

Part I

```
Model Architecture:
AlexNet(
  (features): Sequential(
    (0): Conv2d(3, 96, kernel_size=(11, 11), stride=(4, 4))
    (1): ReLU(inplace=True)
    (2): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)
    (3): Conv2d(96, 256, kernel_size=(5, 5), stride=(1, 1), padding=(2, 2))
    (4): ReLU(inplace=True)
    (5): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)
    (6): Conv2d(256, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (7): ReLU(inplace=True)
    (8): Conv2d(384, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (9): ReLU(inplace=True)
    (10): Conv2d(384, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (11): ReLU(inplace=True)
    (12): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)
  )
  (classifier): Sequential(
    (0): Dropout(p=0.5, inplace=False)
    (1): Linear(in_features=9216, out_features=4096, bias=True)
    (2): ReLU(inplace=True)
    (3): Dropout(p=0.5, inplace=False)
    (4): Linear(in_features=4096, out_features=4096, bias=True)
    (5): ReLU(inplace=True)
    (6): Linear(in_features=4096, out_features=4, bias=True)
  )
)
```

[Epoch 100] train accuracy: 0.9956, loss: 0.0166

[Epoch 100] eval accuracy: 0.9004, loss: 0.7200

Part II

AlexNetLargeKernel:

```
Model Architecture:
AlexNetLargeKernel(
  (features): Sequential(
    (0): Conv2d(3, 96, kernel_size=(21, 21), stride=(8, 8), padding=(1, 1))
    (1): ReLU(inplace=True)
    (2): Conv2d(96, 256, kernel_size=(7, 7), stride=(2, 2), padding=(2, 2))
    (3): ReLU(inplace=True)
    (4): Conv2d(256, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (5): ReLU(inplace=True)
    (6): Conv2d(384, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (7): ReLU(inplace=True)
    (8): Conv2d(384, 256, kernel_size=(3, 3), stride=(2, 2))
    (9): ReLU(inplace=True)
  )
  (classifier): Sequential(
    (0): Dropout(p=0.5, inplace=False)
    (1): Linear(in_features=9216, out_features=4096, bias=True)
    (2): ReLU(inplace=True)
    (3): Dropout(p=0.5, inplace=False)
    (4): Linear(in_features=4096, out_features=4096, bias=True)
    (5): ReLU(inplace=True)
    (6): Linear(in_features=4096, out_features=4, bias=True)
  )
)
```

[Epoch 100] train accuracy: 0.9955, loss: 0.0122

[Epoch 100] eval accuracy: 0.8734, loss: 1.1481

AlexNetTiny:

```
AlexNetTiny(  
  (features): Sequential(  
    (0): Conv2d(3, 48, kernel_size=(11, 11), stride=(4, 4))  
    (1): ReLU(inplace=True)  
    (2): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)  
    (3): Conv2d(48, 128, kernel_size=(5, 5), stride=(1, 1), padding=(2, 2))  
    (4): ReLU(inplace=True)  
    (5): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)  
    (6): Conv2d(128, 192, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (7): ReLU(inplace=True)  
    (8): Conv2d(192, 192, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (9): ReLU(inplace=True)  
    (10): Conv2d(192, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (11): ReLU(inplace=True)  
    (12): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)  
  )  
  (classifier): Sequential(  
    (0): Dropout(p=0.5, inplace=False)  
    (1): Linear(in_features=4608, out_features=2048, bias=True)  
    (2): ReLU(inplace=True)  
    (3): Dropout(p=0.5, inplace=False)  
    (4): Linear(in_features=2048, out_features=1024, bias=True)  
    (5): ReLU(inplace=True)  
    (6): Linear(in_features=1024, out_features=4, bias=True)  
  )  
)
```

