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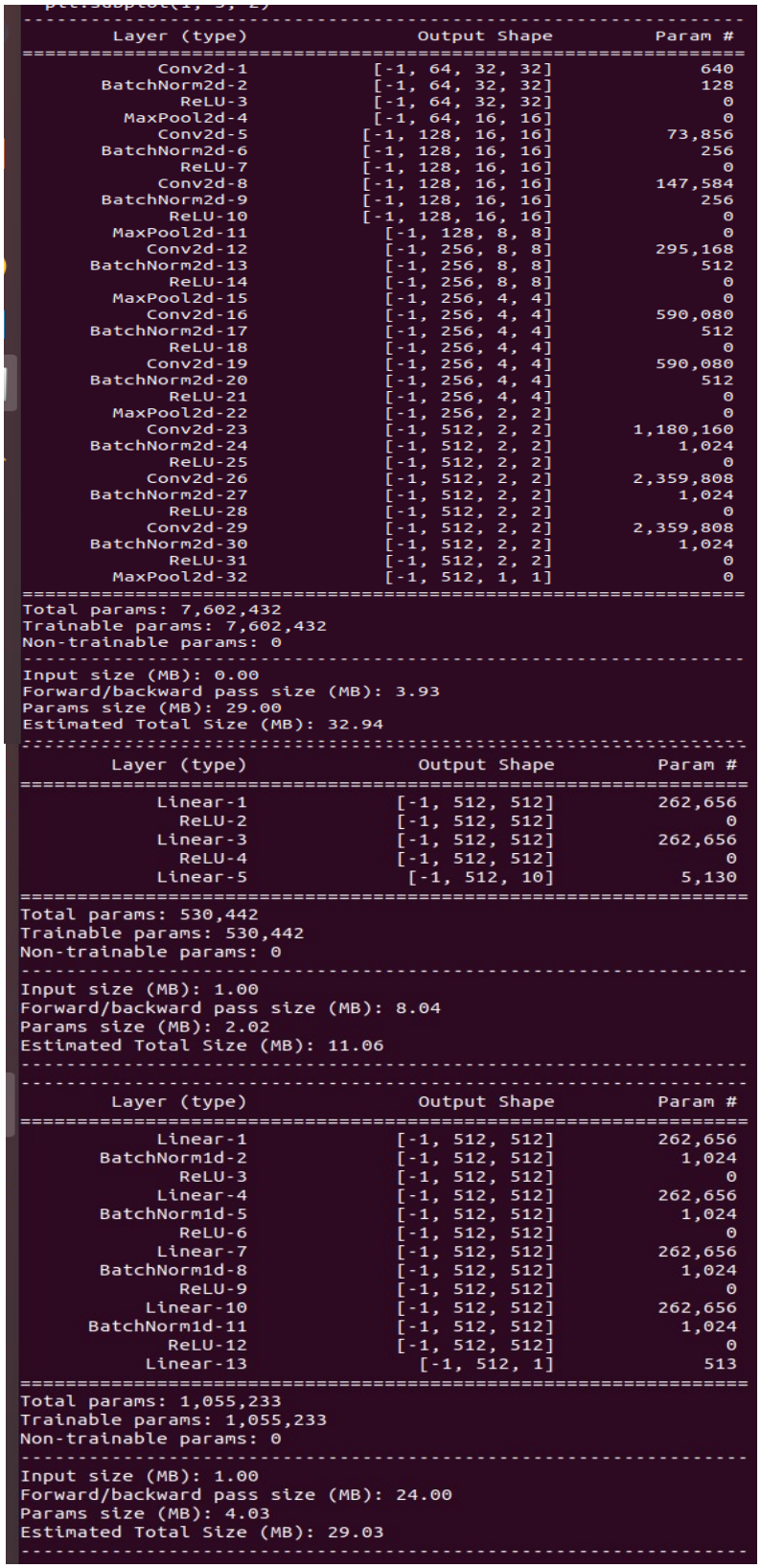
1. 請描述你實作的模型架構、方法以及 accuracy 為何。其中你的方法必須為 domain adversarial training 系列 (就是你的方法必須要讓輸入 training data & testing data 後的某一層輸出 domain 要相近)。(2%)



