

1) Following is my network architecture:

(layers): SequentialLayer:

- (0): ConvLayer: Kernel: (3, 3) In Channels 1 Out Channels 16 Stride 1
- (1): MaxPoolLayer: kernel: 2 stride: 2
- (2): ReLULayer:
- (3): ResNetBlock:
  - (conv\_layers): SequentialLayer:
    - (0): ConvLayer: Kernel: (3, 3) In Channels 16 Out Channels 16 Stride 1
    - (1): ReLULayer:
    - (2): ConvLayer: Kernel: (3, 3) In Channels 16 Out Channels 16 Stride 1
  - (add\_layer): AddLayer:
  - (relu2): ReLULayer:
- (4): MaxPoolLayer: kernel: 2 stride: 2
- (5): ConvLayer: Kernel: (3, 3) In Channels 16 Out Channels 6 Stride 1
- (6): FlattenLayer:
- (7): LinearLayer: (294, 120)
- (8): ReLULayer:
- (9): LinearLayer: (120, 84)
- (10): ReLULayer:
- (11): LinearLayer: (84, 10)

With this relatively shallow architecture, I was able to get %99 in 27 epochs.

2) Using sigmoid slightly reduced the accuracy to 98% on my best model and using pReLU did not change the accuracy.

3) With the following network I was able to achieve 99.1% in 40 epochs.

(layers): SequentialLayer:

- (0): ConvLayer: Kernel: (5, 5) In Channels 1 Out Channels 6 Stride 1
- (1): ResNetBlock:
  - (conv\_layers): SequentialLayer:
    - (0): ConvLayer: Kernel: (3, 3) In Channels 6 Out Channels 6 Stride 1
    - (1): ReLULayer:
    - (2): ConvLayer: Kernel: (3, 3) In Channels 6 Out Channels 6 Stride 1
  - (add\_layer): AddLayer:
  - (relu2): ReLULayer:
- (2): MaxPoolLayer: kernel: 2 stride: 2
- (3): ReLULayer:
- (4): ResNetBlock:
  - (conv\_layers): SequentialLayer:
    - (0): ConvLayer: Kernel: (3, 3) In Channels 6 Out Channels 6 Stride 1
    - (1): ReLULayer:
    - (2): ConvLayer: Kernel: (3, 3) In Channels 6 Out Channels 6 Stride 1
  - (add\_layer): AddLayer:
  - (relu2): ReLULayer:

(5): ConvLayer: Kernel: (5, 5) In Channels 6 Out Channels 16 Stride 1  
(6): ReLULayer:  
(7): ResNetBlock:  
    (conv\_layers): SequentialLayer:  
        (0): ConvLayer: Kernel: (3, 3) In Channels 16 Out Channels 16 Stride 1  
        (1): ReLULayer:  
        (2): ConvLayer: Kernel: (3, 3) In Channels 16 Out Channels 16 Stride 1  
    (add\_layer): AddLayer:  
    (relu2): ReLULayer:  
(8): MaxPoolLayer: kernel: 2 stride: 2  
(9): ReLULayer:  
(10): FlattenLayer:  
(11): LinearLayer: (784, 120)  
(12): ReLULayer:  
(13): LinearLayer: (120, 84)  
(14): ReLULayer:  
(15): LinearLayer: (84, 10)