✓ **¡Felicitaciones! ¡Aprobaste!**

Calificación recibida 100 %   Para Aprobar 80 % o más

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Semantic Segmentation For Self-Driving Cars

Calificación de la entrega más reciente: 100 %

1. Achieving smooth category boundaries is a major difficulty to take into account while designing semantic segmentation models. Which of the following statements describe the origins of this problem? (Check all that apply.)

   1 / 1 punto

   ☐ Objects within the same category having variable appearances. An example being multiple color and models for cars on the road.

   ☑ The similarity in appearance between some categories such as road, curb, and sidewalk.

   ✓ **Correcto**
   Correct!

   ☑ Thin objects such as poles, tree trunks, and lane separators.

   ✓ **Correcto**
   Correct!

2. When comparing the results of a semantic segmentation model to the ground truth, you found out that for the car category, its **class IOU** is **0.75**. Knowing that the number of false positives **(FP)** is **17**, and the number of false negatives **(FN)** is **3**, what is the number of true positives achieved by this model?

   2 / 2 puntos

   > 60

   ✓ **Correcto**
   Correct!

3. To measure the performance of a semantic segmentation model over all classes, a good idea would be to average the class IOU.

   1 / 1 punto

   ○ True

   ◉ False

   ✓ **Correcto**
   Correct!

4. Which of the following do you typically see in a Semantic Segmentation Model? (Check all that apply.)

   1 / 1 punto

   ☑ Up-sampling layers in the decoder stage of the architecture.

   ✓ **Correcto**
   Correct!

   ☑ Multiple Convolutional layers followed by a Pool layer.

   ✓ **Correcto**
   Correct!

   ☐ Up-sampling layers in the encoder stage of the architecture.

   ☑ Multiple Convolutional layers followed by an up-sampling layer.

   ✓ **Correcto**
   Correct!

5. Anchor boxes are an essential component of any semantic segmentation neural network architecture.

   1 / 1 punto

   ○ True

○ False

6. In your semantic segmentation model an input feature map is passed through a nearest neighbor up-sampling layer. The output feature map's depth is equal to that of the input feature map.

1 / 1 punto

⦿ True

○ False

7. A standard semantic segmentation architecture that uses a softmax output layer is allowed to associate multiple categories to a single pixel in the input image.

1 / 1 punto

○ True

⦿ False

8. Which of the bellow loss functions is usually used to train semantic segmentation models?

1 / 1 punto

○ Mean Square Error (L2-Loss)
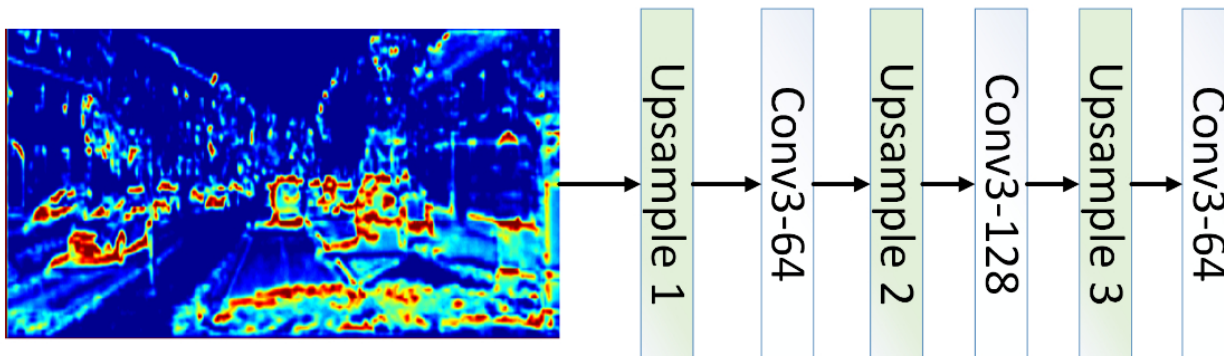
⦿ Cross-Entropy Loss

○ 0-1 Loss

○ Mean Absolute Error (L1-Loss)

9. A semantic segmentation model uses the following decoder architecture. The convolutions are all 3x3, have a padding size of 1, and have a number of filters shown in the figure. The up-sampling multiplier S is 2 for all upsampling layers.

2 / 2 puntos

If you pass an input of dimensions MxNxD through this decoder, what are the expected output dimensions?

Note: M is the width, N is the height, and D is the depth of the input.

⦿ 8*M, 8*N, 64*D

○ 8*M, 8*N, 128*D

○ 6*M, 6*N, 64*D

○ M/8, N/8, 64*D

10. In context of self-driving cars, semantic segmentation can be used to perform: (Check all that apply.)

1 / 1 punto

☑ Constrain the image space used to perform 2D object detection.

✓ **Correcto**
Correct!

☐ Localization in a predefined 3D map.

☐ Velocity estimation of dynamic obstacles in the scene.

☑ Lane boundary estimation.

✓ **Correcto**
Correct!

☑ Drivable space estimation.

✓ **Correcto**
Correct!

11. Which of the following categories in a semantic segmentation output map would be useful to determine lane boundaries?

1 / 1 punto

☐ Road

☑ Lane Separator

✓ **Correcto**
Correct!

☐ Pedestrian

☑ Curb

✓ **Correcto**
Correct!

☑ Sidewalk

✓ **Correcto**
Correct!

12. To estimate a plane model, an algorithm would require a minimum of:

1 / 1 punto

○ Five points, chosen at random.

◉ Three points, chosen to be non-collinear.

○ Three points, chosen to be collinear.

○ Five points, chosen to be non-collinear.

✓ **Correcto**

13. To estimate lines that could belong to lanes in a post-processed output image from semantic segmentation, containing only relevant categories, one would:

1 / 1 punto

○ First apply Canny edge detection followed by a Kalman Filter to estimate lines.

○ Use RANSAC to estimate the road plane, then fit lines to its boundary.

○ First apply Hough transform line estimation followed by Canny edge detection.

◉ First apply Canny edge detection followed by Hough transform line estimation.

✓ **Correcto**
Correct!