

Quiz 5
Oct/25/2021
CS 280: Fall 2021
Instructor: Lan Xu

Name: _____
On your left: _____
On your right: _____

Instructions:

Please answer the questions below. Show all your work. This is an open-book test. NO discussion/-collaboration is allowed.

Problem 1. (20 points) *Transpose Convolution*

1. Use a 5×5 transpose convolution, stride 2 and padding 1, what is the size of the output feature map for a 5×5 input feature map.

Solution 1:

$$N_{\text{out}} = (N_{\text{in}} - 1) \times \text{stride} - 2 \times \text{padding} + \text{dilation} \times (\text{kernel_size} - 1) + 1 = 11$$

Solution 2:

Let the output feature size be X by X , since the transpose convolution can be regraded as the inverse convolution, so

$$N_{\text{in}} = \left\lfloor \frac{X + 2 \times \text{padding} - \text{dilation} \times (\text{kernel_size} - 1) - 1}{\text{stride}} + 1 \right\rfloor$$
$$X = 11 \text{ or } 12$$

2. Given the following input and kernel:

1	7
4	5

input

3	2	9
4	6	1
7	5	6

kernel

Compute the transpose convolution output.(stride 2, padding 1)

Solution:

① 得到对应的 output

3	2	9
4	6	1
7	5	6

21	14	63
28	42	7
49	35	42

12	8	36
16	24	4
28	20	24

15	10	45
20	30	5
35	25	30

②.

3	2	9+4	14	63
4	6	1+28	42	7
7+12	5+8	6+49 3+15	35+10	42+45
16	24	9+20	30	5
28	20	24+35	25	30

⇒

3	2	30	14	63
4	6	29	42	7
19	13	106	45	87
16	24	24	30	5
28	20	59	25	30

③. padding

6	29	42
13	106	45
24	24	30

3	2	30	14
4	6	29	42
19	13	106	45
16	24	24	30

6	29	42	7
13	106	45	87
24	24	30	5
20	59	25	30

Figure 1: sol2