

EPRI DATA ANALYTICS CASE

Correcting the Hierarchy of Meter to Protective Device

The Data Challenge

The mismatch of utility meters to their protective device creates inaccuracy within the utility systems, namely the geospatial information system (GIS), outage management system, customer information system, and/or distribution management system. These inaccuracies persist until an outage occurs or a costly field inspection is undertaken that discovers the mismatch. The effect of the mismatch typically leads to longer outage restoration and additional work to correct the mismatch in the system of record.

Solution Overview

Algorithms can be developed to predict the association between a meter and its protective device using non-outage data and to automatically update the system of record with limited or no user input. Additionally, data gathered during the outage can be used to confirm the association and to correct other mismatches discovered during analysis of the outage data.

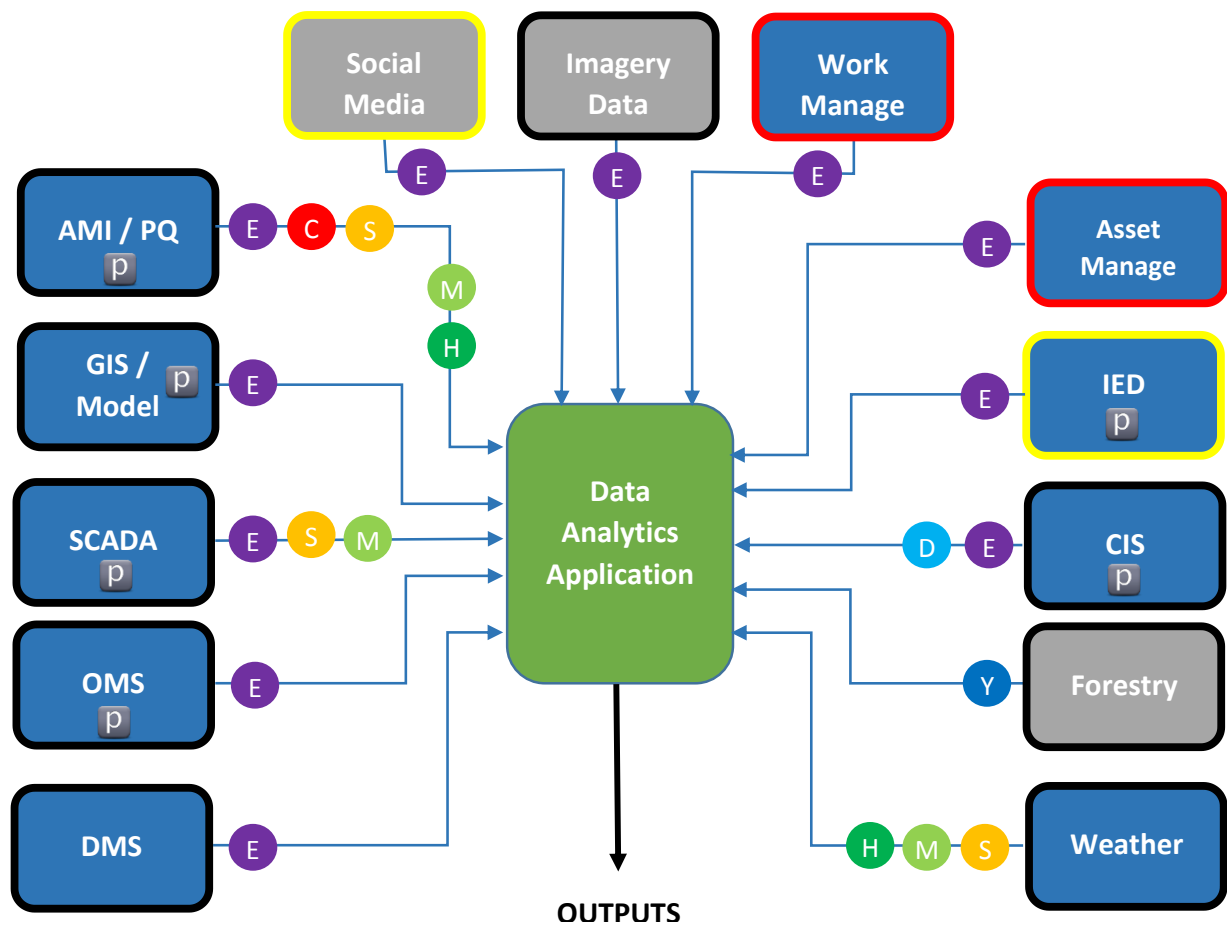
Potential Methods for Solving the Problem

A non-outage algorithm could be developed to compare the list of distribution service transformers down-line from the protective devices and their associated meters to the list of meters assigned to the protective devices. Because the two lists may come from two different systems of record, the mismatches in this comparison analysis would be a possible indication of an incorrect meter-to-protective device assignment. Additionally, a proximity algorithm could be developed to indicate whether the GIS coordinates of a meter is within a reasonable distance of the service transformer within the zone or line segments of the protective devices. These algorithms should identify the mismatched meter-to-protective device associations with a high degree of certainty.

An algorithm to correlate post-outage events could be developed to determine additional mismatches. This algorithm would need to query the outage event and restoration data to associate outage and restoration times of the meters to that of the protective devices to determine whether the times are within an acceptable range of one another. If outside of this range, a meter's outage and restoration times would need to be correlated to the times of other protective devices to determine a possible match. The new association could then be tested against the results of the non-outage algorithm to determine whether the new association is reasonable.

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

- C Cycles
- S Seconds
- M Minutes
- H Hours
- D Days
- Y Months to Years
- E Event Driven