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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Deep Learning - IIT Ropar (course)

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Course
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NPTEL ()How does an
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Week 0 ()

Week 1 ()

Week 2 ()

Week 3 ()

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Week 10 : Assignment 10

The due date for submitting this assignment has passed.

Due on 2025-04-02, 23:59 IST.

Assignment submitted on 2025-04-01, 16:44 IST

1) Consider an input image of size $1000 \times 1000 \times 7$ where 7 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?

Yes, the answer is correct.

Score: 1

Accepted Answers:

(Type: Numeric) 7

1 point

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

1 point

$$K_1 : 5 \times 5$$

$$K_2 : 7 \times 7$$

$$K_3 : 25 \times 25$$

$$K_4 : 41 \times 41$$

$$K_5 : 51 \times 51$$

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
☐

Week 5 ()

Week 6 ()

Week 7 ()

Week 8 ()

Week 9 ()

week 10 ()

The convolution operation (unit? unit=130&less on=131)

Relation between input size, output size and filter size (unit? unit=130&less on=132)

Convolutional Neural Networks (unit? unit=130&less on=133)

Convolutional Neural Networks (Contd.) (unit? unit=130&less on=134)

CNNs (success stories on ImageNet) (unit? unit=130&less on=135)

CNNs (success stories on ImageNet) (Contd.) (unit? unit=130&less on=136)

 K_3 ☐ K_4 ☒ K_5

Yes, the answer is correct.
Score: 1

Accepted Answers:
 K_5

3) Which of the following is a technique used to fool CNNs in Deep Learning?

1 point

- ☐ Transfer learning
- ☐ Dropout
- ☐ Batch normalization
- ☒ Adversarial examples

Yes, the answer is correct.
Score: 1

Accepted Answers:
Adversarial examples

4) 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

5) Which of the following statements about CNN is (are) true?

1 point

- ☒ CNN is a feed-forward network
- ☒ 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

No, the answer is incorrect.
Score: 0

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

6) 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? 1 point

- ☐ $100 \times 100 \times 1$
- ☐ $3 \times 3 \times 1$
- ☒ $34 \times 34 \times 1$
- ☐ $97 \times 97 \times 1$

☐ Image Classification continued (GoogLeNet and ResNet) (unit? unit=130&less on=137)

☐ Visualizing patches which maximally activate a neuron (unit? unit=130&less on=138)

☐ Visualizing filters of a CNN (unit? unit=130&less on=139)

☒ Occlusion experiments (unit? unit=130&less on=140)

☒ Finding influence of input pixels using backpropagation (unit? unit=130&less on=141)

☒ Guided Backpropagation (unit? unit=130&less on=142)

☐ Optimization over images (unit? unit=130&less on=143)

☒ Create images from embeddings (unit? unit=130&less on=144)

☒ Deep Dream (unit?)

Yes, the answer is correct.

Score: 1

Accepted Answers:

$34 \times 34 \times 1$

7) Consider an input image of size $100 \times 100 \times 3$. Suppose that we use 8 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**

- ☐ 3
☒ 24
☐ 10
☐ 8
☐ 100

Yes, the answer is correct.

Score: 1

Accepted Answers:

24

8) 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.

9) 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.
☒ It involves masking a portion of the input image with a patch of zeroes.

Yes, the answer is correct.

Score: 1

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.

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

- ☐ AlexNet
☐ GoogleNet
☒ ResNet
☐ VGG

Yes, the answer is correct.

Score: 1

unit=130&less
on=145)

☐ Deep Art (unit?
unit=130&less
on=146)

☐ Fooling Deep
Convolutional
Neural
Networks
(unit?
unit=130&less
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☒ Lecture
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unit=130&less
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☐ Week 10
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unit=130&less
on=193)

☒ Week 10:
Solution (unit?
unit=130&less
on=254)

☒ **Quiz: Week 10
: Assignment
10
(assessment?
name=320)**

Week 11 ()

Week 12 ()

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**Problem
Solving
Session -
Jan 2025 ()**

Accepted Answers:

ResNet

