

The background image shows a large body of water with a significant spill. The water is divided into two distinct colors: a clear, greenish-blue on the right and a thick, brownish-tan on the left. The boundary between the two is turbulent, with white foam and bubbles visible where the brown water is being dispersed or mixed with the green water. The overall scene suggests an environmental spill or a controlled discharge of a different liquid into a larger body of water.

EDM Spills Management - Cognizant's solution

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What are EDM spills and how are they managed

- Water utilities in UK, need to report on untreated sewer spills from their assets to **Environment Agency**. This is achieved through EDM (Event Duration Monitoring) loggers which monitors untreated sewer spills from pumping stations, CSOs and wastewater treatment plants
- EDM loggers are **not completely reliable** and **subject to failures** and routing maintenance
- EDM spills is a very **significant business performance indicator** with financial and reputational repercussions
- There are opportunities to improve the spills reporting and **drive operational efficiencies** using advanced analytics
 - Identify outliers, flat lines, single spill events and other anomalies using data analysis
 - Utilise underlying analogue signal data for Digital devices to analyse and remove data anomalies
 - Validate EDM signals data using upstream device (e.g. spill to storm tank)
 - Utilise machine learning (ML) models to predict and validate the spills
 - Identify dry weather spills using observed rainfall information
- Furthermore, there are number of opportunities to improve the spill reporting processes including manual data corrections and operational interventions
- Cognizant has developed a new solution leveraging cloud and advanced analytics to effectively manage the end-to-end spills data collection, validation, monitoring, investigation and reporting processes

Opportunities that technology can unlock to better manage and accurately report the spills to regulator

Predicting the spills using advanced analytics will enable operational teams to better prepare to minimise the spills and drive operational efficiencies

Validation of the spills using upstream / downstream devices to improve the accuracy of the spills reported to regulator

Disparate systems and processes to manage spills review, investigation and field interventions

Regulatory requirements to make the spills data available to public within 30 mins meant that business should have means to verify the data automatically

Issues with devices/sites are not proactively monitored and fixed resulting in higher number of spills reported to the regulator

Identification of issues with the device/sites based on data signatures to initiate investigations and field interventions

Removal of spills occurred during operational issues and site maintenance activities is a very tedious process and error prone

Erroneous spills identification and removal is extremely complex process

Use cases that this solution delivers:

Single device data validations

Validation of data received by EDM monitors to identify and remove erroneous data

- Missing data
- Outliers
- Flat lines
- Reading with future date etc.

Multi device rule-based validations

Validate the spills using data from upstream or downstream monitors (e.g. spill into storm tank)

Identify potential issues with the site and create events for investigations

Validation of data received by EDM monitors to identify potential issues and create events for business investigations.

- Device stuck in specific state
- Spilling in loss of echo state
- Flat lining below wier level etc.

Spills Calculations and Reporting

Calculate the spills after applying all the data validations including polled spills identification and 12-24 regulatory spills post removal of all erroneous data records

Machine Learning (ML) based spill validations

ML models to validate the spills information using historical data and other influencing datasets – Rainfall, FTFT, LOE, Flow etc.

Machine Learning (ML) models to predict the spills

ML models to predict the spills based on historical data and compare that with actuals to identify potential issues with the sites and initiate field investigations

Business process improvements

Improve the overall business processes associated with spills review, operational investigations, field interventions and manual data corrections to improve the accuracy of the reporting and better manage the health of the devices

