



North South University

Department of Electrical and Computer Engineering

EEE660/CSE553/CSE468 - Computer Vision

Final - Summer 2021

Submission deadline: 11:59PM 17/09/2021 (Via Google Classroom)

Name:	
Student ID:	
Course:	
Date:	

Instructions

- EEE660 and CSE553 Students should answer questions 1,2 and 3.
- CSE468 Students must answer question 1 and either one of the remaining questions.

Question 1: (10 marks)

Consider the following input **X** with two channels:

First Channel					Second Channel			
1	4	1	3		6	4	-2	1
2	3	1	3		4	3	1	4
5	2	3	6		5	6	2	3
7	7	-1	-8		6	5	-3	1

Consider the following filter **f**:

First Channel			Second Channel	
1	0		0.5	0
-1	0		0	0.5

- (a) Calculate the response when **X** is convolved by **f** with zero padding and a stride of 1. (5)
- (b) Calculate the response when **X** is convolved by **f** with a stride of 1 and padding to ensure that the response is the same size as **X**. (5)

Questions 2: (10 marks)

Consider a convolutional network with the following configuration. Calculate (show the calculation) the number of trainable parameters per layer and in total

Layer #	Type	Details	Number of trainable parameters
1	Input Layer	50 x 50 CMYK Image	
2	Convolutional	10 1x1 filters with a stride of 2 and zero padding	
3	Activation	ReLU activation	
4	Convolutional	30 5x5 filters with a stride of 3 and padding of 2 pixels	
5	Activation	ReLU activation	
6	Max pooling	2x2 region, a stride of 2	
7	Flattening		
8	Fully connected	77 neurons, Activation - Softmax	
Total number of trainable parameters			

Question 3: (10 marks)

Consider the network given in Question 2 that can be used to train a classifier to distinguish between 77 classes. Your task in this question is to modify the network after layer 6 so that the new configuration still classifies over 77 classes but without using any fully connected layers.

Hint: It should be a fully convolutional network.