

Figure 1. Sewer CCTV Inspection

Overview

The HydroTrek-CSRA is a leading ML-based software for determining the defect locations in sewer CCTV using Artificial Intelligence Computer Vision (CV). In addition, it uses Machine Learning (ML) to predict the defect locations in un-inspected assets with high accuracy. The reduction in business risk based on the CV/ML results can 1) prevent catastrophic failures ,2) reduce I&I and 3) improve network performance. The platform has been successfully tested in multiple utilities located in North America. The CV models can be used for QA/QC of existing inspected reports or to create inspection reports from new videos. The ML model can be used to schedule new inspections. These models were developed using the Supercomputing Cluster at the University of British Columbia.

Features

- Functionality to apply off-the-shelf HydroTrek CCTV CV models without developing a custom model
- Requires zero data preparation. The videos are processed by the CV pipeline. Advanced Optical Character Recognition (OCR) extracts information from the videos.
- Handles PACP and wRC codes and has tolerance for noisy data.
- Faster training times for custom CV and ML models using GPU's.
- Advanced ML and GIS-based defect location prediction functionality to prioritize future inspections.



Figure 2. The CV model predicted Pipe Collapse (XP) and Root Fine Joint (RFJ) defects that were missed by humans

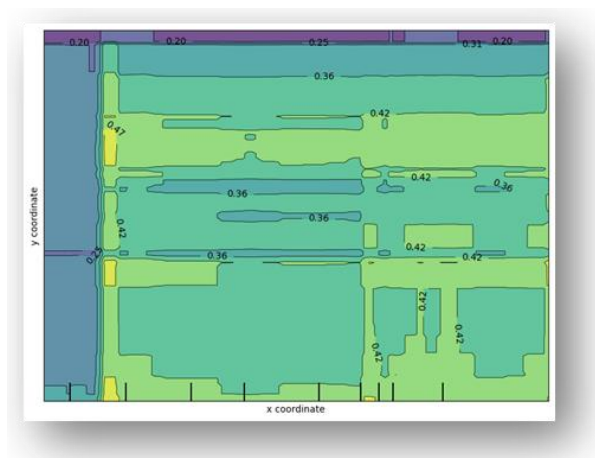


Figure 3. Potential I&I Defects Visualization (Can be done in a GIS map)

Advantages

- The CV model can be used to train new staff, to QA/QC old and new inspection reports, to process the no-annotation videos from sewer CCTV robots.
- The multiple CV models approach allows the prediction of a specific defect or a particular defect class such as I&I. Other CCTV CV approaches provide a single defect label.
- The inspected and predicted defects can be displayed in a 2D and 3D GIS visualization to improve system understanding and to highlight any anomalies.
- Same inspection budget can be spent better by targeting pipes that are likely to contain defects.