

Water Trash Detection System: An Innovative Approach to Monitoring Aquatic Pollution

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Abstract: Water pollution caused by non- biodegradable materials, especially plastics, poses a significant threat to aquatic ecosystems. This study introduces a novel approach to identifying and categorizing waste in water environments through advanced machine learning methods. The proposed Water Trash Detection System (WTDS) integrates You Only Look Once (YOLO) for rapid object detection and Convolutional Neural Networks (CNNs) for categorization of waste types. Capable of analyzing both static imagery and live video feeds, the system can accurately detect items such as plastic bottles, bags, and fishing-related debris. WTDS also provides comprehensive reports on detected waste, supporting environmental agencies and researchers with crucial data for tracking and mitigating water pollution. By combining real- time detection with high classification precision, the system offers a practical solution for sustainable environmental monitoring and management.

Keywords: Water contamination, aquatic debris detection, YOLO, convolutional neural networks, machine learning, real-time monitoring, waste classification, environmental protection, computer vision, image analysis, sustainability

