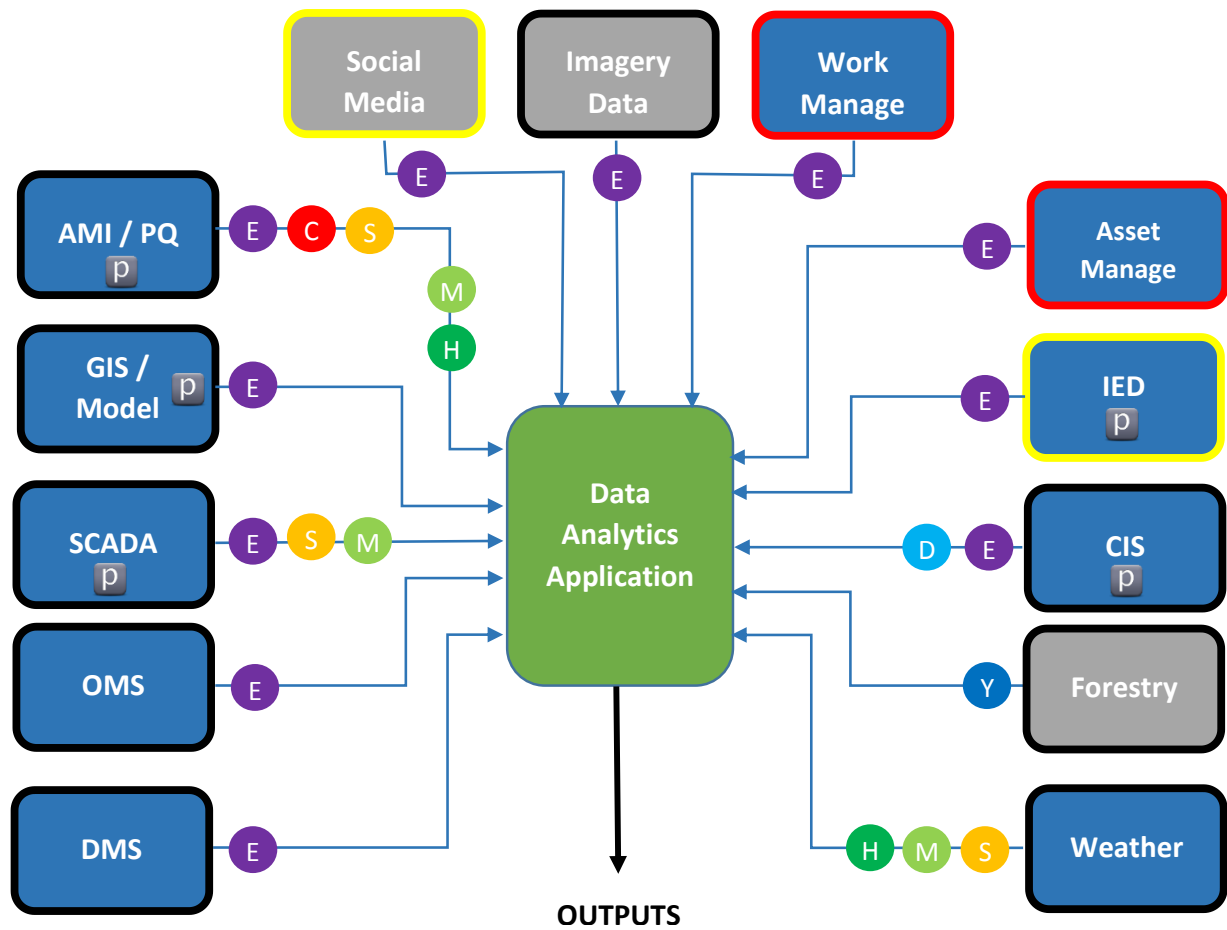
A common method that has been relied upon in the past is for thresholds to be set on measurements values. Once the threshold is exceeded, an alarm is initiated and is displayed for the system operator. Depending on the alert, a message may be sent to the appropriate technician to investigate the potential issue. The method is manageable when the alarms are coming from a small number of devices. As the number of devices grows to as many as tens of thousands of devices or more, the potential number of alarms grows beyond the ability to manage them.

Algorithms can be developed to check for potential issues with sensors, controllers, or equipment. As some equipment and sensors fail, their measurements values may drift either up or down over time. The algorithm would use trending analysis to assist in alerting the analysts of a potential issue prior to failure or even before reaching an alarm state.

Correlation algorithms can also be developed to track trends between devices on the same phase. Over time, the trends of source-side device measurements should track those of load-side device measurements on the same phase. For voltage and current readings, the trending approach should be useful. For kW and kWh readings, the aggregation of smart-metered loads by phase to the monitoring point should provide confirmation of the correct phasing indication. In addition, the mismatch in the aggregated value versus the SCADA measurement could indicate a failing of the sensor providing the measurement.

Available Data Sets

The data sets highlighted in the following figure are available in the EPRI Data Repository to solve this data analytics case.



Classifications of Data:

- Traditional Data Set
- New Data Set
- Structured Data
- Un-structured Data
- Format of Data Varies

p Denotes a primary data set used to solve this data analytics case.

Frequency of Measurement

- Cycles
- Seconds
- Minutes
- Hours
- Days
- Months to Years
- Event Driven