Using Roboflow to Improve Training of detection of Vector Robot from images captured from another Vector Robot

by Amitabha Banerjee (@hiamitabha)

Dataset:
- Original Dataset: Created a dataset of 303 labelled images captured from Vector's camera. LabelImg was used to label. Images were captured under different light conditions, different starting postures of the Vector robot (Images were captured while the robot was freely moving), different backgrounds.

- Roboflow Enhanced: Roboflow use to preprocess (auto-orient, resize, auto adjust contrast, grayscale) and augment (rotate +/- 5 degrees), blur (0.5), noise (5%), bounding box brightness (+/- 25%)

- Split of 70%/20%/10% train/validation/test.

Training:
- Done with Yolov5 Medium model. On Google Colab with T4 GPU.
- 50 epochs.
- Refer to https://github.com/hiamitabha/course/blob/master/TrainVectorWithYOLOv5.ipynb

Inference:
- Model applied on 2 30 second video clips (900 frames) taken from Vector's camera. One had same background as used in original dataset (Video1), other had a very different background (Video 2).

Results

	Number of Images in Dataset	Precision arrived during Training	Recall arrived in Training	Precision arrived in Inference (Video1)	Recall arrived in Inference (Video1)	Precision arrived in Inference (Video 2)	Recall arrived in Inference (Video 2)
Original Dataset	303	0.196	0.982	0.21	0.21	0.98	0.35
Roboflow enhanced	727	0.96	0.99	1	0.47	0.77	0.76

- Notes
- Roboflow steps improve almost all scores
- High precision with original dataset on video2 was because few objects were detected, but very few mistakes were made.