Programming Assignment 2
CAP 5415
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Observation for model 1:

Model 1 architecture:
 ConvNet(
  (conv1): Conv2d(3, 48, kernel_size=(3, 3), stride=(1, 1))
  (conv2): Conv2d(48, 96, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (conv3): Conv2d(96, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (conv4): Conv2d(128, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (pool): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
  (fc1): Linear(in_features=1152, out_features=1000, bias=True)
  (fc2): Linear(in_features=1000, out_features=500, bias=True)
  (fc3): Linear(in_features=500, out_features=10, bias=True)
)

Hyperparameters:
 Batch size: 32
 Number of epochs: 30
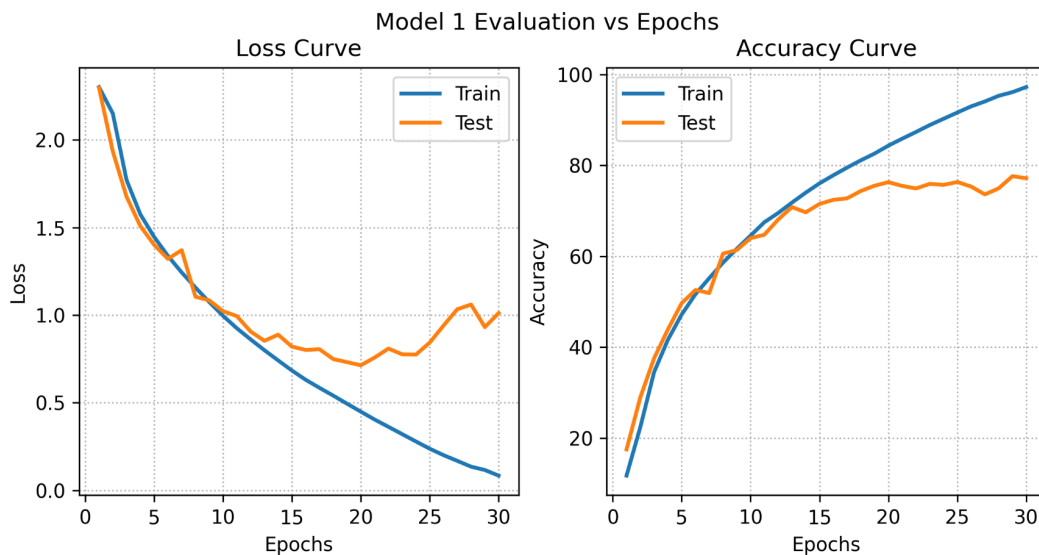 Learning rate: 0.01
Best testing accuracy is 76.83%

Figure 1: Loss and accuracy curve with respect to corresponding epochs for model 1

In model 1, we used four convolutional layers and three fully connected layers. The train loss always shows a downward trend, while after 20 epochs, the test loss shows an upward

tendency, which can be the threshold point before the model is overfitted. On the other hand, in the accuracy curve, until approximately 20 epochs, train and test accuracy go higher, then train accuracy continues with epochs but test accuracy falls. We got our best accuracy for 27 no epochs.

Observation for model 2:

Model 2 architecture:
ConvNet(
 (conv1): Conv2d(3, 96, kernel_size=(5, 5), stride=(1, 1))
 (conv2): Conv2d(96, 256, kernel_size=(5, 5), stride=(1, 1), padding=(1, 1))
 (conv3): Conv2d(256, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
 (conv4): Conv2d(384, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
 (conv5): Conv2d(384, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
 (pool): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
 (fc1): Linear(in_features=2304, out_features=2000, bias=True)
 (fc2): Linear(in_features=2000, out_features=1000, bias=True)
 (fc3): Linear(in_features=1000, out_features=10, bias=True)
)
Hyperparameters:
 Batch size: 32
 Number of epochs: 30
 Learning rate: 0.01
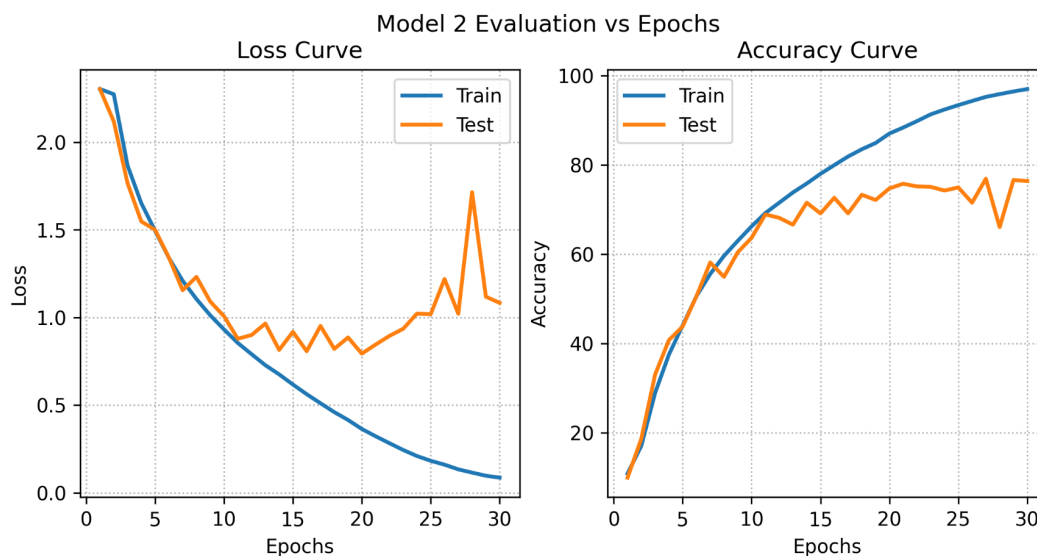Best testing accuracy is 77.24%

Figure 2: Loss and accuracy curve with respect to corresponding epochs for model 2

In model 2, we used five convolutional layers and three fully connected layers with more filter numbers and a larger kernel size than in model 1. In model 2, we also get a similar kind of loss

and accuracy curve as in model 1. But in model 2, both the test loss and accuracy curve show more fluctuations than in model 1. We found that our best test accuracy for model 2 is 77.24% for epoch no. 28.

Between model 1 and model 2, we have very little performance difference, but model 2 uses more convolutional layers and kernels and more fully connected layers of neurons, which might make model 2 more complex than model 1. From the result, we also observe that model 2 shows more fluctuations in the test curve for both the loss and accuracy curves. Thus, from my observation, model one is providing a better overall result than model two.