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Course outline

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Convolutional Neural Networks: An Introduction - Part 01

Convolutional Neural Networks: An Introduction - Part 02

Backpropagation in CNNs

CNN Architectures for Image Classification: AlexNet, VGG

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Problem Solving Session - July 2024

Week 4 : Assignment 4(Non-Graded)

Assignment not submitted

1) Match the following

1 point

- 1) CNN i) gradient computation using chain rule of calculus
- 2) FNN ii) sparse connectivity
- iii) less number of parameters
- iv) vector-to-vector function
- v) classification

- 1 → iii, iv, v 2 → ii, iv
- 1 → i, ii, iii, iv 2 → ii, iii, v
- 1 → i, ii, iii, v 2 → i, iv, v
- 1 → i, ii, v 2 → iii, iv
- 1 → i, iii 2 → ii, iii

Yes, the answer is correct.

Score: 1

Accepted Answers:

1 →i,ii,iii,v 2 →i,iv,v

2) Which of the following is true? Select all possible answers:

1 point

- The number of learnable parameters in pooling layer is 0.
- Dilation rate is same as stride.
- One pixel is affected in a convolved output by a single input pixel when even-sized filters are used.

Derivative of loss w.r.t. input image X , where $Y = X * W$ is $\frac{\partial L}{\partial X[i,j]} = \frac{\partial L}{\partial Y} \oplus W$, where $*$ represents convolution and \oplus represents correlation.)

Yes, the answer is correct.

Score: 1

Accepted Answers:

The number of learnable parameters in pooling layer is 0.

Derivative of loss w.r.t. input image X , where $Y = X * W$ is $\frac{\partial L}{\partial X[i,j]} = \frac{\partial L}{\partial Y} \oplus W$, where $*$ represents convolution and \oplus represents correlation.)

3) You are solving a binary classification task of classifying images as dog vs not-dog. You design a CNN with a single output neuron. Let the output of this neuron be z . The final output of your network, y' is given by:

1 point

$$y' = \sigma(\text{ReLU}(z))$$

You classify all inputs with a final value $y' \geq 0.5$ as dog.

State whether the following statement is true or false:

Using ReLU followed by sigmoid in the output layer will cause all predictions to be positive.

- True
- False

Yes, the answer is correct.

Score: 1

Accepted Answers:

True

4) Parameter sharing (i.e. a feature detector that is useful for one part of the image is probably useful for another part of the image too) is one of the benefits of using convolutional networks. Among the following options given below, select the true statements about parameter sharing in ConvNets. Select all possible answers:

1 point

- It reduces the total number of parameters, thus reducing overfitting
- It allows a features detector to be used in multiple locations throughout the whole input image/input volume
- It allows gradient descent to set many of the parameters to zero, thus making the connection sparse
- None of the above

Yes, the answer is correct.

Score: 1

Accepted Answers:

It reduces the total number of parameters, thus reducing overfitting

It allows a features detector to be used in multiple locations throughout the whole input image/input volume

5) Weight sharing allows CNNs to deal with image data without using too many parameters. Select the correct option from below with respect to weight sharing.

1 point

- Weight sharing increases bias
- Weight sharing increases variance
- It increases both bias and variance
- None of the above

Yes, the answer is correct.

Score: 1

Accepted Answers:

Weight sharing increases bias

Check Answers and Submit

Your score is: 5/5