

Deteksi Sambungan Coupler pada Gerbong Kereta Api Menggunakan Metode Convolutional Neural Network

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ABSTRACT

Abstract:

The coupler on a train that connects between train cars plays a crucial role in ensuring that the train cars can operate together and coordinate well, thus ensuring the safety and smoothness of train travel. So far, coupler inspections have been carried out visually and manually by personnel at the beginning of train journeys, when the train stops at stations or other locations, and even while it's in motion. Such coupler inspections pose risks to personnel, as they might lead to accidents. Additionally, limited inspection time and the restricted visibility for personnel due to weather conditions, as well as couplers hidden between cars or tucked under platforms, result in inspections being unable to be comprehensive, thereby retaining the risks of errors and coupler connection failures.

To address these issues, a more advanced inspection technology approach is employed, utilizing Artificial Intelligence technology. In this research, in collaboration with PT. Rekindo Global Jasa, which focuses on the development of products in the train control system category, an apparatus is designed and built to automatically detect coupler connections between train cars using Artificial Intelligence. The specific objective of this research is to detect coupler connections on train cars using the Convolutional Neural Network (CNN) method. The CNN method is used in this study because CNN is an effective type of artificial neural network for image classification, leveraging the spatial structure of images. One advantage of using CNN is its applicability in transfer learning, which involves taking a model already trained on a large dataset and adapting it to a smaller dataset.

This research employs a research and development approach to obtain a CNN model that can be used to detect coupler connections on train cars based on images captured using a camera. The general stages of this research encompass four main phases as follows: (1) Literature review and needs analysis, (2) Data preprocessing, (3) Training, and (4) Prediction: CNN model implementation and testing.

The outcome of this research is a CNN model that can be utilized to detect coupler connections on train cars.

Keywords: Coupler, AI, ANN, CNN, train

Kata Kunci: *Coupler, AI, ANN, CNN, train*