

Object Detection System On Smart Stick Based On Convolution Neural Network Integrated with Voice Note

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ABSTRACT

According to WHO, global visual impairment reaches 2.2 billion people, with 1 billion of them preventable or untreated. Indonesia has the highest blindness rate in Southeast Asia, with a blindness prevalence of 3% based on the RAAB survey by PERDAMI and Balitbangkes in 15 provinces. This study develops a Convolutional Neural Network-based Object Detection System integrated with the Voice Note feature to improve the accuracy and efficiency of object detection around the user. This system provides real-time audio feedback so that blind people can recognize the environment more easily. The research stages include data preprocessing by resizing the image to 200x200 pixels and dataset normalization. The Convolutional Neural Network model consists of several convolution and pooling layers to extract features, as well as flatten and fully connected layers with a sigmoid activation function for prediction. The model is compiled using binary_crossentropy and RMSprop optimizer with a learning rate of 0.01, and trained for 150 epochs. Evaluation using precision, recall, F1-Score, and Mean Square Error (MSE) showed good results in object detection. It is hoped that this innovation can help blind people to do activities more safely and independently.

Keywords: Convolutional Neural Network, Object Detection, Voice Note, Blind, Smart Cane