[Epoch 100] train accuracy: 0.9969, loss: 0.0107

[Epoch 100] eval accuracy: 0.9066, loss: 0.6590

AlexNetAvgPooling:

```
AlexNetAvgPooling(  
  (features): Sequential(  
    (0): Conv2d(3, 96, kernel_size=(11, 11), stride=(4, 4))  
    (1): ReLU(inplace=True)  
    (2): AvgPool2d(kernel_size=3, stride=2, padding=0)  
    (3): Conv2d(96, 256, kernel_size=(5, 5), stride=(1, 1), padding=(2, 2))  
    (4): ReLU(inplace=True)  
    (5): AvgPool2d(kernel_size=3, stride=2, padding=0)  
    (6): Conv2d(256, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (7): ReLU(inplace=True)  
    (8): Conv2d(384, 384, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (9): ReLU(inplace=True)  
    (10): Conv2d(384, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (11): ReLU(inplace=True)  
    (12): AvgPool2d(kernel_size=3, stride=2, padding=0)  
  )  
  (classifier): Sequential(  
    (0): Dropout(p=0.5, inplace=False)  
    (1): Linear(in_features=9216, out_features=4096, bias=True)  
    (2): ReLU(inplace=True)  
    (3): Dropout(p=0.5, inplace=False)  
    (4): Linear(in_features=4096, out_features=4096, bias=True)  
    (5): ReLU(inplace=True)  
    (6): Linear(in_features=4096, out_features=4, bias=True)  
  )  
)
```

[Epoch 100] train accuracy: 0.9928, loss: 0.0226

[Epoch 100] eval accuracy: 0.8776, loss: 0.9795

AlexNetDilation

```
AlexNetDilation(  
  (features): Sequential(  
    (0): Conv2d(3, 96, kernel_size=(11, 11), stride=(4, 4), padding=(5, 5), dilation=(2, 2))  
    (1): ReLU(inplace=True)  
    (2): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)  
    (3): Conv2d(96, 256, kernel_size=(5, 5), stride=(1, 1), padding=(4, 4), dilation=(2, 2))  
    (4): ReLU(inplace=True)  
    (5): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)  
    (6): Conv2d(256, 384, kernel_size=(3, 3), stride=(1, 1), padding=(2, 2), dilation=(2, 2))  
    (7): ReLU(inplace=True)  
    (8): Conv2d(384, 384, kernel_size=(3, 3), stride=(1, 1), padding=(2, 2), dilation=(2, 2))  
    (9): ReLU(inplace=True)  
    (10): Conv2d(384, 256, kernel_size=(3, 3), stride=(1, 1), padding=(2, 2), dilation=(2, 2))  
    (11): ReLU(inplace=True)  
    (12): MaxPool2d(kernel_size=3, stride=2, padding=0, dilation=1, ceil_mode=False)  
  )  
  (classifier): Sequential(  
    (0): Dropout(p=0.5, inplace=False)  
    (1): Linear(in_features=9216, out_features=4096, bias=True)  
    (2): ReLU(inplace=True)  
    (3): Dropout(p=0.5, inplace=False)  
    (4): Linear(in_features=4096, out_features=4096, bias=True)  
    (5): ReLU(inplace=True)  
    (6): Linear(in_features=4096, out_features=4, bias=True)  
  )  
)
```

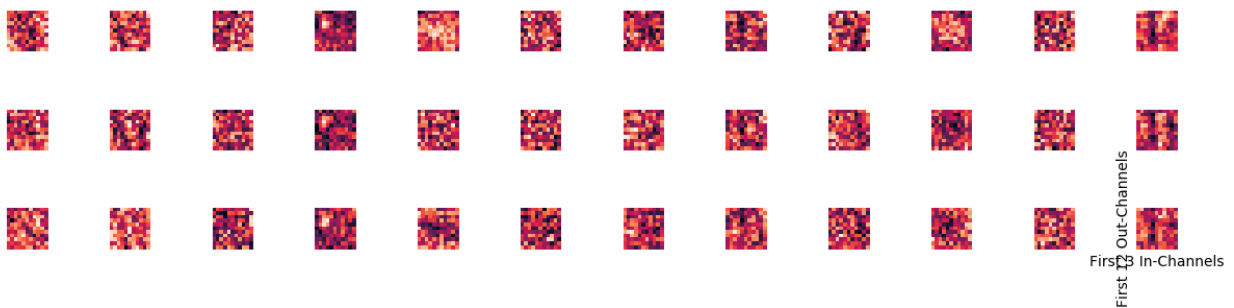
[Epoch 100] train accuracy: 0.9843, loss: 0.0511

