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Object Detection For Self-Driving Cars

Calificación de la entrega más reciente: 100 %

1. The object detection problem is defined as the locating objects in the scene, as well as classifying the objects' category. 1 / 1 punto

- (•) True
- ( ) False

Correcto
Correct!

2. The problem of object detection is non-trivial. Which of the following statements describe reasons for the difficulty in performing object detection? (Check all that apply.) 1 / 1 punto

- [ ] Cameras are not reliable to perform detection in outdoor environments.
- [x] Object size gets smaller as objects move farther away in a road scene.

Correcto
Correct!

- [x] Extent of objects is not fully observed.

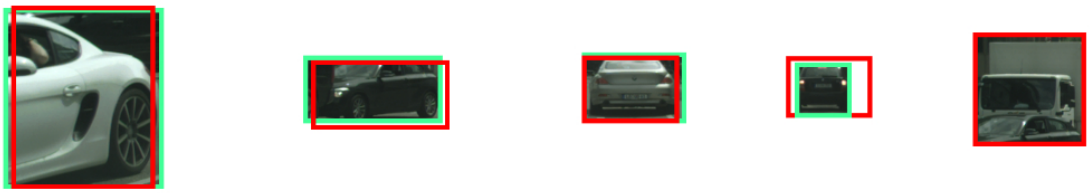
Correcto
Correct!

- [ ] The objects that are usually of interest to detect are highly variable in shape and color.
- [x] Scene illumination is highly variable on road scenes.

Correcto
Correct!

3. You are a self-driving car perception engineer developing an object detector for your self-driving car. You know that for your object detector to be reliable enough to deploy on a self-driving car, it should have a **minimum precision of** 0.99 and a **minimum recall of** 0.9. The precision and recall are to be computed at a **score threshold** of 0.9 and at an **IOU threshold** of 0.7. 2 / 2 puntos

You compute the IOU of your detector on a frame with ground truth to find out the following:



S_{car}	0.99	0.95	0.90	0.78	0.74
IOU	0.95	0.69	0.75	0.45	0

Assuming that the single frame shown above is sufficient to characterize the performance of the object detector, is your system reliable to be used on a self-driving car?

- ( ) Yes
- (•) No

Correcto
Correct!

4. The **width and height** of the output of a convolutional feature extractor are usually an order of magnitude higher than those of its input. 1 / 1 punto

- ○ True
- ◉ False

Correcto
Correct!

5. The input to a convolutional layer has a **width, height and depth** of 224x224x3 respectively. The convolutional layer has the following properties: 1 / 1 punto

- **Kernel shape:** 3x3x256
- **Stride**: 2
- **Padding**: 3

What is the depth of the output of this convolutional layer?

256

Correcto
Correct!

6. When designing convolutional architectures for object detection, max pooling layers are usually placed in which of the following building blocks: 1 / 1 punto

- ○ Prior anchor boxes
- ◉ Convolutional feature extractor
- ○ Loss function
- ○ Output fully connected layers

Correcto
Correct!

7. 1. What type of output layer is most commonly used in the regression head of a convolutional object detector? 1 / 1 punto

- ○ Softmax Layer
- ◉ Linear Layer
- ○ Sigmoidal Layer
- ○ Absolute Value Layer

Correcto
Correct!

8. Prior anchor boxes are usually sampled at random in image space before being used in the output layers of an object detector. 1 / 1 punto

- ○ True
- ◉ False

Correcto
Correct!

9. While training an object detector, the cross entropy is calculated for the negative anchors **only.** 1 / 1 punto

- ◉ True
- ○ False

Correcto
Correct!

10. When training an object detection model, the regression loss has the form: 1 / 1 punto

$$L_{reg} = \frac{1}{N_p} \sum_i p_i L_2(b_i, b_i^*)$$

where the L2 norm is computed for every member in the minibatch. For a **positive** minibatch members, the value of P_i is:

1

Correcto
Correct!

11. During non-maximum suppression, the output bounding box list is sorted based on the value of every member's: 1 / 1 punto

- ○ Regression loss
- ○ IOU with ground truth
- ◉ Softmax output score
- ○ Position in image space

Correcto
Correct!

12. In context of self-driving cars, the output of object detectors can be used as a prior to perform which of the following tasks? (Check all that apply.) 1 / 1 punto

- ☑ Object tracking

Correcto
Correct!

- ☑ 3D object detection

Correcto
Correct!

- ☑ Traffic light state estimation

Correcto
Correct!

- ☐ Drivable space estimation

13. One of the main advantages of using the output of 2D object detectors as a prior to 3D object detection is their ability to easily handle occlusion and truncation. 1 / 1 punto

- ○ True
- ◉ False

Correcto
Correct!

14. Sudden camera motion is detrimental to the performance of object trackers. This is because tracking usually assumes gradual change in the camera's pose relative to the scene. 1 / 1 punto

- ◉ True
- ○ False

Correcto
Correct!