

Homework 3

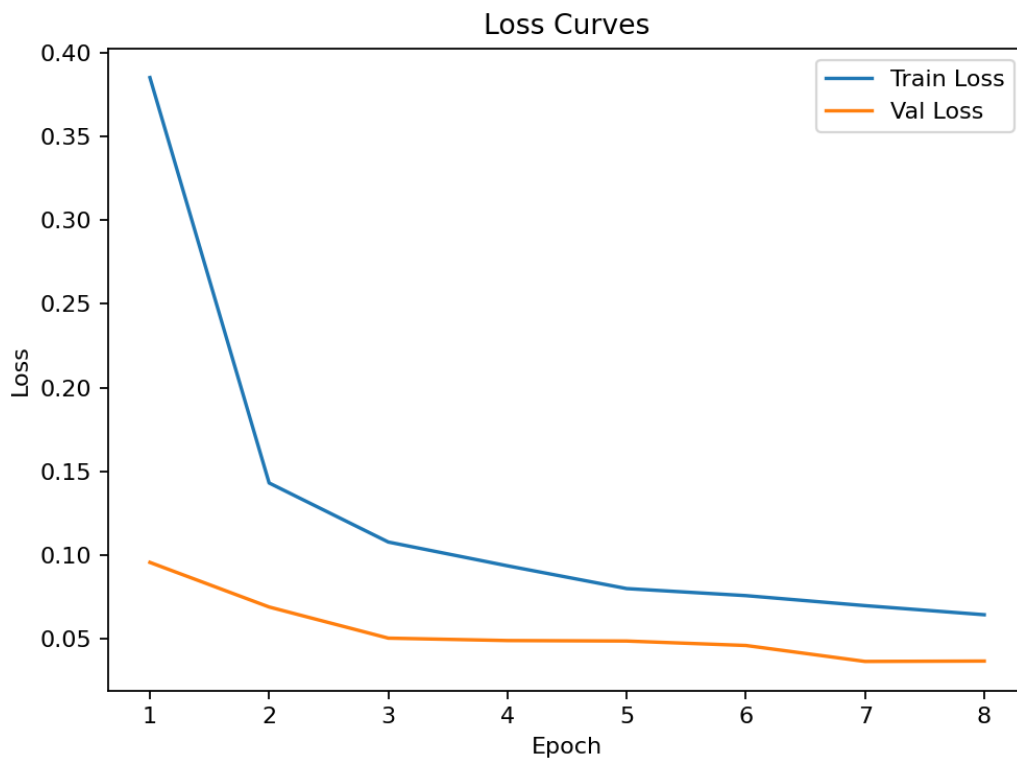
1) Network Architecture

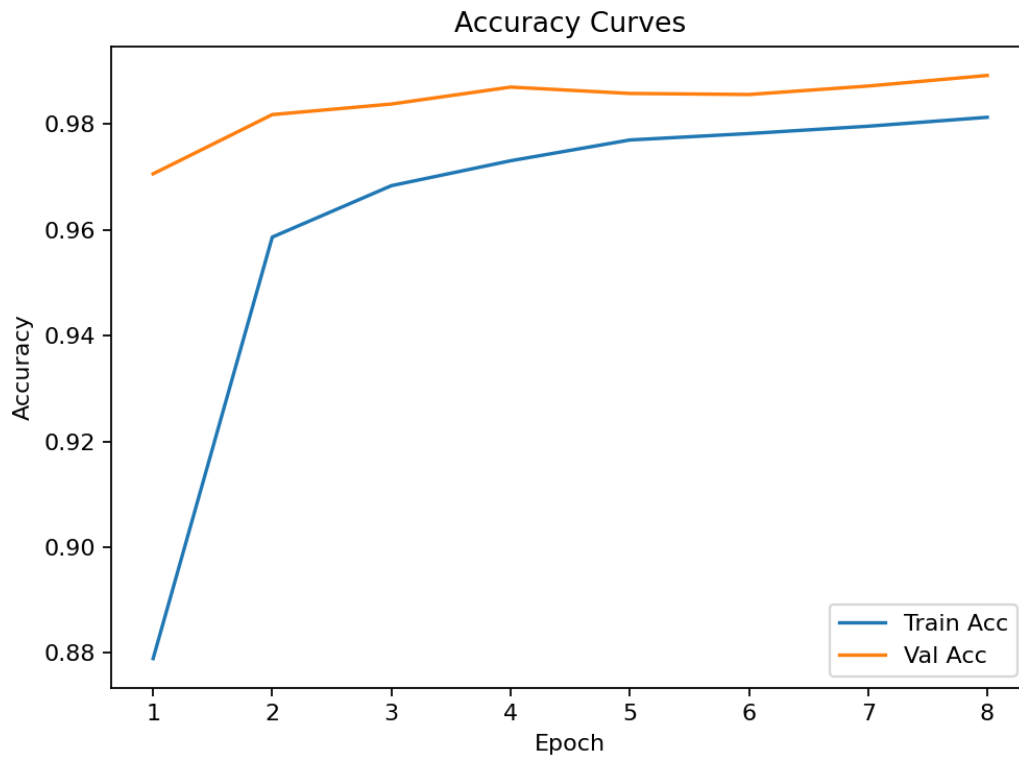
```
MNISTCNN(  
  (block1): Sequential(  
    (0): Conv2d(1, 32, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (1): ReLU(inplace=True)  
    (2): Conv2d(32, 32, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1))  
    (3): ReLU(inplace=True)  
    (4): MaxPool2d(kernel_size=2, stride=2, padding=0, dilation=1, ceil_mode=False)  
    (5): Dropout(p=0.25, inplace=False)  
  )  
  (block2): Sequential(  
    (0): Conv2d(32, 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): Dropout(p=0.25, inplace=False)  
  )  
  (fc1): Linear(in_features=3136, out_features=128, bias=True)  
