Back **Special Applications: Face Recognition & Neural Style Transfer**
Graded Quiz • 30 min

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Special Applications: Face Recognition & Neural Style Transfer

Quiz • 30 min

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1. Which of the following do you agree with? **1 / 1 point**

- ○ Face verification requires K comparisons of a person's face.
- ◉ Face recognition requires K comparisons of a person's face.
- ○ Face recognition requires comparing pictures against one person's face.

Correct
Correct, in face recognition we compare the face of one person to K to classify the face as one of those K or not.

2. Why is the face verification problem considered a one-shot learning problem? Choose the best answer. **1 / 1 point**

- ○ Because we have only have to forward pass the image one time through our neural network for verification.
- ○ Because of the sensitive nature of the problem, we won't have a chance to correct it if the network makes a mistake.
- ○ Because we are trying to compare to one specific person only.
- ◉ Because we might have only one example of the person we want to verify.

Correct
Correct. One-shot learning refers to the amount of data we have to solve a task.

3. In order to train the parameters of a face recognition system, it would be reasonable to use a training set comprising 100,000 pictures of 100,000 different persons. **1 / 1 point**

- ◉ False
- ○ True

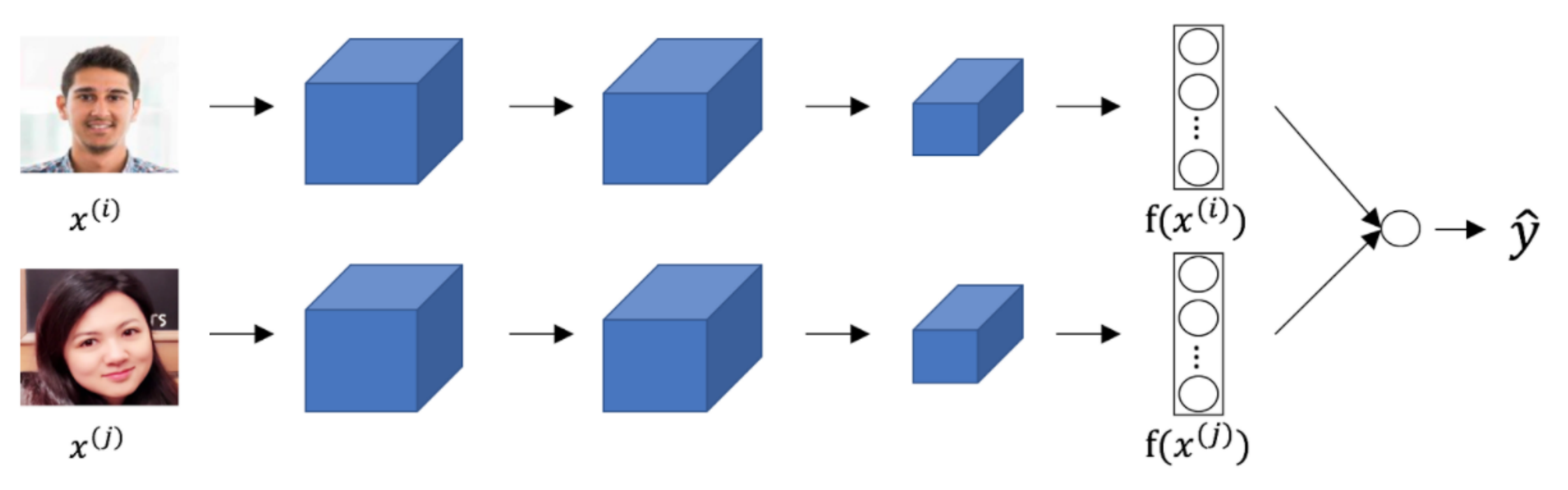
Correct
Correct, to train a network using the triplet loss you need several pictures of the same person.

4. Which of the following is a correct definition of the triplet loss? Consider that $\alpha > 0$. (We encourage you to figure out the answer from first principles, rather than just refer to the lecture.) **1 / 1 point**

- ○ $max(||f(A) - f(N)||^2 - ||f(A) - f(P)||^2 - \alpha, 0)$
- ○ $max(||f(A) - f(P)||^2 - ||f(A) - f(N)||^2 - \alpha, 0)$
- ◉ $max(||f(A) - f(P)||^2 - ||f(A) - f(N)||^2 + \alpha, 0)$
- ○ $max(||f(A) - f(N)||^2 - ||f(A) - f(P)||^2 + \alpha, 0)$

Correct
Correct

5. Consider the following Siamese network architecture: **1 / 1 point**



The upper and lower neural networks have different input images, but have exactly the same parameters.

- ◉ True
- ○ False

Correct
Yes it is true, parameters are shared among these two networks.

6. You train a ConvNet on a dataset with 100 different classes. You wonder if you can find a hidden unit which responds strongly to pictures of cats. (I.e., a neuron so that, of all the input/training images that strongly activate that neuron, the majority are cat pictures.) You are more likely to find this unit in layer 4 of the network than in layer 1. **1 / 1 point**

- ◉ True
- ○ False

Correct
Yes, this neuron understands complex shapes (cat pictures) so it is more likely to be in a deeper layer than in the first layer.

7. In neural style transfer, we train the pixels of an image, and not the parameters of a network. **1 / 1 point**

- ○ False
- ◉ True

Correct
Correct. Neural style transfer compares the high-level features of two images and modifies the pixels of one of them in order to look artistic.

8. In the deeper layers of a ConvNet, each channel corresponds to a different feature detector. The style matrix $G^{[l]}$ measures the degree to which the activations of different feature detectors in layer l vary (or correlate) together with each other. **1 / 1 point**

- ○ False
- ◉ True

Correct
Yes, the style matrix $G^{[l]}$ can be seen as a matrix of cross-correlations between the different feature detectors.

9. In neural style transfer, which of the following better express the gradients used? **1 / 1 point**

- ○ Neural style transfer doesn't use gradient descent since there are no trainable parameters.
- ○ $\frac{\partial J}{\partial W^{[l]}}$
- ○ $\frac{\partial J}{\partial S}$
- ◉ $\frac{\partial J}{\partial G}$

Correct
Correct, we use the gradient of the cost function over the value of the pixels of the generated image.

10. You are working with 3D data. You are building a network layer whose input volume has size 32x32x32x16 (this volume has 16 channels), and applies convolutions with 32 filters of dimension 3x3x3x16 (no padding, stride 1). What is the resulting output volume? **1 / 1 point**

- ○ Undefined: This convolution step is impossible and cannot be performed because the dimensions specified don't match up.
- ○ 30x30x30x16
- ◉ 30x30x30x32

Correct
Correct, you have used the formula $\lfloor \frac{n^{[l-1]} - f + 2 \times p}{s} \rfloor + 1 = n^{[l]}$ over the three first dimensions of the input data.