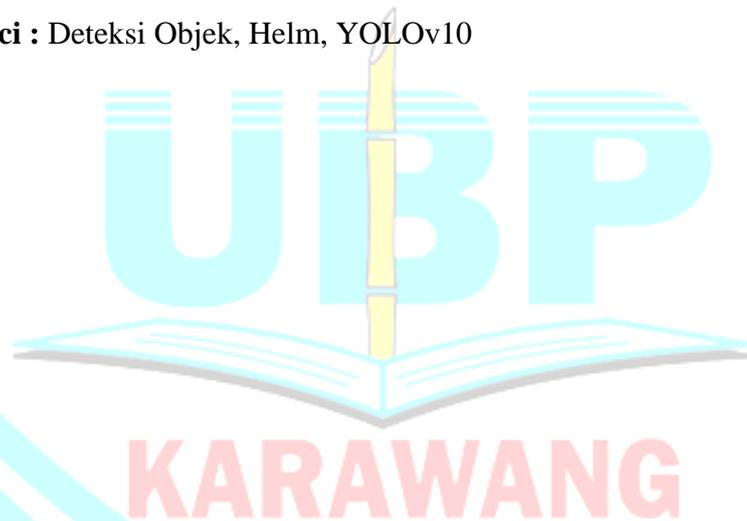# ABSTRAK

Keselamatan berkendara, khususnya bagi pengendara sepeda motor, merupakan isu krusial, dan penggunaan helm secara konsisten terbukti dapat mengurangi risiko cedera kepala. Deteksi otomatis penggunaan helm melalui analisis citra dapat menjadi solusi efektif untuk memantau dan meningkatkan kepatuhan terhadap peraturan keselamatan. Dalam penelitian ini, model YOLOv10, sebuah arsitektur deteksi objek real-time terbaru, dilatih dan diuji menggunakan dataset citra yang relevan. Kinerja model dievaluasi berdasarkan metrik deteksi objek standar seperti precision, recall, F1-score, dan mean Average Precision (mAP). Berdasarkan hasil pelatihan dengan 300 citra dan 60 data validasi, model YOLOv10 berhasil mencapai nilai mAP50 sebesar 99,5%. Sementara itu, hasil pengujian menggunakan 20 citra menghasilkan akurasi sebesar 95%, menunjukkan bahwa sistem mampu mendeteksi penggunaan helm dengan cukup baik.

Kata Kunci : Deteksi Objek, Helm, YOLOv10

ABSTRACT

Motorcycle safety, particularly for riders, is a critical issue, and consistent helmet use has been proven to reduce the risk of head injuries. Automatic helmet detection through image analysis offers an effective solution for monitoring and improving compliance with safety regulations. In this study, the YOLOv10 model, a state-of-the-art real-time object detection architecture, was trained and tested using a relevant image dataset. The model's performance was evaluated using standard object detection metrics such as precision, recall, F1-score, and mean Average Precision (mAP). Based on the training results using 300 images and 60 validation samples, the YOLOv10 model achieved an mAP50 score of 99.5%. Additionally, testing with 20 images yielded an accuracy of 95%, indicating that the system is capable of detecting helmet usage with high effectiveness.

Keywords : Object Detection, Helmet, YOLOv10