R09521603

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Hw1

Problem 1

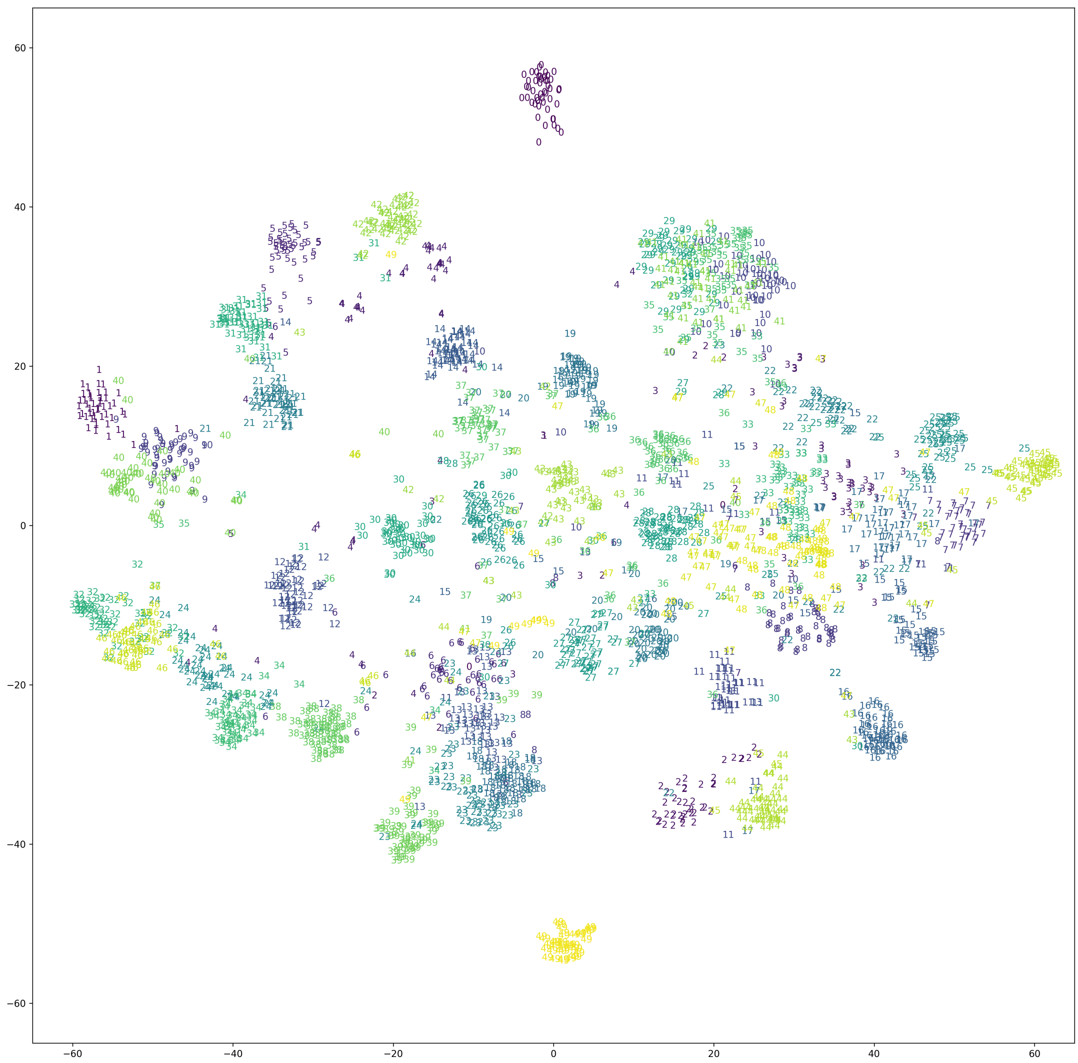
1.

```
(myModel): VGG(
  (features): Sequential(
    (0): Conv2d(3, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (2): ReLU(inplace=True)
    (3): Conv2d(64, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (4): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (5): ReLU(inplace=True)
    (6): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (7): Conv2d(64, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (8): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (9): ReLU(inplace=True)
    (10): Conv2d(128, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (11): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (12): ReLU(inplace=True)
    (13): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (14): Conv2d(128, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (15): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (16): ReLU(inplace=True)
    (17): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (18): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (19): ReLU(inplace=True)
    (20): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (21): BatchNorm2d(256, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
    (22): ReLU(inplace=True)
  (23): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)

  (24): Conv2d(256, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))

  (25): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

  (26): ReLU(inplace=True)

  (27): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))

  (28): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

  (29): ReLU(inplace=True)

  (30): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))

  (31): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

  (32): ReLU(inplace=True)

  (33): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)

  (34): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))

  (35): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

  (36): ReLU(inplace=True)

  (37): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))

  (38): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

  (39): ReLU(inplace=True)

  (40): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))

  (41): BatchNorm2d(512, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

  (42): ReLU(inplace=True)

  (43): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)

)

(avgpool): AdaptiveAvgPool2d(output_size=(7, 7))

(classifier): Sequential(

  (0): Linear(in_features=25088, out_features=4096, bias=True)

  (1): ReLU(inplace=True)

  (2): Dropout(p=0.5, inplace=False)

  (3): Linear(in_features=4096, out_features=4096, bias=True)

  (4): ReLU(inplace=True)

  (5): Dropout(p=0.5, inplace=False)

  (6): Linear(in_features=4096, out_features=50, bias=True)

)
```

)

2. Accuracy : 0.8296

3.



tsne.png

Most of them have some center cluster phenomenon, I think most of the validation set has been set apart. But some category is too similar that they are too close to each other, for example class 29 and 10. But some of them done pretty well, like class 0 and 1, those class have been set apart far from other category.

