Congratulations! You passed!

Grade received 100% **Latest Submission Grade** 100% **To pass** 80% or higher

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1. You are building a 3-class object classification and localization algorithm. The classes are: pedestrian (c=1), car (c=2), motorcycle (c=3). What should y be for the image below? Remember that "?" means "don't care", which means that the neural network loss function won't care what the neural network gives for that component of the output. Recall $y = [p_c, b_x, b_y, b_h, b_w, c_1, c_2, c_3]$.

1 / 1 point

https://www.pexels.com/es-es/foto/mujer-vestida-con-falda-azul-y-blanca-caminando-cerca-de-la-hierba-verde-durante-el-dia-144474/

- $y = [1, 0.66, 0.5, 0.16, 0.75, 1, 0, 0]$
- $y = [1, ?, ?, ?, ?, 1, ?, ?]$
- $y = [1, 0.66, 0.5, 0.75, 0.16, 0, 0, 0]$
- $y = [1, 0.66, 0.5, 0.75, 0.16, 1, 0, 0]$ (selected)

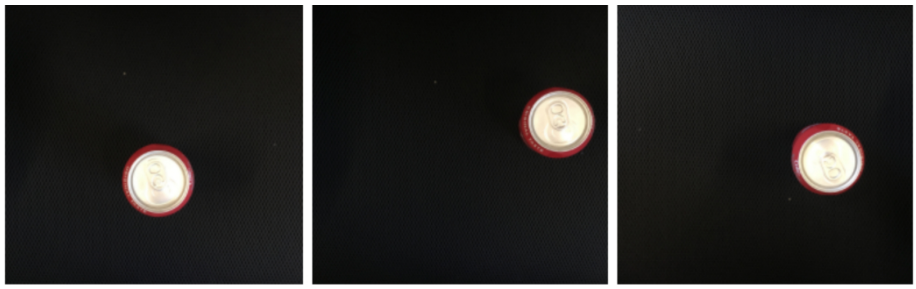
Expand

Correct

Correct. $p_c = 1$ since there is a pedestrian in the picture. We can see that b_x, b_y as percentages of the image are approximately correct as well b_h, b_w, and the value of $c_1 = 1$ for a pedestrian.

2. You are working on a factory automation task. Your system will see a can of soft-drink coming down a conveyor belt, and you want it to take a picture and decide whether (i) there is a soft-drink can in the image, and if so (ii) its bounding box. Since the soft-drink can is round, the bounding box is always square, and the soft-drink can always appear the same size in the image. There is at most one soft-drink can in each image. Here are some typical images in your training set:

1 / 1 point



The most adequate output for a network to do the required task is $y = [p_c, b_x, b_y, b_h, b_w, c_1]$. (Which of the following do you agree with the most?)

- True, since this is a localization problem.
- False, since we only need two values c_1 for no soft-drink can and c_2 for soft-drink can.
- False, we don't need b_h, b_w since the cans are all the same size.
- True, p_c indicates the presence of an object of interest, b_x, b_y, b_h, b_w indicate the position of the object and its bounding box, and c_1 indicates the probability of there being a can of soft-drink.

Expand

Correct
Correct. With the position b_x, b_y we can completely characterize the position of the object if it is present. We should use only one additional logistic unit to indicate if the object is present or not.

3. When building a neural network that inputs a picture of a person's face and outputs N landmarks on the face (assume that the input image contains exactly one face), we need two coordinates for each landmark, thus we need 2N output units. True/False? **1 / 1 point**

- True
- False

Expand

Correct
Correct. Recall that each landmark is a specific position in the face's image, thus we need to specify two coordinates for each landmark.

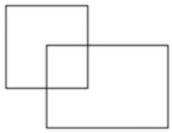
4. When training one of the object detection systems described in the lectures, you need a training set that contains many pictures of the object(s) you wish to detect. However, bounding boxes do not need to be provided in the training set, since the algorithm can learn to detect the objects by itself. **1 / 1 point**

- False
- True

Expand

Correct
Correct, you need bounding boxes in the training set. Your loss function should try to match the predictions for the bounding boxes to the true bounding boxes from the training set.

5. What is the IoU between these two boxes? The upper-left box is 2x2, and the lower-right box is 2x3. The overlapping region is 1x1. **1 / 1 point**



- ◉ $\frac{1}{9}$
- ○ $\frac{1}{6}$
- ○ $\frac{1}{10}$
- ○ None of the above

Expand

Correct
Correct. The left box's area is 4 while the right box 's is 6. Their intersection's area is 1. So their union's area is 4 + 6 - 1 = 9 which leads to an intersection over union of 1/9.

6. Suppose you run non-max suppression on the predicted boxes below. The parameters you use for non-max suppression are that boxes with probability $\leq$ 0.4 are discarded, and the IoU threshold for deciding if two boxes overlap is 0.5. How many boxes will remain after non-max suppression? **1 / 1 point**

- ○ 7
- ○ 4
- ○ 6
- ◉ 5
- ○ 3

Expand

Correct
Correct!

7. If we use anchor boxes in YOLO we no longer need the coordinates of the bounding box b_x, b_y, b_h, b_w since they are given by the cell position of the grid and the anchor box selection. True/False? **1 / 1 point**

- (•) False
- ( ) True

Expand

Correct
Correct. We use the grid and anchor boxes to improve the capabilities of the algorithm to localize and detect objects, for example, two different objects that intersect, but we still use the bounding box coordinates.

8. We are trying to build a system that assigns a value of 1 to each pixel that is part of a tumor from a medical image taken from a patient. **1 / 1 point**

This is a problem of localization? True/False

- (•) False
- ( ) True

Expand

Correct
Correct. This is a problem of semantic segmentation since we need to classify each pixel from the image.

9. Using the concept of Transpose Convolution, fill in the values of **X**, **Y** and **Z** below. **1 / 1 point**

(*padding = 1, stride = 2*)

Input: 2x2

1	2
3	4

Filter: 3x3

1	0	-1
1	0	-1
1	0	-1

Result: 6x6

	0	1	0	-2	
	0	**X**	0	**Y**	

	0	1	0	**Z**	
	0	1	0	-4	

- X = 2, Y = -6, Z = 4
- X = 2, Y = 6, Z = 4
- X = 2, Y = -6, Z = -4
- X = -2, Y = -6, Z = -4

Expand

Correct

10. When using the U-Net architecture with an input $h \times w \times c$, where c denotes the number of channels, the output will always have the shape $h \times w$. True/False? **1 / 1 point**

- False
- True

Expand

Correct

Correct. The output of the U-Net architecture can be $h \times w \times k$ where k is the number of classes.