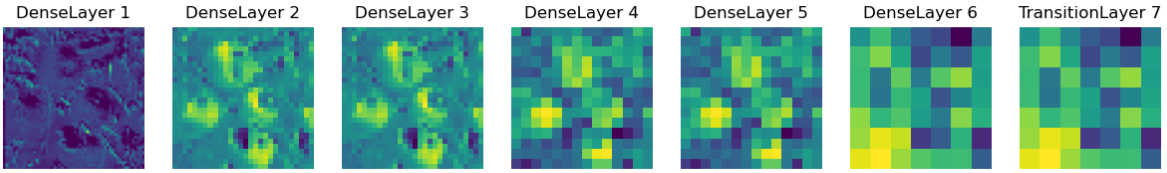
6 DenseNet Result

- DenseNet 121



- DeseNet은 여러개의 DenseLayer가 있는 DenseBlock에서 각 DenseLayer의 output을 input으로 추가로 받아 특성을 추출하는 방식이며, DenseBlock에서 ModuleList를 사용해 DenseLayer를 순차적으로 실행함
- 이후, TransitionLayer는 DenseBlock 사이에 위치하여, 특징 맵의 크기와 차원을 줄여줌
  - 계산 비용을 관리하고, 너무 많은 특징이 네트워크 후반부로 전달되는것을 방지해줌
  - BatchNormalization : 정규화 과정을 통해 입력을 안정화
  - Convolution(conv1) : 1 × 1 컨볼루션을 사용하여 채널수를 in_channels * compression_factor로 줄임 → 특징 차원을 축소
  - Arverage Pooling (avgpool) : 공간 크기를 반으로 줄임

- 결과
  - DenseNet-121

```
Epoch: 001/030 | Train_Error: 57.917%
Epoch: 011/030 | Batch 0000/0004 | Cost: 0.0299
Epoch: 011/030 | Train_Error: 2.500%
Epoch: 021/030 | Batch 0000/0004 | Cost: 0.1222
Epoch: 021/030 | Train_Error: 1.667%
Epoch: 030/030 | Batch 0000/0004 | Cost: 0.0139
Epoch: 030/030 | Train_Error: 0.417%
```

  - ResNet-50

```
Epoch: 001/030 | Batch 0000/0004 | Cost: 1.2001
Epoch: 001/030 | Train_Error: 42.500%
Epoch: 011/030 | Batch 0000/0004 | Cost: 0.0249
Epoch: 011/030 | Train_Error: 2.500%
Epoch: 021/030 | Batch 0000/0004 | Cost: 0.0644
Epoch: 021/030 | Train_Error: 3.333%
Epoch: 030/030 | Batch 0000/0004 | Cost: 0.0155
Epoch: 030/030 | Train_Error: 6.667%
```

- 데이터의 양이 많지 않아 정확하지 않지만 논문의 분석대로 RseNet보다 DenseNet이 더 좋은 결과를 주었음

▼ Input이 각 DenseBlcok과 TransitionLayer를 통과할 때의 결과

DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(64, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(76, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(76, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(88, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(88, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(100, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(100, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(112, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(112, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(124, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(124, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(136, eps=1e-05, momentum=0.1, affine=True,

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track_running_stats=True)
(conv1): Conv2d(136, 68, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(68, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(68, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(80, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(80, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(92, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(92, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(104, eps=1e-05, momentum=0.1, affine=True,
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track_running_stats=True)
(conv1): Conv2d(104, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(116, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(116, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(128, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(140, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(140, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(7): DenseLayer(
(BN1): BatchNorm2d(152, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(152, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(164, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(164, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(176, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(176, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(188, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(188, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

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(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(200, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(200, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(212, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(212, 106, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(106, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(106, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(118, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(118, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
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(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(130, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(130, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(142, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(142, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(154, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(154, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(166, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(166, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(178, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(178, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(190, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(190, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(202, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(202, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(214, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(214, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(226, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(226, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(238, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(238, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(250, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(250, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(13): DenseLayer(
(BN1): BatchNorm2d(262, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(262, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(274, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(274, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(286, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(286, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(16): DenseLayer(
(BN1): BatchNorm2d(298, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(298, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(17): DenseLayer(
(BN1): BatchNorm2d(310, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(310, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(18): DenseLayer(
(BN1): BatchNorm2d(322, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(322, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(19): DenseLayer(
(BN1): BatchNorm2d(334, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(334, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(20): DenseLayer(
(BN1): BatchNorm2d(346, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(346, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(21): DenseLayer(
(BN1): BatchNorm2d(358, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(358, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(22): DenseLayer(
(BN1): BatchNorm2d(370, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(370, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(23): DenseLayer(
(BN1): BatchNorm2d(382, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(382, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(394, eps=1e-05, momentum=0.1, affine=True,

```
track_running_stats=True)
(conv1): Conv2d(394, 197, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(197, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(197, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(209, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(209, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(221, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(221, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(233, eps=1e-05, momentum=0.1, affine=True,
```

track_running_stats=True)
(conv1): Conv2d(233, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(245, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(245, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(257, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(257, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(269, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(269, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(7): DenseLayer(
(BN1): BatchNorm2d(281, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(281, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(293, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(293, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(305, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(305, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(317, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(317, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(329, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(329, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(341, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(341, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(353, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(353, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(365, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(365, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(377, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(377, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(64, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(76, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(76, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)