Problem 2 :

1.

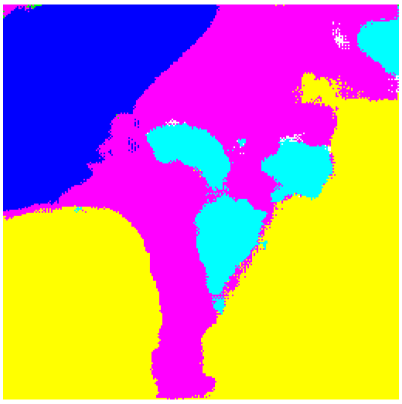
```
Segmentator(
  (myModel): Sequential(
    (0): Sequential(
      (0): Conv2d(3, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (1): ReLU(inplace=True)
      (2): Conv2d(64, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (3): ReLU(inplace=True)
      (4): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
      (5): Conv2d(64, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (6): ReLU(inplace=True)
      (7): Conv2d(128, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (8): ReLU(inplace=True)
      (9): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
      (10): Conv2d(128, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (11): ReLU(inplace=True)
      (12): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (13): ReLU(inplace=True)
      (14): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (15): ReLU(inplace=True)
      (16): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
      (17): Conv2d(256, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (18): ReLU(inplace=True)
      (19): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (20): ReLU(inplace=True)
      (21): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (22): ReLU(inplace=True)
      (23): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
      (24): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (25): ReLU(inplace=True)
      (26): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (27): ReLU(inplace=True)
      (28): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (29): ReLU(inplace=True)
      (30): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    )
  )
  (conv): Sequential(
    (0): Conv2d(512, 4096, kernel_size=(1, 1), stride=(1, 1))
    (1): Conv2d(4096, 4096, kernel_size=(1, 1), stride=(1, 1))
    (2): Conv2d(4096, 7, kernel_size=(1, 1), stride=(1, 1))
  )
  (up_conv): ConvTranspose2d(7, 7, kernel_size=(64, 64), stride=(32, 32), padding=(16, 16), bias=False)
)
```

2.

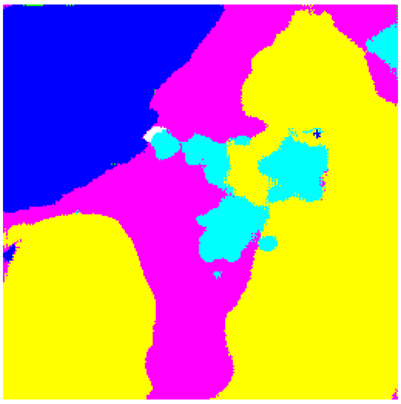
```
Unet(
  (myEncoder): ModuleList(
    (0): Conv2d(3, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (1): ReLU(inplace=True)
    (2): Conv2d(64, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (3): ReLU(inplace=True)
    (4): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (5): Conv2d(64, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (6): ReLU(inplace=True)
    (7): Conv2d(128, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (8): ReLU(inplace=True)
    (9): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
    (10): Conv2d(128, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
    (11): ReLU(inplace=True)
  (12): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (13): ReLU(inplace=True)
  (14): Conv2d(256, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (15): ReLU(inplace=True)
  (16): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
  (17): Conv2d(256, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (18): ReLU(inplace=True)
  (19): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (20): ReLU(inplace=True)
  (21): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (22): ReLU(inplace=True)
  (23): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
  (24): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (25): ReLU(inplace=True)
  (26): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (27): ReLU(inplace=True)
  (28): Conv2d(512, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
  (29): ReLU(inplace=True)
  (30): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)
)
(lastLayer): Sequential(
  (0): Conv2d(512, 512, kernel_size=(1, 1), stride=(1, 1))
  (1): ReLU()
)
(upConv): ModuleList(
  (0): ConvTranspose2d(512, 512, kernel_size=(2, 2), stride=(2, 2))
  (1): ConvTranspose2d(512, 512, kernel_size=(2, 2), stride=(2, 2))
  (2): ConvTranspose2d(512, 256, kernel_size=(2, 2), stride=(2, 2))
  (3): ConvTranspose2d(256, 128, kernel_size=(2, 2), stride=(2, 2))
  (4): ConvTranspose2d(128, 64, kernel_size=(2, 2), stride=(2, 2))
)
(dec_Conv): ModuleList(
  (0): dec_Block(
    (block): Sequential(
      (0): Conv2d(1024, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (1): ReLU()
    )
  )
  (1): dec_Block(
    (block): Sequential(
      (0): Conv2d(1024, 512, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (1): ReLU()
    )
  )
  (2): dec_Block(
    (block): Sequential(
      (0): Conv2d(512, 256, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (1): ReLU()
    )
  )
  (3): dec_Block(
    (block): Sequential(
      (0): Conv2d(256, 128, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (1): ReLU()
    )
  )
  (4): dec_Block(
    (block): Sequential(
      (0): Conv2d(128, 64, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))
      (1): ReLU()
    )
  )
)
(outLayer): Sequential(
      (0): Conv2d(64, 7, kernel_size=(1, 1), stride=(1, 1))
    )
  )
```

