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Week 10 : Assignment 10

The due date for submitting this assignment has passed.

Due on 2024-10-02, 23:59 IST.

Assignment submitted on 2024-10-02, 11:11 IST

1) Consider an input image of size $1000 \times 1000 \times 10$ where 10 refers to the number of channels (Such images do exist!). Suppose we want to apply a convolution operation on the entire image by sliding a kernel of size $1 \times 1 \times d$. What should be the depth d of the kernel?

10

Yes, the answer is correct.
Score: 1

Accepted Answers:
(Type: Numeric) 10

1 point

2) For the same input image in Q1, suppose that we apply the following kernels of differing sizes. ***1 point***

$K_1 : 3 \times 3$
$K_2 : 7 \times 7$
$K_3 : 17 \times 17$
$K_4 : 41 \times 41$

Assume that stride $s = 1$ and no zero padding. Among all these kernels which one shrinks the output dimensions the most?

- K_1
- K_2
- K_3
- (selected)

K_4

Yes, the answer is correct.
Score: 1

Accepted Answers:
K_4

3) Which of the following statements about CNN is (are) true? ***1 point***

- [x] CNN is a feed-forward network
- [x] Weight sharing helps CNN layers to reduce the number of parameters
- [ ] CNN is suitable only for natural images
- [ ] The shape of the input to the CNN network should be square

Yes, the answer is correct.
Score: 1

Accepted Answers:
CNN is a feed-forward network
Weight sharing helps CNN layers to reduce the number of parameters

4) Consider an input image of size $100 \times 100 \times 1$. Suppose that we used kernel of size 3×3, zero padding $P = 1$ and stride value $S = 3$. What will be the output dimension?

10

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 34

0 points

5) Consider an input image of size $100 \times 100 \times 3$. Suppose that we use 10 kernels (filters) each of size 1×1, zero padding $P = 1$ and stride value $S = 2$. How many parameters are there? (assume no bias terms) ***1 point***

- ( ) 5
- ( ) 10
- ( ) 15
- (•) 30

Yes, the answer is correct.
Score: 1

Accepted Answers:
30

6) Which statement is true about the size of filters in CNNs? ***1 point***

- [ ] The size of the filter does not affect the features it captures.
- [ ] The size of the filter only affects the computation time.
- [x] Larger filters capture more global features.
- [x] Smaller filters capture more local features.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Larger filters capture more global features.

Smaller filters capture more local features.

7) What is the motivation behind using multiple filters in one Convolution layer? ***1 point***

- Reduced complexity of the network
- Reduced size of the convolved image
- Insufficient information
- Each filter captures some feature of the image separately

Yes, the answer is correct.
Score: 1
Accepted Answers:
Each filter captures some feature of the image separately

8) Which of the following architectures has the highest no of layers? ***1 point***

- AlexNet
- GoogleNet
- ResNet
- VGG

Yes, the answer is correct.
Score: 1
Accepted Answers:
ResNet

9) What is the purpose of guided backpropagation in CNNs? ***1 point***

- To train the CNN to improve its accuracy on a given task.
- To reduce the size of the input images in order to speed up computation.
- To visualize which pixels in an image are most important for a particular class prediction.
- None of the above.

Yes, the answer is correct.
Score: 1
Accepted Answers:
To visualize which pixels in an image are most important for a particular class prediction.

10) Which of the following statements is true regarding the occlusion experiment in a CNN? ***1 point***

- [ ] It is a technique used to prevent overfitting in deep learning models.
- [ ] It is used to increase the number of filters in a convolutional layer.
- [ ] It is used to determine the importance of each feature map in the output of the network.
- [x] It involves masking a portion of the input image with a patch of zeroes.

Partially Correct.
Score: 0.5
Accepted Answers:
It is used to determine the importance of each feature map in the output of the network.
It involves masking a portion of the input image with a patch of zeroes.