

ABSTRACT

Over time, the need for data storage space continues to increase. Therefore, data compression, such as Discrete Cosine Transform (DCT) compression, is necessary to save space. At the same time, artificial intelligence (AI) is rapidly developing, including in the field of computer vision. YOLO (You Only Look Once) has become a popular algorithm in object detection systems due to its speed and efficiency in detecting objects.

However, object detection performance is highly dependent on the quality of the input image. Therefore, research is needed to determine the performance of YOLOv5 when images are compressed, including those with extreme compression.

This research was conducted by compressing images in the COCO dataset using the DCT method with high-frequency DCT coefficients ranging from 1.00, 0.95, 0.90, to 0.05. The compressed images are then detected in the YOLOv5 system, producing images with bounding boxes and labels. After detection, the average confidence score, Intersection over Union (IoU), and mean Average Precision (mAP) for each DCT high-frequency coefficient factor are calculated, using the 100% DCT high-frequency coefficient as the ground truth.

This study aimed to determine the performance of YOLOv5 object detection on images compressed with the DCT method by using the average confidence score, mean Average Precision (mAP), and IoU. It was found that at DCT high-frequency coefficients of 30% and below, there was a significant decrease.

Keyword: Object Detection, Data Compression, DCT, YOLOv5, COCO