[Epoch 100] eval accuracy: 0.8932, loss: 0.7845

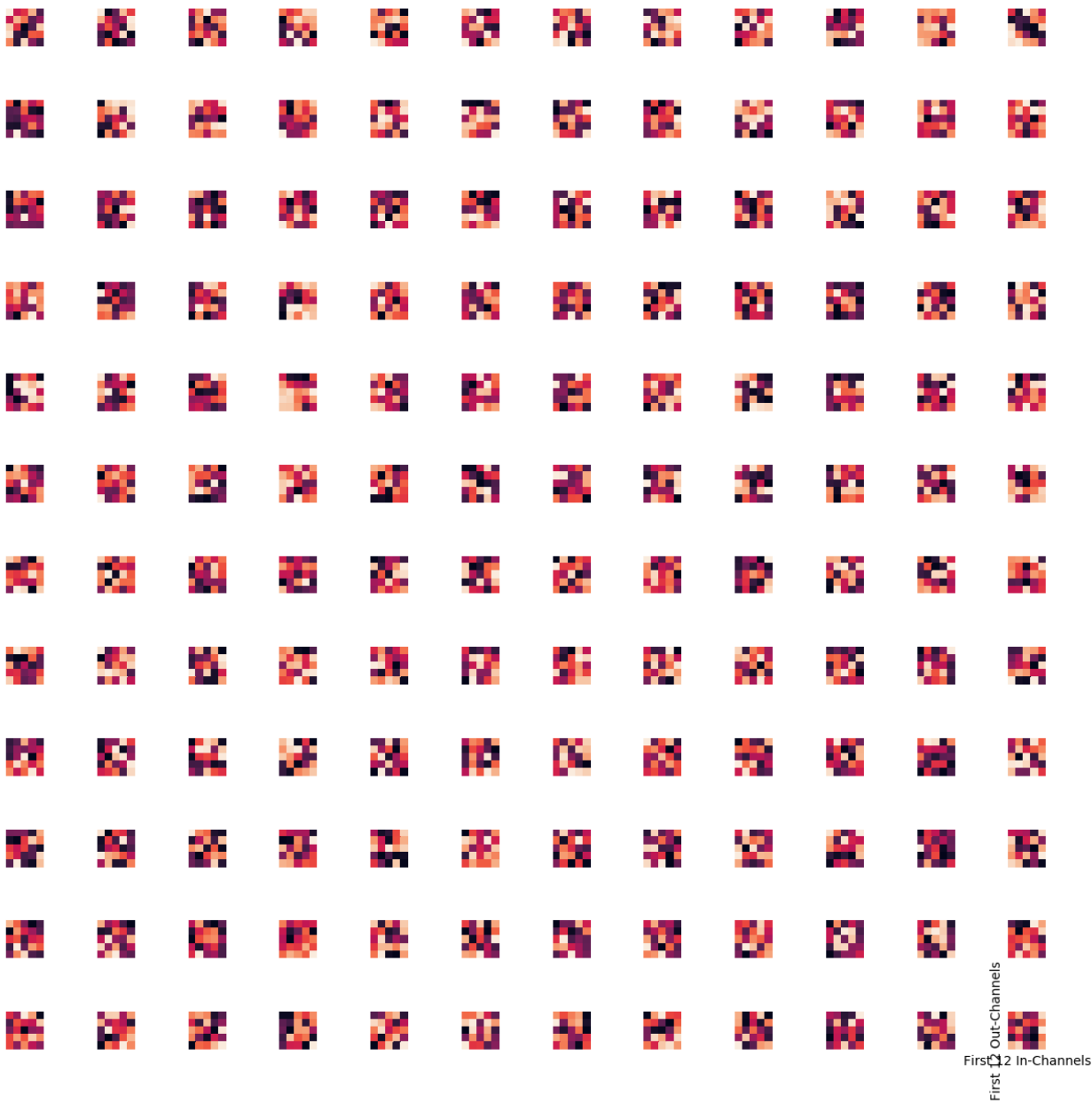
Part III

Domain Kernels:

Conv2d-0



Conv2d-3



Conv2d-6

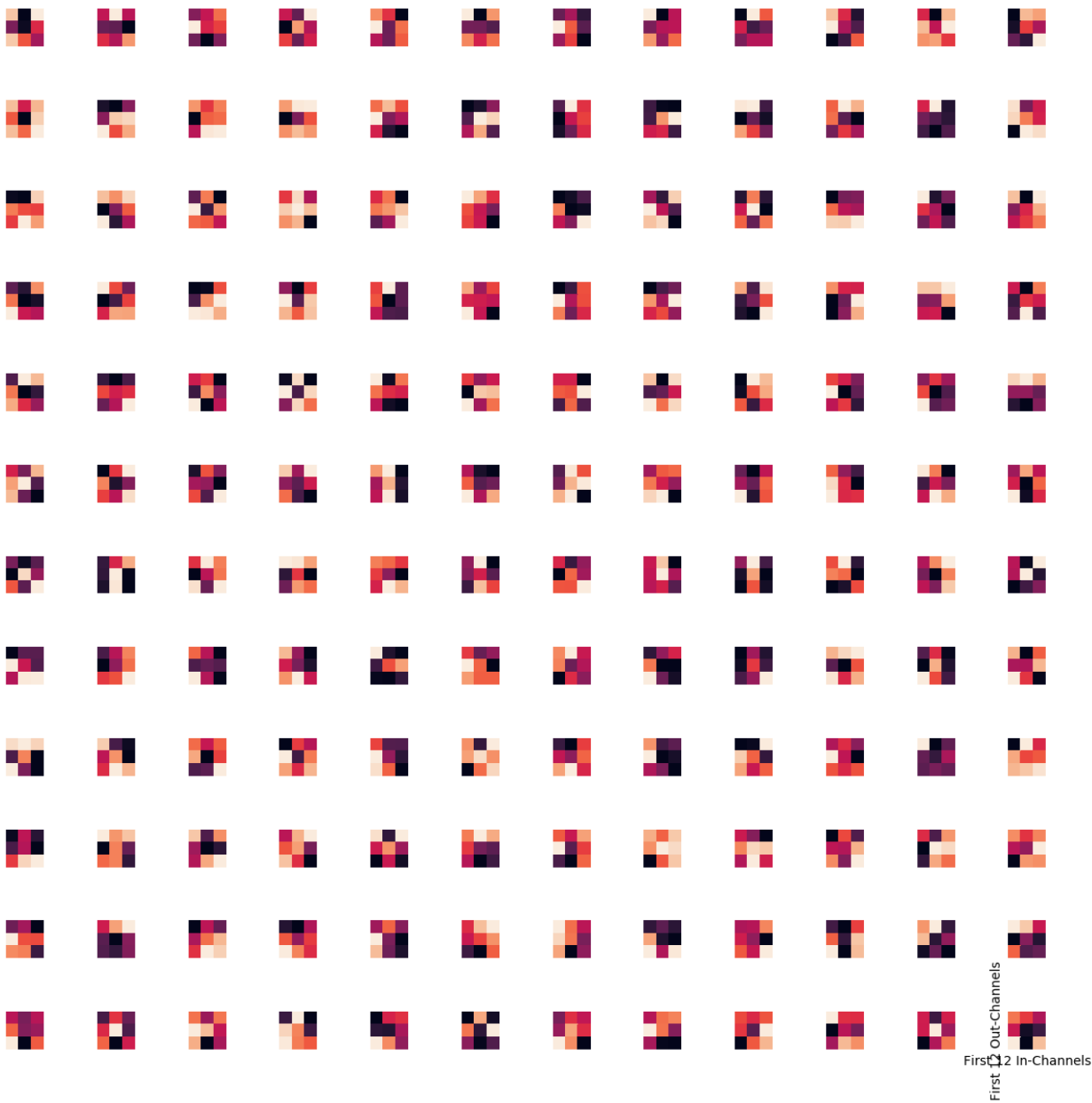


Conv2d-8



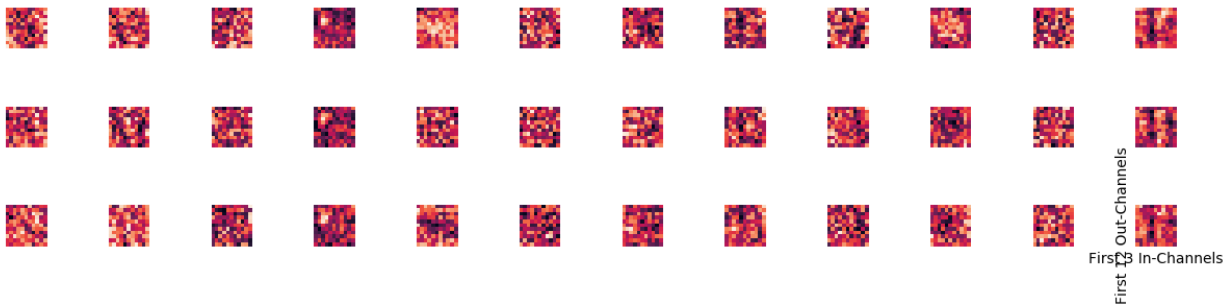
First 12 Out-Channels
First 12 In-Channels

