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Task : Optimizing Yolo v4 Repository

Today I have studied detect.py python file , it's fully about how saved model is loaded and used for detection.

Working of detection file : (Step by step)

1. Initially TensorFlow session is created for compute and perform operation in GPU or CPU.

2. Absl python module is used for get command line arguments from user like model , IOU threshold ,size etc.. .

3. Input image is loaded with opencv and converted to RGB(Red, Green ,Blue) format. Because opencv reads only in BGR format.

4. Loaded image is resized to input size(416) and scaled with 255, to reduce numerical computations and stability .

5. If multiple image is used for detection , all loaded image is appended in one list.Next that list is converted to TensorFlow constant.

6. Saved model is loaded with TensorFlow method called tf.saved_model.load() .

7. Input image passed to loaded model . It will forward propagate that image and returns the final feature map of output.

8. This output shape of model is (batch_size , no.of bbox , bbox coordinate + probability of classes).
For example :
(1,11,10)
1 → is batch size
11 → number of bbox
10 → (4 coordinates + 6 classes)

9. This output is given to Non – max suppression algorithm to remove unwanted bbox . For that tensorFlow's

tf.image.combined_non_max_suppression method used. It returns the bbox , scores , class probability , valid detections. Valid detection has number of bbox is greater than give iou and threshold confidence score.

For example :
boxes = (1,50 , 4) → (batch_size , No.of. bbox , bbox coordinates)
scores = (1, 50) → (batch size , scores for bbox)
classes = (batch size , classes of bbox)
valid detection = 1 → (Number valid detection in input images)

10. Next, Class names are loaded in one variable to show the name in image. Above non_max_supreesion output and this class names are given to draw_bbox function to create bbox in given input image.

Steps in creation of Bounding Box :

11. Loop is created to take number of bounding box with the help of valid detection variable.

12. Bounding box is valid , that coordinates are taken and multiply with original image size to change coordinate size to original image.

13. This coordinates is taken and rectangle bounding box is created for that coordinate with the help of cv2.rectangle() function in opencv.

Link :
https://github.com/theAIGuysCode/tensorflow-yolov4-tflite/blob/master/detect.py