

Video Analytics of Pipeline Conditions using Artificial Intelligence

Executive Summary

Mainland South Division is managing approximately 2,000 km of drainage and sewerage assets. Routine inspections by closed circuit television (CCTV) survey inspections are carried out to identify pipe defects and evaluate pipe conditions. Defect coding and grading of pipe conditions, are carried out in compliance with the fourth edition of Manual of Sewer Condition Classification (MSCC) by certified coders. While the identification and coding of defects can be time-consuming and can rely on the professional knowledge of certified coders, Artificial Intelligence (AI) is contemplated as a potential measure to unify, expedite and streamline the pipe defect coding process.

This study investigated the use of Artificial Intelligence (AI) to analyze pipe defect in CCTV video. The main objectives were (a) to study the feasibility of automating video analytics of pipe defects for defect coding using AI; (b) to evaluate the effectiveness and accuracy of identifying and coding defects of the drainage and sewerage network using AI in compliance with MSCC. The AI shall be able to automate the identification and coding of selected defects to an accuracy as specified in the Brief; and (c) to recommend improvements to the accuracy on automating video analytics of pipe defects using AI and roadmap for broad application of AI on coding of pipe defects. AI was established, built and tested for identification and coding of specified defects fulfilling the requirements of MSCC.