Image Analytics for spills validation

Use image analytics to validate the spills using CCTV footages from the sites

Utilizing network flow data for spills validation

Use flow information from the network to validate the spills

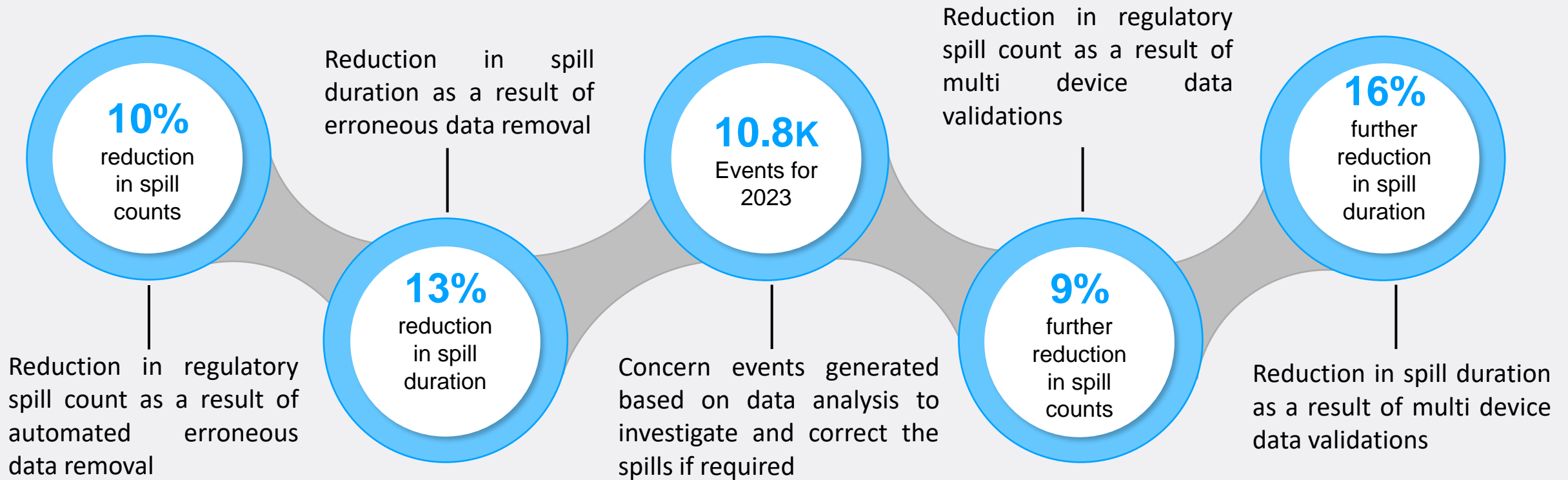
Operational

Pipeline

Business benefits realized

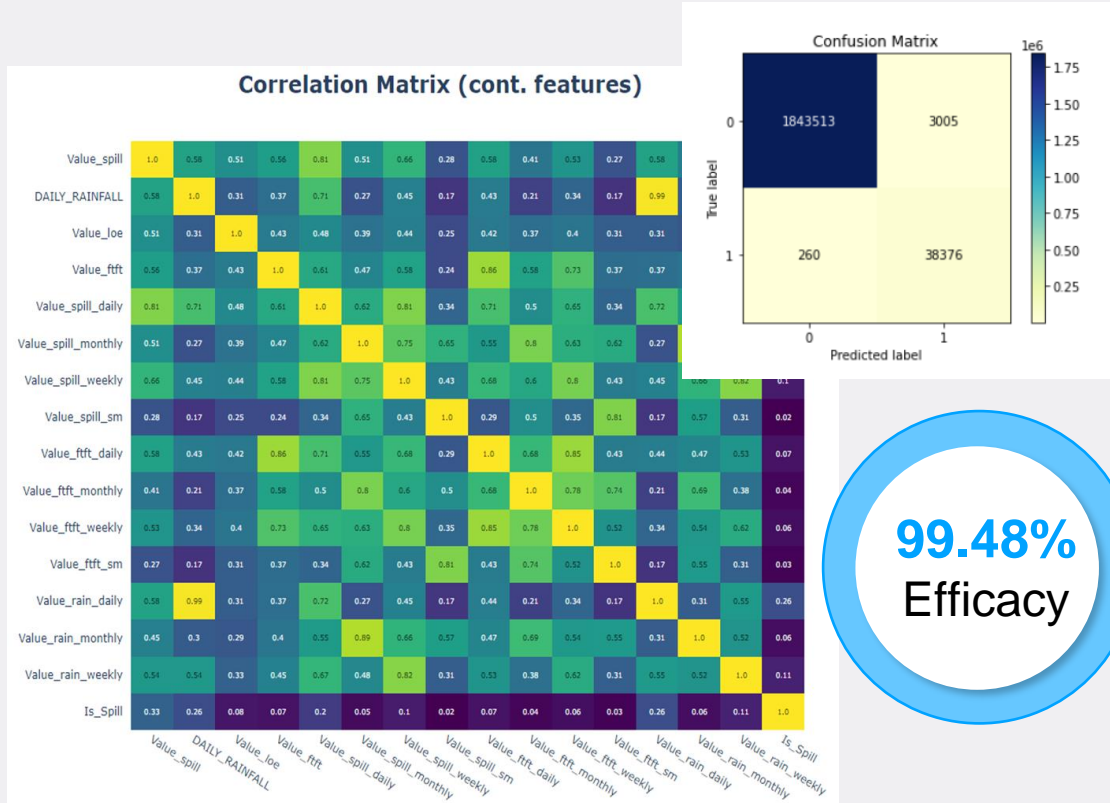
Solution delivered the following business benefits till date

