

ABSTRACT

DEEP LEARNING-BASED FABRIC DEFECT DETECTION USING YOLOV5

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Automation technologies such as machine learning play an important role in everyday life. The importance of computer vision automation is crucial in detecting fabric defects, because of the high labor costs of manual defect inspection and also the lack of inspection. Manual defect inspection is limited by human capabilities due to the large number of fabrics and varieties of defects. However, there are several challenges in developing fabric defect detection, such as maximizing recall and precision with a limited number of data sets.

This research proposes a modified network YOLOv5 model to determine the best model for jeans fabric defect detection. To develop a model that can perform the defect detection task well, it is necessary to find an accurate, precise defect position. The implementation of the program is using 367 fabric defect images with a total of 2 classes of jeans fabric defect and image augmentation to create more datasets.

The results of the system evaluation show the best model is Improved YOLOv5x with perfect accuracy and F1-Score. Improved YOLOv5x successfully identifies and classifies all fabric defect objects in the test dataset. Moreover, the Improved YOLOv5x model successfully fulfills real-time computing speed with a computational speed of 31.15 FPS.

keywords: computer vision, deep learning, fabric defect, object detection, yolo