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----------------------------------------------------------------
        Layer (type)               Output Shape         Param #
================================================================
            Conv2d-1           [-1, 64, 32, 32]             640
       BatchNorm2d-2           [-1, 64, 32, 32]             128
              ReLU-3           [-1, 64, 32, 32]               0
         MaxPool2d-4           [-1, 64, 16, 16]               0
            Conv2d-5          [-1, 128, 16, 16]          73,856
       BatchNorm2d-6          [-1, 128, 16, 16]             256
              ReLU-7          [-1, 128, 16, 16]               0
            Conv2d-8          [-1, 128, 16, 16]         147,584
       BatchNorm2d-9          [-1, 128, 16, 16]             256
             ReLU-10          [-1, 128, 16, 16]               0
        MaxPool2d-11            [-1, 128, 8, 8]               0
           Conv2d-12            [-1, 256, 8, 8]         295,168
      BatchNorm2d-13            [-1, 256, 8, 8]             512
             ReLU-14            [-1, 256, 8, 8]               0
        MaxPool2d-15            [-1, 256, 4, 4]               0
           Conv2d-16            [-1, 256, 4, 4]         590,080
      BatchNorm2d-17            [-1, 256, 4, 4]             512
             ReLU-18            [-1, 256, 4, 4]               0
           Conv2d-19            [-1, 256, 4, 4]         590,080
      BatchNorm2d-20            [-1, 256, 4, 4]             512
             ReLU-21            [-1, 256, 4, 4]               0
        MaxPool2d-22            [-1, 256, 2, 2]               0
           Conv2d-23            [-1, 512, 2, 2]       1,180,160
      BatchNorm2d-24            [-1, 512, 2, 2]           1,024
             ReLU-25            [-1, 512, 2, 2]               0
           Conv2d-26            [-1, 512, 2, 2]       2,359,808
      BatchNorm2d-27            [-1, 512, 2, 2]           1,024
             ReLU-28            [-1, 512, 2, 2]               0
           Conv2d-29            [-1, 512, 2, 2]       2,359,808
      BatchNorm2d-30            [-1, 512, 2, 2]           1,024
             ReLU-31            [-1, 512, 2, 2]               0
        MaxPool2d-32            [-1, 512, 1, 1]               0
================================================================
Total params: 7,602,432
Trainable params: 7,602,432
Non-trainable params: 0
----------------------------------------------------------------
Input size (MB): 0.00
Forward/backward pass size (MB): 3.93
Params size (MB): 29.00
Estimated Total Size (MB): 32.94
----------------------------------------------------------------
        Layer (type)               Output Shape         Param #
================================================================
            Linear-1             [-1, 512, 512]         262,656
              ReLU-2             [-1, 512, 512]               0
            Linear-3             [-1, 512, 512]         262,656
              ReLU-4             [-1, 512, 512]               0
            Linear-5              [-1, 512, 10]           5,130
================================================================
Total params: 530,442
Trainable params: 530,442
Non-trainable params: 0
----------------------------------------------------------------
Input size (MB): 1.00
Forward/backward pass size (MB): 8.04
Params size (MB): 2.02
Estimated Total Size (MB): 11.06
----------------------------------------------------------------
----------------------------------------------------------------
        Layer (type)               Output Shape         Param #
================================================================
            Linear-1             [-1, 512, 512]         262,656
       BatchNorm1d-2             [-1, 512, 512]           1,024
              ReLU-3             [-1, 512, 512]               0
            Linear-4             [-1, 512, 512]         262,656
       BatchNorm1d-5             [-1, 512, 512]           1,024
              ReLU-6             [-1, 512, 512]               0
            Linear-7             [-1, 512, 512]         262,656
       BatchNorm1d-8             [-1, 512, 512]           1,024
              ReLU-9             [-1, 512, 512]               0
           Linear-10             [-1, 512, 512]         262,656
      BatchNorm1d-11             [-1, 512, 512]           1,024
             ReLU-12             [-1, 512, 512]               0
           Linear-13               [-1, 512, 1]             513
================================================================
Total params: 1,055,233
Trainable params: 1,055,233
Non-trainable params: 0
----------------------------------------------------------------
Input size (MB): 1.00
Forward/backward pass size (MB): 24.00
Params size (MB): 4.03
Estimated Total Size (MB): 29.03
----------------------------------------------------------------
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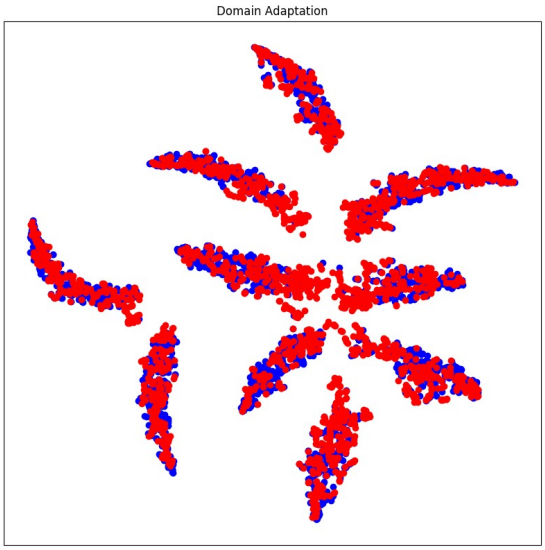
在此次作業中，我在 feature extractor 中，加深了三層 layer，使其參數量增大至 760w 個，domain classifier 以及 labelPredictor 則保持相同。並一樣的對 source 的 transform 轉為灰階，並一樣的進行 canny edge detection 轉為線條圖，水平翻轉，旋轉 15 度。target 的則先 resize 成 32×32，除了去掉 canny，因其原本就是線條圖，其他皆相同。會將 labelPredictor 以及 domain classfier 保持相同是因為本身已經夠強去對抗 feature extractor 了，若是增強 domain classifier 則在 kaggle 的分數並不會上升許多，若是增強了 label predictor 則幾乎不變，大概是因為他只是做 label classify 根本不需太強。

左邊圖分別為 feature_extractor, label_predictor,domain_classifier 的參數量以及架構。

2. 請視覺化真實圖片以及手繪圖片通過沒有使用 domain adversarial training 的 feature extractor 的 domain 分布圖。(2%)



3. 請視覺化真實圖片以及手繪圖片通過有使用 domain adversarial training 的 feature extractor 的 domain 分布圖。(2%)