ABSTRAK

Putra, Daniswara Andhika 2026. Implementasi *Yolov8* terhadap kondisi wajah tertutup sebagian (*Occulusion*) untuk deteksi dini K3 di hanggar perakitan PT. Industri Kereta Api. Skripsi. Program Studi Teknik Informatika, FT, Universitas PGRI Madiun. Pembibim (1) Muh.Nur Luthfi Azis, S.Kom., M.Kom (2) Moch Yusuf Asyhari, S.Tr.Kom., M.Kom.

Kawasan hanggar perakitan PT Industri Kereta Api (PT INKA) merupakan area kerja dengan risiko tinggi yang menuntut penerapan protokol Keselamatan dan Kesehatan Kerja (K3) secara ketat, termasuk kewajiban penggunaan Alat Pelindung Diri (APD) seperti helm, masker, dan kacamata pelindung (*safety glasses*). Namun, penggunaan atribut tersebut menciptakan kondisi wajah tertutup sebagian (*occlusion*), yang sering kali menyulitkan pengawasan kepatuhan K3 secara manual akibat keterbatasan personel dan luasnya area hanggar. Penelitian ini bertujuan untuk mengimplementasikan sistem deteksi dini K3 berbasis *computer vision* menggunakan algoritma *Deep Learning* YOLOv8 yang tangguh (*robust*) terhadap kondisi *occlusion* di PT INKA. Sistem ini dikembangkan dalam bentuk aplikasi *dashboard monitoring* berbasis web yang terintegrasi dengan perangkat keras berupa kamera (*webcam*) sebagai penangkap citra digital secara *real-time*. Pengujian model dilakukan menggunakan dataset citra pekerja dengan berbagai variasi oklusi atribut APD wajah. Hasil penelitian menunjukkan bahwa model YOLOv8 mampu mendeteksi dan mengklasifikasikan status kepatuhan penggunaan APD pada kondisi wajah yang tertutup sebagian secara *real-time* dengan tingkat akurasi *mean Average Precision* (mAP). Sistem berbasis website yang dibangun berhasil memvisualisasikan hasil deteksi, mencatat riwayat pelanggaran, serta mengirimkan notifikasi peringatan dini (*early warning alert*) secara otomatis kepada pengawas K3 (*Safety Officer*). Dengan demikian, sistem ini dapat menjadi solusi preventif yang efektif untuk mengoptimalkan pengawasan keselamatan kerja sekaligus mendukung pencapaian target *Zero Accident* di lingkungan industri manufaktur perkeretaapian.

Kata Kunci: *YOLOv8,* Alat Pelindung Diri (APD)*,* Oklusi *(Occlusion),* Deteksi Dini K3, Dashboard Monitoring, PT INKA.

ABSTRAK

Putra, Daniswara Andhika (2026). *Implementation of YOLOv8 for Partially Occluded Faces in Early OHS Detection at the PT. Industri Kereta Api Assembly Hangar. Undergraduate Thesis. Informatics Engineering Study Program, Faculty of Engineering, Universitas PGRI Madiun. Supervisors*: (1) Muh. Nur Luthfi Azis, S.Kom., M.Kom.; (2) Moch Yusuf Asyhari, S.Tr.Kom., M.Kom..

The assembly hangar area of PT Industri Kereta Api (PT INKA) is a high-risk work area that requires strict implementation of Occupational Safety and Health (K3) protocols, including the mandatory use of Personal Protective Equipment (PPE) such as helmets, masks, and safety glasses. However, the use of these attributes creates a condition of partially covered faces (occlusion), which often makes it difficult to monitor K3 compliance manually due to limited personnel and the size of the hangar area. This study aims to implement a computer vision-based K3 early detection system using the robust YOLOv8 Deep Learning algorithm for occlusion conditions at PT INKA. This system is developed in the form of a web-based monitoring dashboard application integrated with hardware in the form of a camera (webcam) as a real-time digital image capture. Model testing was carried out using a dataset of worker images with various variations of facial PPE attribute occlusion. The results show that the YOLOv8 model is able to detect and classify the compliance status of PPE use in partially covered face conditions in real-time with an accuracy level of mean Average Precision (mAP). The developed website-based system successfully visualizes detection results, records violation history, and automatically sends early warning alerts to safety officers. Therefore, this system can be an effective preventative solution to optimize occupational safety oversight while supporting the achievement of the Zero Accident target in the railway manufacturing industry.

Keywords: *YOLOv8, Personal Protective Equipment (PPE), Occlusion, OHS Early Detection, Monitoring Dashboard*, PT INKA