

ABSTRAK

Keselamatan pengendara sepeda motor merupakan aspek penting dalam menekan angka kecelakaan lalu lintas, dan salah satu faktor krusial adalah kepatuhan penggunaan helm sebagai pelindung kepala. Pelanggaran berupa tidak digunakannya helm masih sering dijumpai meskipun penggunaannya telah diwajibkan dalam aturan keselamatan berkendara, sehingga deteksi penggunaan helm menjadi sangat penting untuk mendukung keselamatan sekaligus efektivitas pemantauan lalu lintas. Penelitian ini mengembangkan sistem deteksi otomatis penggunaan helm berbasis *computer vision* dengan algoritma YOLOv8 untuk mendeteksi objek helm dan OCR (*Optical Character Recognition*) untuk membaca teks pelat nomor kendaraan. Dataset diperoleh dari rekaman video nyata, kemudian dilakukan anotasi, pra-pemrosesan, dan pelatihan model sehingga sistem mampu mendeteksi pengendara dengan maupun tanpa helm serta mengenali pelat nomor secara akurat. Hasil pengujian menunjukkan akurasi deteksi berada pada rentang 75% hingga 89% dengan nilai *mean Average Precision* (mAP) mencapai 85%, yang menunjukkan bahwa model memiliki performa yang cukup stabil di berbagai kondisi pencahayaan. Sistem dilengkapi dengan mekanisme otomatis untuk menyimpan hasil deteksi berupa citra teranotasi ke dalam google drive, serta mencatat metadata hasil deteksi berupa waktu, lokasi, hasil deteksi, akurasi dan tautan gambar ke dalam google spreadsheet. Integrasi ini menunjukkan bahwa sistem mendukung otomatisasi pengarsipan data dan dokumentasi hasil deteksi secara *realtime*, sehingga mempermudah proses pelacakan dan verifikasi hasil.

Kata Kunci: Pengendara sepeda Motor, Helm, Plat Nomor, YOLOv8 dan OCR



ABSTRACT

Motorcyclist safety is an important aspect in reducing the number of traffic accidents, and one crucial factor is compliance with the use of helmets as head protection. Violations in the form of not wearing helmets are still often found even though their use has been mandated in driving safety regulations, so that helmet use detection is very important to support safety and the effectiveness of traffic monitoring. This study developed an automatic helmet use detection system based on computer vision with the YOLOv8 algorithm to detect helmet objects and OCR (Optical Character Recognition) to read vehicle license plate text. The dataset was obtained from real video recordings, then annotation, pre-processing, and model training were carried out so that the system was able to detect riders with or without helmets and recognize license plates accurately. The test results showed that the detection accuracy was in the range of 75% to 89% with a mean Average Precision (mAP) value reaching 85%, which indicates that the model has a fairly stable performance in various lighting conditions. The system is equipped with an automatic mechanism to save the detection results in the form of annotated images to Google Drive, as well as recording the detection result metadata in the form of time, location, detection results, accuracy and image links to Google spreadsheets. This integration demonstrates that the system supports automation of data archiving and documentation of detection results in real time, thus simplifying the process of tracking and verifying results.

Keywords: Motorcyclists, Helmets, License Plates, YOLOv8, and OCR

