

CS280 Fall 2021 Assignment 2

Part A

Convolutional Neural Nets

October 23, 2021

Name:

Student ID:

1. Convolution Cost (10 points)

Assume an input of shape $c_i \times h \times w$ and a convolution kernel of shape $c_o \times c_i \times k_h \times k_w$, padding of (p_h, p_w) , and stride of (s_h, s_w) .

- What is the computational cost (multiplications and additions) for the forward propagation?
- What is the memory footprint?

2. Residual and Inception blocks (5 points)

What are the major differences between the Inception block and the residual block? After removing some paths in the Inception block, how are they related to each other?

3. Optimization (5 points)

Consider a simple multilayer perceptron with a single hidden layer of, say, d dimensions in the hidden layer and a single output. Show that for any local minimum there are at least $d!$ equivalent solutions that behave identically.