(2): DenseLayer(
(BN1): BatchNorm2d(88, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(88, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(100, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(100, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(112, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(112, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(124, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(124, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

```
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(136, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(136, 68, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(68, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(68, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(80, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(80, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(92, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(92, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
```

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(104, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(104, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(116, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(116, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(128, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(140, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(140, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(152, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(152, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(164, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(164, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(176, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(176, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(188, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(188, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(200, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(200, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(212, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(212, 106, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(106, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(106, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(1): DenseLayer(
(BN1): BatchNorm2d(118, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(118, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(130, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(130, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(142, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(142, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(154, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(154, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(166, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(166, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(178, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(178, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(190, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(190, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(202, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(202, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(214, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(214, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(226, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(226, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(238, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(238, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(250, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(250, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(262, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(262, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(274, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(274, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(286, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(286, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(16): DenseLayer(
(BN1): BatchNorm2d(298, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(298, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(17): DenseLayer(
(BN1): BatchNorm2d(310, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(310, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(18): DenseLayer(
(BN1): BatchNorm2d(322, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(322, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(19): DenseLayer(
(BN1): BatchNorm2d(334, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(334, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(20): DenseLayer(
(BN1): BatchNorm2d(346, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(346, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(21): DenseLayer(
(BN1): BatchNorm2d(358, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(358, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(22): DenseLayer(
(BN1): BatchNorm2d(370, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(370, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(23): DenseLayer(
(BN1): BatchNorm2d(382, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(382, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(394, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(394, 197, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(197, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(197, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(209, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(209, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(221, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(221, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(233, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(233, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(245, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(245, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(257, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(257, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(269, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(269, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(281, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(281, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(293, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(293, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(305, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(305, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(317, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(317, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(329, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(329, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(341, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(341, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(353, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(353, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(14): DenseLayer(
(BN1): BatchNorm2d(365, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(365, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(377, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(377, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(64, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(76, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(76, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(88, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(88, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(100, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(100, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(112, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(112, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(124, eps=1e-05, momentum=0.1, affine=True,

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track_running_stats=True)
(conv1): Conv2d(124, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(136, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(136, 68, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(68, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(68, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(80, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(80, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
```

(2): DenseLayer(
(BN1): BatchNorm2d(92, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(92, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(104, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(104, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(116, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(116, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(128, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(140, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(140, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(152, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(152, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(164, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(164, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(176, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(176, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(188, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(188, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(200, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(200, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(212, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(212, 106, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(106, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(106, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(118, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(118, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(130, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(130, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(142, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(142, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(154, eps=1e-05, momentum=0.1, affine=True,

```
track_running_stats=True)
(conv1): Conv2d(154, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(166, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(166, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(178, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(178, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(190, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(190, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
```

(8): DenseLayer(
(BN1): BatchNorm2d(202, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(202, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(214, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(214, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(226, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(226, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(238, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(238, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(250, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(250, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(262, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(262, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(274, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(274, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(286, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(286, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(16): DenseLayer(
(BN1): BatchNorm2d(298, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(298, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(17): DenseLayer(
(BN1): BatchNorm2d(310, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(310, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(18): DenseLayer(
(BN1): BatchNorm2d(322, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(322, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(19): DenseLayer(
(BN1): BatchNorm2d(334, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(334, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(20): DenseLayer(
(BN1): BatchNorm2d(346, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(346, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(21): DenseLayer(
(BN1): BatchNorm2d(358, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(358, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(22): DenseLayer(
(BN1): BatchNorm2d(370, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(370, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(23): DenseLayer(
(BN1): BatchNorm2d(382, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(382, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(394, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(394, 197, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(197, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(197, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(209, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(209, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(2): DenseLayer(
(BN1): BatchNorm2d(221, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(221, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(233, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(233, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(245, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(245, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(257, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(257, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(269, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(269, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(281, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(281, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(293, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(293, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(305, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(305, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(317, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(317, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(329, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(329, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(341, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(341, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(353, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(353, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(365, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(365, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(377, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(377, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(64, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

