

Poster Presentation

📅 Sat. Oct 26, 2024 1:00 PM - 1:50 PM JST | Sat. Oct 26, 2024 4:00 AM - 4:50 AM UTC 🏠 Venue(Hybrid Space)

[P1] ポスター発表 #1**[P1-23] Heterogeneous Datasets-based Federated Learning for Global Road Damage Detection**

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Keywords : Global Road Damage Detection、Federated Learning (FL)、Road Safety、Intelligent Transport、Deep Learning、Big Data、Automation、Smart City Applications

There is a critical need for advanced technologies to detect road damage efficiently and cost-effectively. Traditional centralized deep learning models require extensive data transfer and pose challenges when data sharing is restricted among different parties due to privacy concerns. Federated Learning (FL) mitigates such issues by exchanging model parameters and enhancing collaboration among parties without sharing raw data. While previous studies focused on datasets from various countries which were largely similar in terms of image capturing method, resolution, road view etc., this research showcases FL's efficacy with diverse datasets from Japan, China, and Norway. Utilizing YOLOv8l and Flower framework with FedAvg strategy, the FL model achieved a mean average precision (mAP50) of 0.467 on a multi-country test dataset, surpassing Japan's centralized model by 3.5% and Norway's & China's centralized models by more than 20%. This underscores FL's capacity to effectively learn from diverse datasets and enhance road damage detection accuracy across different varying regions, proving to be more robust and more generalized than traditional models.