Water Distribution System Asset Risk Assessment (DSRA)

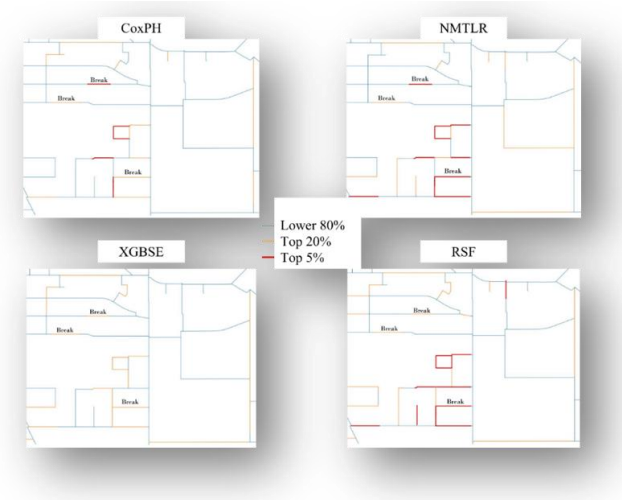

Figure 1. Predicted LoF's from Multiple ML Models in GIS

Overview

The HydroTrek-DSRA is a leading ML-based software for determining the Likelihood of Failure (LoF) probabilities for Distribution System Mains using Machine Learning (ML). In addition, it uses GIS-based analysis to calculate the Consequences of Failure (CoF) for those assets. The reduction in business risk based on the LoF/CoF can 1) prevent catastrophic failures ,2) reduce non-revenue water and 3) improve network performance. The platform has been successfully tested in multiple utilities located in North America. Multiple ML models are leveraged in a unique "Survival Analysis" approach that creates superior results compared to traditional ML approaches. These models were developed using the Supercomputing Cluster at the University of British Columbia.

Features

- Functionality to apply off-the-shelf HydroTrek LoF-ML models without developing a custom model
- Ability to leverage available data to create the best ML model. It is not necessary to have large datasets with an extensive set of pipe features.
- Tolerance for noisy data.
- Faster training times for custom ML models using GPU's.
- Advanced GIS-based CoF functionality to determine spatiotemporal impacts of the discharged water on the built-up environment and on the receiving streams.

Figure 2. Extensive Data Analysis Prior to the ML Phase

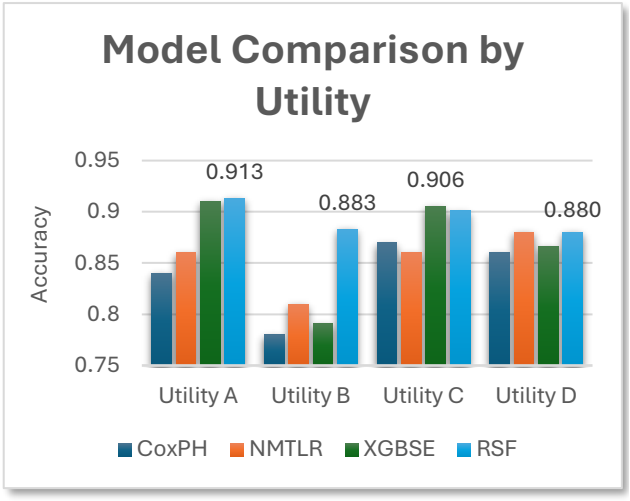

Figure 3. Results from Several Utilities

Advantages

- The ML LoF predictions are several times better than the age-based LoF predictions.
- The "Survival Analysis" approach leads to the construction of a temporal degradation curve for each pipe. Most ML approaches provide a single failure probability of a given pipe.
- Data analytics and visualization improves data understanding and highlights any anomalies.
- A specific ML model can be chosen that works best with the features of the available data.
- The software provides fast calculation of the flow-paths for the discharged water
- The CoF can carried out in industry standard GIS systems.