The following benefits have been realised for the annual year 2023

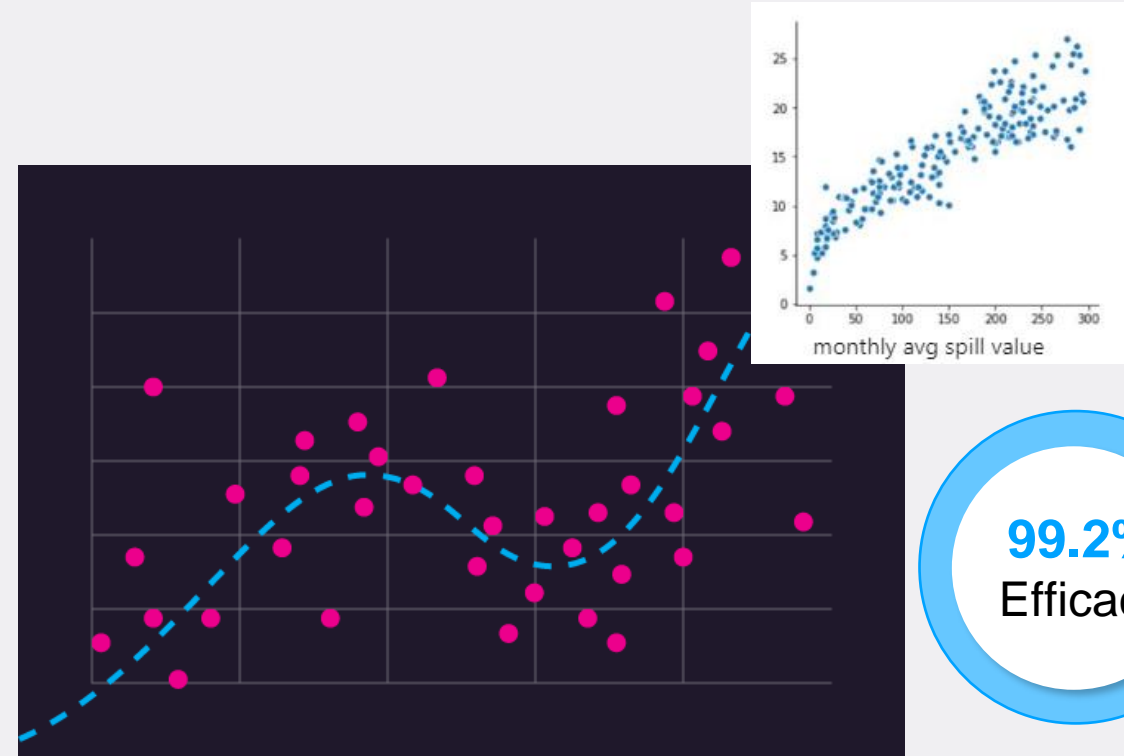


Machine Learning for spills validation and prediction

Use machine learning models to validate and predict the spills using different historical datasets and drive proactive investigations and interventions



A classification model that correlates various datasets (Spills, Rainfall, LOE, FTFT etc.) to validate the spills based on historical data patterns and create events for business investigation for potential invalid spills



A regression model to predict the frequency of the spills based on historical data correlations across various datasets (Spills, Rainfall, LOE, FTFT etc.) and compare them with the actual frequency recorded to identify potentially problematic sites to initiate business investigations

Thank you