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# ICDEC 2024 Challenge: Vehicle Detection in Various Weather Conditions(VDVWC)

## Overview

This challenge aims to develop a robust vehicle detection system capable of accurately identifying various types of vehicles under different weather and lighting conditions, including rainy, sunny, day, and night scenarios.

## Model and Method

The RT-DETR (Real-Time Detection Transformer) model was employed for this challenge. RT-DETR is a Transformer-based object detection model pre-trained on the COCO dataset, which ensures high accuracy and real-time performance. The large version of the model (RT-DETR-L) was fine-tuned on the custom vehicle detection dataset.

## Dataset Description

- Training Set: 2600 images and their corresponding labels.
- Validation Set: 200 images and their corresponding labels.
- Label Format: YOLO format, which includes the class ID and bounding box coordinates normalized to the image dimensions.
- Classes: ["car", "bike", "auto", "rickshaw", "cycle", "bus", "minitruck", "truck", "van", "taxi", "motorvan", "toto", "train", "boat", "cycle van"]

The dataset comprises vehicle images captured under various scenarios, including:

- Rainy conditions
- Sunny conditions
- Daytime
- Nighttime

## Training Configuration

The training process involved the following configuration:

- Epochs: 53
- Image Size: 640 pixels

## Conclusion

The model successfully demonstrated the effectiveness of the RT-DETR model in vehicle detection across varying weather and lighting scenarios. The use of Transformer-based architecture contributed to the model's robustness and real-time performance, making it suitable for real-world applications in dynamic environments.

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