

Object detection using mask rcnn

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Abstract

Mask R-CNN is a deep learning architecture used for instance segmentation. It is an augmentation of the well known Faster R-CNN object detection architecture. Mask R-CNN adds an additional mask branch to the existing Faster R-CNN model. The Faster R-CNN produces two things for each object in the picture. Its class label and the bounding box co-ordinates. Mask R-CNN adds an extra branch to this which yields the object mask too.

Introduction

We will see how its possible to train the mask R-CNN detector to detect in our case a pan and draw a perfect polygon of the object. it can be useful to use it to identify and mesure precisely object distance

Definition of mask R-CNN

Mask R-CNN is an extension of faster R-CNN in which the later is used to detect and classify various objects in an images. Class labels and bounding box co-ordinates are assigned to various objects in an image during object detection. Besides these , Mask R-CNN provides object mask for each object through semantic segmentation. Since there are two phases ,the model has two parts. An architecture similar to faster R-CNN is used for object, while a fully convolutional network (FCN) is used to carry out semantic segmentation . [1]

Methodology

Collecting data : the data was collected from google images total of 61 images of pan in different position with different lighting and with different background the more images you can recover and the more different they will be, the more effective your model will be.

Annotations : we manually define the position of the object and assign a label for that we used this open source project <https://www.makesense.ai>. After that we put these annotations in json format and our data set in zip file

Train : wfor that we use transfer learning with pretrained model of (mask_rcnn_coco.h5) we devied data into 90% of train and 10% of test then we choosed initial hyperparameters with learning rate of 0.001 with 5 epochs and each epochs has step of 500 for optimizer we used keras.optimizer.SGD

Results : we can test the resulting model of the training Mask R-CNN



We can notice that our pan is clearly segmented with the mask which means that the model has shown his efficiency and robustness

Conclusion

The result above show the degree to which Mask R-CNN has improved and generalised solutions. Also, the simplicity of its architecture and ability to get tuned using a small number of hyperparameters is what makes it an absolute favourite

Reference

[1] Sreya Ramesh ,Vinod kumar ,” a review on instance segmentation using mask rcnn” in international conference on systems energy and environment., jan .2021