3. mIOU : 0.692463

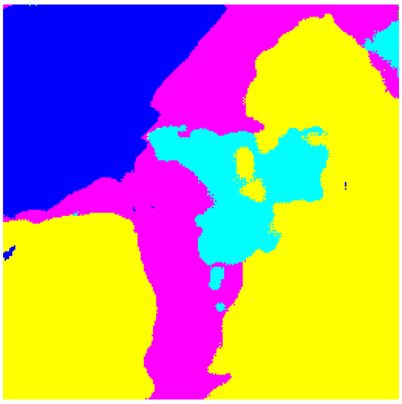
4.



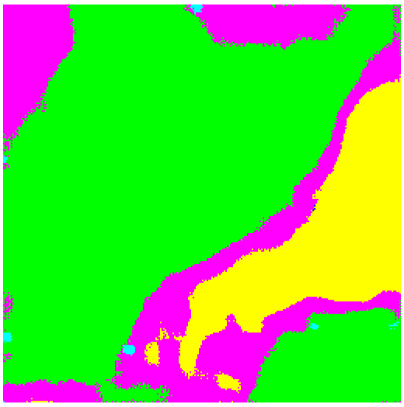
Early 0010_sat.jpg”



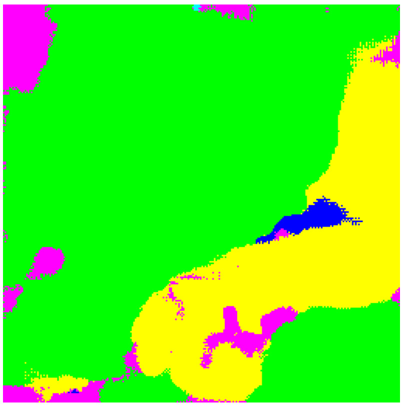
Middle 0010_sat.jpg”



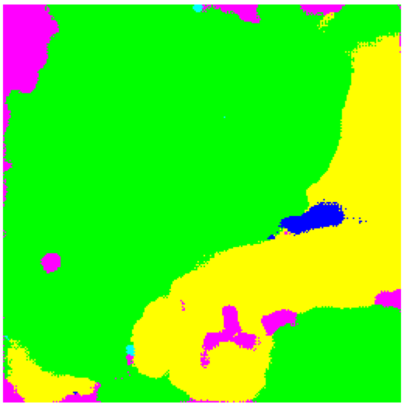
Final 0010_sat.jpg”



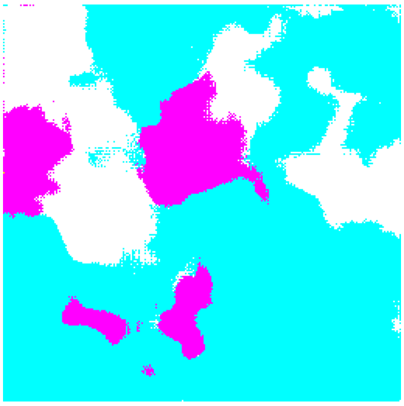
Early 0097_sat.jpg”



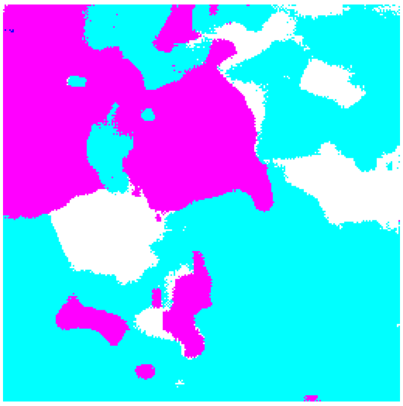
Middle 0097_sat.jpg”



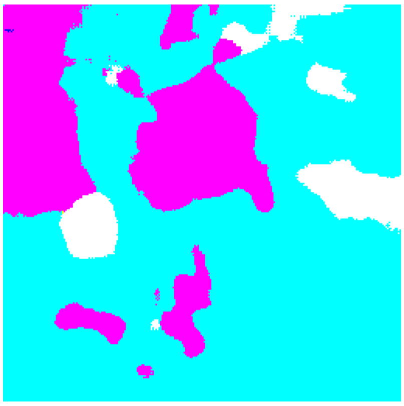
Final 0097_sat.jpg”



Early 0107_sat.jpg”



Middle 0107_sat.jpg”



Final 0107_sat.jpg”

Reference:

R09521608 蔡瑋倫

R09521607 賴意函