```
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(76, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(76, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(88, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(88, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(100, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(100, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(112, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(112, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
```

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(124, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(124, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(136, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(136, 68, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(68, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(68, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(80, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(80, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(92, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(92, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(104, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(104, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(116, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(116, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(128, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(140, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(140, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(152, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(152, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(164, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(164, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

```
(9): DenseLayer(
(BN1): BatchNorm2d(176, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(176, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(188, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(188, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(200, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(200, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(212, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(212, 106, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
```

```
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(106, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(106, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(118, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(118, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(130, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(130, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(142, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(142, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
```

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(154, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(154, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(166, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(166, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(178, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(178, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(190, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(190, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(202, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(202, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(214, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(214, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(226, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(226, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(238, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(238, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(250, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(250, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(262, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(262, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(274, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(274, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(15): DenseLayer(
(BN1): BatchNorm2d(286, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(286, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(16): DenseLayer(
(BN1): BatchNorm2d(298, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(298, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(17): DenseLayer(
(BN1): BatchNorm2d(310, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(310, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(18): DenseLayer(
(BN1): BatchNorm2d(322, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(322, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(19): DenseLayer(
(BN1): BatchNorm2d(334, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(334, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(20): DenseLayer(
(BN1): BatchNorm2d(346, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(346, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(21): DenseLayer(
(BN1): BatchNorm2d(358, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(358, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(22): DenseLayer(
(BN1): BatchNorm2d(370, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(370, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(23): DenseLayer(
(BN1): BatchNorm2d(382, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(382, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(394, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(394, 197, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(197, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(197, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(209, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(209, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(221, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(221, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(233, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(233, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(245, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(245, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(257, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(257, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(269, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(269, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(281, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(281, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(293, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(293, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

(9): DenseLayer(
(BN1): BatchNorm2d(305, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(305, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(317, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(317, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(329, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(329, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(12): DenseLayer(
(BN1): BatchNorm2d(341, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(341, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(13): DenseLayer(
(BN1): BatchNorm2d(353, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(353, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(14): DenseLayer(
(BN1): BatchNorm2d(365, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(365, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(15): DenseLayer(
(BN1): BatchNorm2d(377, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(377, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True,

track_running_stats=True)
(conv1): Conv2d(64, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(76, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(76, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(88, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(88, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(100, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(100, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)

```
(4): DenseLayer(
(BN1): BatchNorm2d(112, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(112, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(124, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(124, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
TransitionLayer(
(BN): BatchNorm2d(136, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(136, 68, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(68, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(68, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
```

(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(80, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(80, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(92, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(92, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(3): DenseLayer(
(BN1): BatchNorm2d(104, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(104, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(116, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(116, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)

(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(128, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(128, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(140, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(140, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(152, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(152, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(164, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(164, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)

```
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(176, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(176, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(188, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(188, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(11): DenseLayer(
(BN1): BatchNorm2d(200, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(200, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
)
)
```

```
TransitionLayer(
(BN): BatchNorm2d(212, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(212, 106, kernel_size=(1, 1), stride=(1, 1), bias=False)
(avgpool): AvgPool2d(kernel_size=2, stride=2, padding=0)
)
DenseBlock(
(deep_nn): ModuleList(
(0): DenseLayer(
(BN1): BatchNorm2d(106, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(106, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(1): DenseLayer(
(BN1): BatchNorm2d(118, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(118, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(2): DenseLayer(
(BN1): BatchNorm2d(130, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(130, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
```

(3): DenseLayer(
(BN1): BatchNorm2d(142, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(142, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(4): DenseLayer(
(BN1): BatchNorm2d(154, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(154, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(5): DenseLayer(
(BN1): BatchNorm2d(166, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(166, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)
(relu): ReLU()
)
(6): DenseLayer(
(BN1): BatchNorm2d(178, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv1): Conv2d(178, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1), bias=False)

(relu): ReLU()
)
(7): DenseLayer(
(BN1): BatchNorm2d(190, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(190, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(8): DenseLayer(
(BN1): BatchNorm2d(202, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(202, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(9): DenseLayer(
(BN1): BatchNorm2d(214, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(214, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv2): Conv2d(48, 12, kernel_size=(3, 3), stride=(1, 1), padding=(1, 1),
bias=False)
(relu): ReLU()
)
(10): DenseLayer(
(BN1): BatchNorm2d(226, eps=1e-05, momentum=0.1, affine=True,
track_running_stats=True)
(conv1): Conv2d(226, 48, kernel_size=(1, 1), stride=(1, 1), bias=False)
(BN2): BatchNorm2d(48, eps=1e-05, momentum=0.1, affine=True,
track_running_s