

Consent compliance analysis [water]

Business Objective

- To analyze and understand hidden patterns and trends of various effluents and to monitor the sludge from water treatment plants
- Prediction of effluents concentration based on historical sensor data enables a workflow where the potential breach can be identified and remedial action can be taken proactively

Benefit

- Early detection of compliance breach and mitigation helps in taking informed decisions
- Provides cost benefit analysis against the utilization of current infrastructure vs capital investment for plant optimization
- Avoid penalties and reputational damage resulting from effluent discharges at Sewage Treatment Works (STW) and determine sources (effluents) of water contamination

Expected Outputs

- Deeper insights on toxicity levels of various effluents
- Statistical forecasting model for prediction of effluents concentration in near future
- Prediction analysis on all the chemicals sensor measurements

Data Used

- Parameter data providing details of various chemicals with concentration values
- Task data containing breach details, breach threshold data, site data providing location details of breaches
- Sensor activity measurements of various time-stamped Ammonia (effluent) concentrations from SCADA sensors

Design

- It is divided into three parts:-
 - Descriptive Analysis
 - WWTP Effluent Forecasting
 - WWTP Fault Prediction Model
- ARIMA Model is used for prediction of Ammonia concentration in near future.
- K-Means clustering techniques to cluster the sensor measurement data

Output

- Prediction of ammonia effluent concentration in near future
- Latest incoming sensor measurement records dataset with predicted cluster and computed distance, based on which the fault is predicted

Benefits

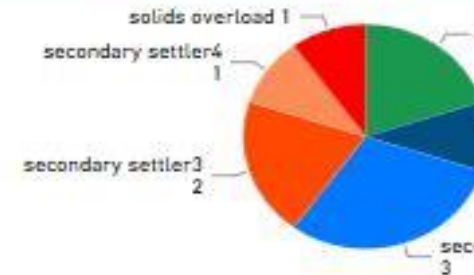
- Effluent toxicity testing measures the effects of treated wastewater on the aquatic organisms.
- Management, planning, and regulation of freshwaters
- Trend analysis for failure detection

Efficient & well organized Operations – Water Treatment Plant

Time Fault Prediction

Fault Distribution

secondary settler1	secondary settler3	secondary settler4
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Sensor

H-S	Q-E	RD-DBO-G	RD-DBO-
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Sensor Trend At The Time of Fault



- Forecast the Ammonia concentrations in a Waste Water Treatment Plant (WWTP) in the next few hours and next few days based on the last real time data point available from the SCADA sensor

- Cluster the sensor measurement data based on an operational order such that the WWTP operations team can understand more about possibility of operational failure within the WWTP

- Proactive fault prediction on latest incoming sensor data
- Futuristic predicted effluent concentrations to identify breaches

Improved operations of water treatment plants.