

Title : Desktop-Based Pipeline Inspection Analysis System Using Deep Learning for MFL ILI Data

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## ABSTRACT

This cooperative education project presents the development of a desktop-based pipeline inspection analysis system for Magnetic Flux Leakage (MFL) In-Line Inspection (ILI) data. The system supports inspection data input from CSV and MFL files and employs deep learning-based object detection to automatically identify pipeline components and anomalies. Inspection results are visualized through an interactive user interface and further processed for engineering analysis and report generation. Experimental results show that the system achieves a maximum mAP@50 of approximately 0.88 for component detection, while anomaly detection achieves an mAP@50 of approximately 0.54, demonstrating its effectiveness in reducing inspection workload and supporting pipeline maintenance decision-making in industrial applications.

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