AI MODELING FOR DETECTING WATER LEAKAGE IN URBAN WATER INFRASTRUCTURE SYSTEM.

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CIE 500 – AI for Urban Water Network

SEAS EWRE

CONTENT

INTRODUCTION

- Urban water system infrastructure refers to the network of physical structures, facilities, and systems designed to manage and distribute water resources in urban areas.
- Urban water infrastructure systems are critical for the sustainable management and distribution of water resources in cities.
- However, these systems are often plagued by water leakage, which leads to significant economic losses, environmental damage, and reduced efficiency in water distribution
- This project focuses on leveraging benchmark hydraulic data to optimize AI models for water leakage detection.

PROJECT OBJECTIVES

- Optimize an already existing AI model to accurately detect leaks in Urban Water Systems.
- Improve and optimize the traditional detection method.
- Input and automate a real-time monitoring system in the model.

PROCESS

- Data Collection and Preprocessing
- Model Optimization
- Performance and Evaluation
- Comparative Analysis
- Practical Implementation

LITERATURE REVIEW

Vanijjirattikhan, R et al…"AI-based acoustic leak detection in water distribution systems"

- Developed AI-powered system to detect leaks in water distribution networks.
- Collected acoustic data via a smartphone app.
- Processed data using machine learning algorithms (Deep Neural Network (DNN), Convolutional Neural Network (CNN), and Support Vector Machine (SVM).
- Field trials showed the system's accuracy to be above 90%.

Cantos, W.P. " Artificial Intelligence Application for Leak Detection and Geolocation in Water Distribution Systems "

- Explored the feasibility of using an Artificial Intelligence-based Risk Assessment Method (AI-RAM) for early leak detection in water infrastructure.
- The AI-RAM integrates a historical, data-driven, statistical-based RAM.

- The method yields real-time leak detection indicators (Likelihood, Severity, and Risk) visualized through Human Machine Interfaces (HMIs).

Aghashahi et al..."Benchmarking dataset for leak detection and localization in water distribution systems"

- Utilized a publicly available dataset designed to advance research in leak detection and localization within water distribution systems (WDSs).
- The data accounts for different leak types, network topologies and background conditions.
- The aim was to provide a comprehensive labeled dataset to help researchers validate models, assess sensor feasibility, and identify key features for machine learning in WDS leak detection.

REFERENCES

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