  (fc2): Linear(in_features=128, out_features=10, bias=True)  
)
```

2) Code

See the attached file: mnist_cnn_pytorch.py

3) Training & Validation Curves



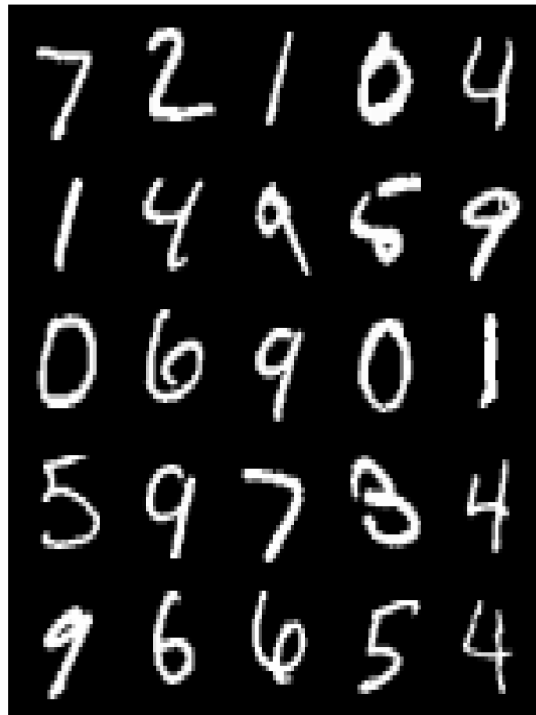


4) Test Results

Metric	Value
Best Val Loss	0.0366
Test Loss	0.0160
Test Accuracy	0.9946
Trainable Params	467,818

Sample Predictions

Predictions: 7 2 1 0 4 1 4 9 5 9 0 6 9 0 1 5 9 7 3 4 9 6 6 5 4



Confusion Matrix

Confusion matrix visualization showing True vs Predicted values. The color scale ranges from 0 (dark purple) to 1000 (yellow). The diagonal elements are bright yellow, indicating high counts for correct classifications. The off-diagonal elements are dark purple, indicating low counts for misclassifications.

