ABSTRAK

Pendataan dan pemeliharaan jalan berlubang secara konvensional membutuhkan waktu dan biaya yang besar. Penelitian ini bertujuan menerapkan algoritma You Only Look Once versi 8 (YOLOv8) untuk mendeteksi jalan berlubang secara otomatis menggunakan citra digital. Dataset terdiri dari 892 gambar yang dikumpulkan dari sumber publik dan pengambilan langsung di lapangan, kemudian dianotasi menggunakan platform Roboflow. Data diproses melalui tahapan preprocessing, pelatihan model dengan 100 epoch, batch size 8, dan ukuran gambar 640×640 piksel, serta pengujian menggunakan metrik mean Average Precision (mAP), Precision, Recall, dan F1-score. Hasil pelatihan menunjukkan performa model baik dengan nilai precision 0,89, recall 0,853, mAP50 0,901, dan F1-score 0,865. Implementasi pada citra baru di luar dataset menghasilkan confidence score 0,88, menunjukkan deteksi yang akurat dan stabil. Penelitian ini membuktikan bahwa YOLOv8 efektif untuk deteksi jalan berlubang secara otomatis, memberikan solusi cepat dan efisien bagi pemeliharaan infrastruktur jalan. Hasil ini dapat menjadi referensi untuk pengembangan sistem pemantauan kondisi jalan secara real-time berbasis visi komputer.

Kata Kunci: computer vision, deep learning, deteksi jalan berlubang, object detection, yolov8

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ABSTRACT

Conventional inspection and maintenance of potholes require significant time and cost. This study aims to implement the You Only Look Once version 8 (YOLOv8) algorithm for automatic pothole detection using digital images. A dataset of 892 images was collected from public sources and direct field captures, annotated using the Roboflow platform. Data underwent preprocessing, followed by model training with 100 epochs, a batch size of 8, and image resolution of 640×640 pixels. The model was evaluated using mean Average Precision (mAP), Precision, Recall, and F1-score metrics. Training results demonstrated strong performance with a precision of 0.89, recall of 0.853, mAP50 of 0.901, and F1-score of 0.865. Testing on new, unseen images produced a confidence score of 0.88, indicating accurate and reliable detection. The findings confirm that YOLOv8 is effective for automated pothole detection, offering a fast and efficient solution to support road infrastructure maintenance and reduce traffic risks. This approach contributes to computer vision applications in transportation and provides a reference for future research in real-time road condition monitoring.

***Keyword**: computer vision, deep learning, YOLOv8, pothole detection, object detection*

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