Assignment 6

BIOENG 145/245

Due Tuesday 3/19 11:59PM

*****PLEASE DO NOT MODIFY THE FUNCTION NAMES AND THE FILE NAMES OR THE AUTOGRADER WILL BREAK!!*****

1 Convolution Linear Layer

In this portion, you have one method to implement: the convolution linear layer. This function is equivalent to PyTorch's `torch.nn.Conv2d()`. Implement the function in `q1.py`. Like our usual practice, I would strongly suggest understanding how the sliding window algorithm works before coding. Additionally, this is the formula to calculate the output of a convolutional layer given the parameters: In our case, assume padding size is 0.

$$n_{out} = \left\lfloor \frac{n_{in} + 2p - k}{s} \right\rfloor + 1$$

n_{in}: number of input features

n_{out}: number of output features

k: convolution kernel size

p: convolution padding size

s: convolution stride size

Additionally, assume that our height and width are equal (a square image). In the formula, height and width is the n_{in}.

Several tests have been included in this homework, and they will be done by calling the various `.npy` files. Please do not remove those files nor modify them.

2 PyTorch CNN Tutorial

In our last homework, we have you implemented a very basic dense neural network. In this homework, we will explore building our own convolution neural networks. In this task, we will be classifying a series of blood cells. These cells can either be classified as basophils, eosinophils, or neutrophils.

Here is the link to the Google Colab notebook:

https://colab.research.google.com/drive/15yMwAwCAH8bDVNE5VNcBzVmcQmKmpzn1?usp=sharing

The code to save a file is not currently included in the notebook, so please Google methods to save a PyTorch model.

3 Submission

You will submit `q1.py`, `q2.ipynb`, `predictions.npy`, and `my_model.pt`.