PROBLEM SET 2

CMSC 828L

Deep Learning

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Task 1 and 4:

Given images from class 0 are less smooth than class 1.
- We perform convolution with a 3 by 3 Laplacian filter for edge detection. Since class 0 is less smooth, the resulting output from the above convolution will be stronger than class 1.
- We then find the global average with the pooling layer. Since the average for class 0 is higher than the other class, we adjust the parameters of the fc_sigmoid layer to separate class 1 and class 0 based on the global average.

Task 2:

From the given image description,
class 0 has gaussian distribution
class 1 has random distribution

- We first normalize the image with a kernel with value 1/255 at the center.
- The probability that a pixel value is above 0.65 in Gaussian distribution is lower than the random distribution. We aim to sum all the pixel values above 0.65.
- The sum in gaussian distribution will be lower. To eliminate the values below 0.65, we use bias -0.65 and apply "relu" activation.
- We then find global average with a pooling layer.
- Adjust the parameters of the fc_sigmoid layer to separate class 1 and 0 based on the above global average.

Task 3:

From the given image description,
class 0 has diamonds
class 1 has squares

- The kernel is selected such that the output will have higher value when it matches with a square while convolution.
- Adjust the bias of convolution layer to eliminate other lower values after "relu" activation. Then find global maximum with a pooling layer.
- The result will have higher value in the presence of the square. Adjust the parameters of the fc_sigmoid layer to separate class 1 and 0 based on the result from pooling layer.