TrashCan Dataset

Dataset :

Link : https://public.roboflow.com/object-detection/hard-hat-workers

Data Distribution :

Train dataset : 100 Images
Validation dataset : 500 Images

Classes :

animal_crab	animal_eel	animal_etc	animal_fish	animal_shells	animal_starfish
plant	rov	trash_bag	trash_bottle	trash_branch	trash_can
trash_clothing	trash_container	trash_cup	trash_net	trash_pipe	trash_rope
trash_snack_wrapper	trash_tarp	trash_unknown_instance	trash_wreckage		

Annotation Format : MS-COCO

Model :

Name Mask RCNN with a backbone of ResNet50 with a single GPU support.

Model Training :

The repository [mm-openlab/mm detection](#) has been used to train the dataset.

Model environment :

Google Colab notebook with 1x GPU support.
Method: In this experiment, the few-shot learning is adopted. So, the training set has opted as the validation /test and vice versa.

Colab Link:
https://colab.research.google.com/drive/1ct5P62ocoeRocN8usNLbdJ7qrw1dgWgB?usp=sharing

Scheduler in the like: in the x1 (12 epochs)

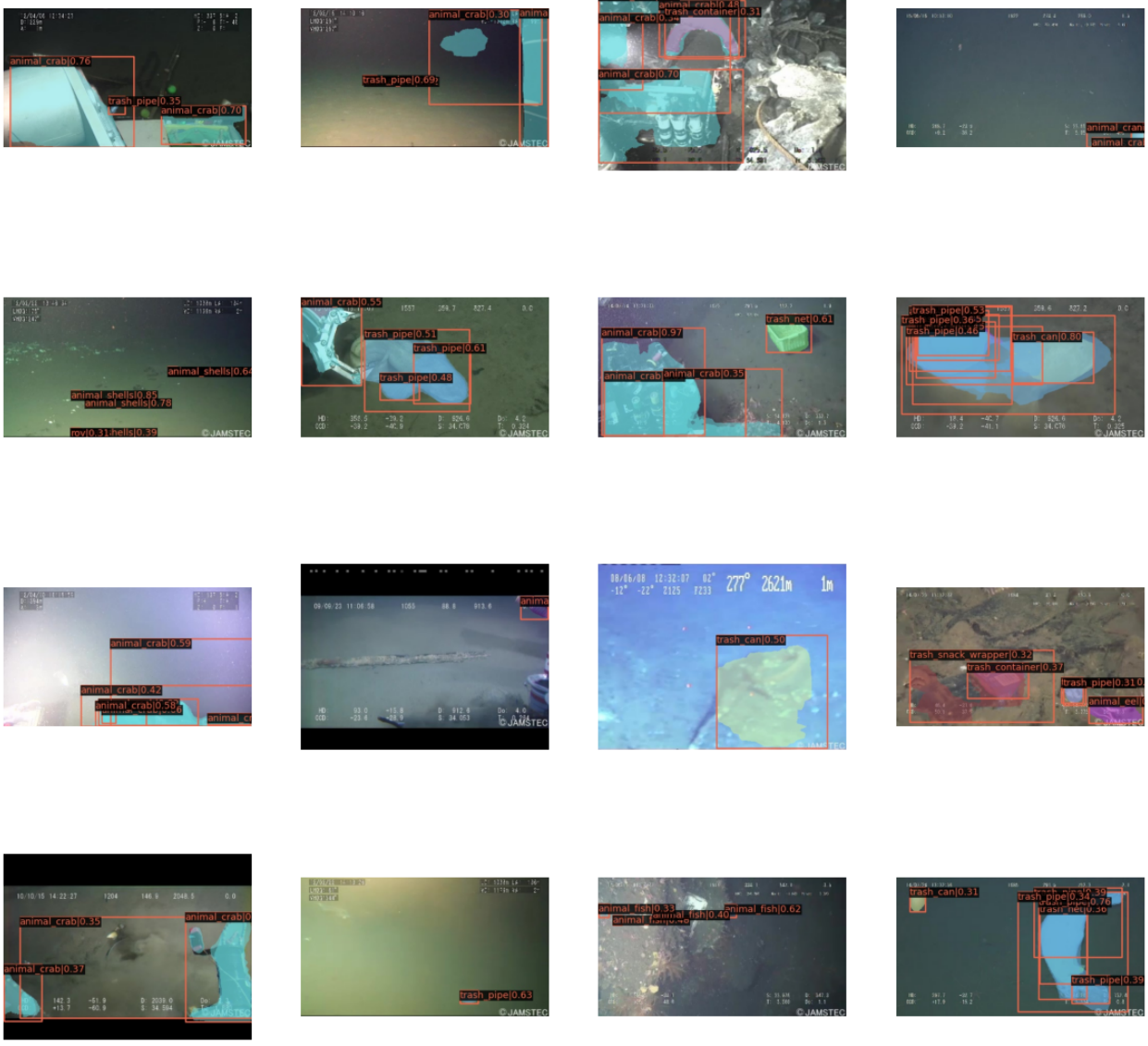
Results :

```
Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.130
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=1000 ] = 0.241
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=1000 ] = 0.120
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=1000 ] = 0.131
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=1000 ] = 0.122
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=1000 ] = 0.093
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.265
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=300 ] = 0.265
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=1000 ] = 0.265
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=1000 ] = 0.236
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=1000 ] = 0.228
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=1000 ] = 0.212

 Average Precision  (AP) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.110
 Average Precision  (AP) @[ IoU=0.50      | area=   all | maxDets=1000 ] = 0.219
 Average Precision  (AP) @[ IoU=0.75      | area=   all | maxDets=1000 ] = 0.093
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= small | maxDets=1000 ] = 0.098
 Average Precision  (AP) @[ IoU=0.50:0.95 | area=medium | maxDets=1000 ] = 0.099
 Average Precision  (AP) @[ IoU=0.50:0.95 | area= large | maxDets=1000 ] = 0.107
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=100 ] = 0.240
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=300 ] = 0.240
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=   all | maxDets=1000 ] = 0.240
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= small | maxDets=1000 ] = 0.219
 Average Recall     (AR) @[ IoU=0.50:0.95 | area=medium | maxDets=1000 ] = 0.211
 Average Recall     (AR) @[ IoU=0.50:0.95 | area= large | maxDets=1000 ] = 0.202
```

Test Results and explanation :

Tested Images



As we can see that inthe images of the prediction, some of the objects are predicted quite nicely and some are not.
We can write the points like,this phenomenonthis -

1. Objects are classified quite nicely.
2. But the bounding boxes are overlapping, thus the bbox predictions are less accurate.
3. Some of the objects are left untouched.
4. Similar objects are classified as a partial (one classified, one left)

Conclusion :

The massiveness of the dataset certainly devastated the prediction accuracy. Also, some extra objects similar to the trashes are identified and decrease the accuracy, rather than that, the model is quite expressive towards the segmentation part, but the object detection.

THE END