Conv2d-10

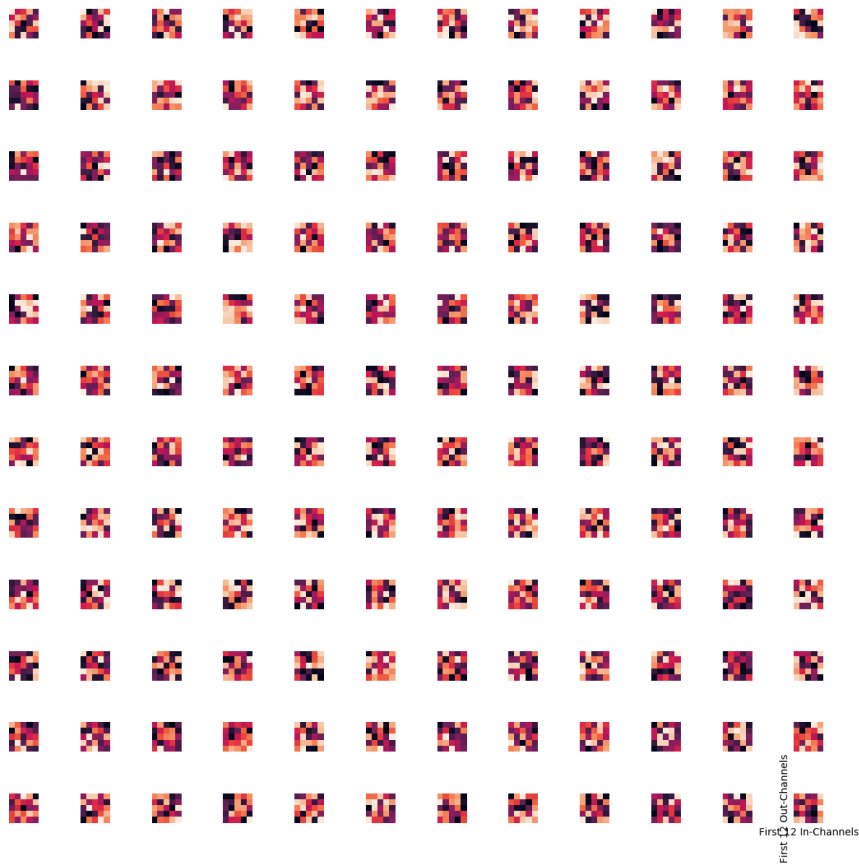


Category Kernels:

Conv2d-0



Conv2d-3



Conv2d-6



Conv2d-8



First 12 Out-Channels
First 12 In-Channels

Conv2d-10

