

## Documents

Yusof, N.'M.<sup>a</sup>, Sophian, A.<sup>a</sup>, Zaki, H.F.M.<sup>a</sup>, Bawono, A.A.<sup>b</sup>, Embong, A.H.<sup>a</sup>, Ashraf, A.<sup>c</sup>

**Assessing the performance of YOLOv5, YOLOv6, and YOLOv7 in road defect detection and classification: a comparative study**

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<sup>a</sup> Department of Mechatronics Engineering, International Islamic University Malaysia, Malaysia

<sup>b</sup> Faculty of Rail, Transport, and Logistics, Technical University of Munich Asia, Singapore

<sup>c</sup> Department of Electrical and Computer Engineering, International Islamic University Malaysia, Malaysia

**Abstract**

Road defect inspection is a crucial task in maintaining a good transportation infrastructure as road surface distress can impact user's comfortability, reduce the lifetime of vehicles' parts, and cause road casualties. In recent years, machine learning has been adapted widely in various fields, including object detection, thanks to its superior performance and the availability of high computing power which is generally needed for its model training. Many works have reported using machine-learning-based object detection algorithms to detect defects, such as cracks in buildings and roads. In this work, YOLOv5, YOLOv6 and YOLOv7 models have been implemented and trained using a custom dataset of road cracks and potholes and their performances have been evaluated and compared. Experiments on the dataset show that YOLOv7 has the highest performance with mAP@0.5 score of 79.0% and an inference speed of 0.47 m for 255 test images. © 2024, Institute of Advanced Engineering and Science. All rights reserved.

**Author Keywords**

Machine learning; Object detection; Pavement maintenance; Road crack; Road defect detection; Road inspection; You only look once

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**Correspondence Address**

Sophian A.; Mechatronics Engineering Department, Malaysia; email: ali\_sophian@iium.edu.my

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