IMPLEMENTASI *YOU ONLY LOOK ONCE* (YOLO) UNTUK DETEKSI KEBOCORAN GAS METANA BERBASIS VIDEO *INFRARED CAMERA*

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ABSTRAK

IMPLEMENTASI *YOU ONLY LOOK ONCE* (YOLO) UNTUK DETEKSI KEBOCORAN GAS METANA BERBASIS VIDEO *INFRARED CAMERA*

Gas metana memberikan dampak besar pada efek rumah kaca. Gas metana menyumbang sekitar setengah dari kenaikan suhu rata-rata bumi. Gas metana meningkat begitu cepat dan berbahaya pada atmosfer bumi. Kabar baiknya umur metana pada atmosfer bumi lebih pendek dibanding polutan lain, sehingga menjadikan hal ini sebagai peluang besar dalam menekan pemanasan global. Pengurangan emisi gas metana dapat menjadi skala prioritas dalam upaya penekanan pemanasan global. Oleh karena itu, diperlukan sistem guna mendeteksi kebocoran gas metana. Penelitian ini bertujuan untuk mendeteksi kebocoran gas metana menggunakan *YOU ONLY LOOK ONCE* (YOLO). Penelitian ini mengimplementasikan YOLOv8 sebagai metode deteksi kebocoran gas metana berdasarkan data video yang diambil menggunakan kamera inframerah. Penelitian ini menggunakan *batch size*, *dropout*, *learning rate*, dan jenis *optimizer* sebagai uji coba. Model optimal terbaik dihasilkan oleh model YOLOv8n dengan *batch size* 128, *dropout* 0, *learning rate* 0.001, dan jenis *optimizer* yang digunakan adalah SGD. Model optimal tersebut mampu mendeteksi kebocoran gas metana dengan baik dengan nilai mAP sebesar 96.7%, *precision* 93.5%, dan *recall* 92.4%.

Kata kunci: Deteksi objek, Metana, YOLO, YOLOv8.

ABSTRACT

IMPLEMENTATION OF *YOU ONLY LOOK ONCE* (YOLO) FOR METHANE GAS LEAKAGE DETECTION BASED ON VIDEO INFRARED CAMERA

Methane gas has a major impact on the greenhouse effect. Methane gas contributes about half of the earth's average temperature increase. Methane gas is increasing fast and is dangerous to the earth's atmosphere. Fortunately, the lifespan of methane in the Earth's atmosphere is shorter than other pollutants, making it a great opportunity to reduce global warming. Reducing methane gas emissions can be a priority in efforts to suppress global warming. Therefore, a system is required to detect methane gas leaks. The purpose of this research is to detect methane gas leakage using You Only Look Once (YOLO). This research implements YOLOv8 as a methane gas leak detection method based on video data collected using an infrared camera. This research used batch size, dropout, learning rate, and optimizer as an experiment. The best optimal model was generated by the YOLOv8n with batch size 128, dropout 0, learning rate 0.001, and type of optimizer used was SGD. The best optimal model is able to detect methane gas leaks properly with mAP values of 96.7%, precision of 93.5%, and recall of 92.4%.

Keywords: Methane, Object Detection, YOLO, YOLOv8.

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DAFTAR TABEL

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