1 AI Service for Module 1 in the Service Life Cycle: Service message

AI FOR THE IDENTIFICATION OF ANOMALIES IN CATHODIC PROTECTION (CP)

According to the German Association of Gas and Water Professionals (DVGW), network operators are obliged to regularly assure themselves of the effectiveness of their corrosion protection, also for hazard prevention. The collection and regular monitoring of cathodic protection sensor data via remote monitoring is the preferred way to implement this requirement (compared to on-site monitoring at the asset).

With AI methods, this effort can be reduced considerably further and a higher efficiency can be achieved, as the experts only examine relevant cases with potentially real incidents instead of sifting through and evaluating “false alarms”.

FOR THE FOLLOWING CHALLENGES

- Fast, targeted alerting
- Avoidance of false alarms
- Widely branched piping systems

THE USE CASE

It is important to be able to access many sensors in a time-critical manner in cathodic protection (CP) processes. This sensor data is continuously recorded and transferred to a central system and then evaluated.

The evaluation focuses on the achievement of fixed threshold values derived from the past, which means nothing more than the simple update of past data against which it is checked whether a threshold value has been exceeded.

When said thresholds are exceeded, alarms are generated that are submitted to a central specialised unit for analysis. These are either acknowledged as “false alarms” or the alarm is evaluated as a malfunction and a service ticket is created for on-site maintenance at the asset.

Here, using AI for anomaly detection can help optimise alerting in a targeted and cost-effective manner.

THE SOLUTION IN DETAIL

Using historical data, an anomaly detection model is developed and trained.

In a first step, the CCP sensor data is collected and transferred to a central system (cloud) and in a subsequent process, this data is processed as part of a sanity check. The model allows the explicit integration of further helpful external data, such as weather data (soil moisture).

Further down the line, an AI algorithm then identifies anomalies in cathodic protection monitoring and creates targeted warnings through the dynamic thresholds.

This extends the possibilities of regular monitoring of the effectiveness of corrosion protection and not only ensures but significantly improves the detection of real faults.

PROJECT STATUS

The model is being developed as part of the Service-Meister project.

REQUIREMENTS

The service is provided as a full service, i.e. OGE connects customer plants to its own central system and monitors the customer plants with its own personnel. The maintenance process itself can remain with the customer.

AVAILABILITY

Upon request.

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SERVICE MEISTER

SPECIFICATION

	Input data	Pre-processing	Data storage	Algorithms	Interfaces
High-Level Description	Mapped and parametrised sensor data	Sanity Check	Main memory	Anomaly detection	Monitoring / Dashboard / Alarms
Configurability	Possibly external data like soil moisture	Dependence on neighbouring sensors		Training period, Pipeline system	Plot selection or representation of the dashboard
Technical Implementation	Sensors on site	Python	File system, IoT Cloud Services	Python, Docker Container	REST-API
Specific example from the speedboat project	The CP sensor data is recorded every 24 hours and transferred to a central system (cloud)	The data is processed	The processed data is stored in the cloud	AI identifies anomalies in cathodic protection (CP) monitoring	Possibility of regular monitoring of the effectiveness of corrosion protection and detection of real failures

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