산업인공지능학과

딥러닝실제

11주차 과제

2020254003

원형일

4-4 수행

```
[[ 967    0    3    0    2    3    6    1    7    2]
 [   0 1126    1    0    0    0    3    4    0    2]
 [   2    2 1011    4    0    0    3    7    4    0]
 [   1    1    0  987    1   12    1    3   10    3]
 [   1    0    3    0  966    1    1    2    5   11]
 [   0    1    0    6    0  862    4    1    2    1]
 [   3    2    4    0    4    3  938    0    3    0]
 [   3    1    3    4    1    3    1 1002    3    6]
 [   2    2    6    3    1    4    1    5  934    3]
 [   1    0    1    6    7    4    0    3    6  981]]
테스트 집합에 대한 정확률은 97.74000000000001 %입니다.
```

Batch size (128), 은닉층(50)

```
[[ 966    0    4    0    0    2    8    0    5    1]
 [   0 1124    1    0    1    1    2    4    1    3]
 [   2    3  997    6    3    1    3    9    5    0]
 [   1    1    7  980    0   15    1    4    5    5]
 [   1    0    5    0  963    1    5    1    3    9]
 [   3    1    0   10    1  860    5    0    2    4]
 [   3    2    1    1    4    3  929    0    3    1]
 [   1    1    8    1    2    1    0 1004    5    7]
 [   2    3    8    5    0    4    4    1  942    4]
 [   1    0    1    7    8    4    1    5    3  975]]
테스트 집합에 대한 정확률은 97.39999999999999 %입니다.
```

결과 비교

```
Iteration 51, loss = 0.00486176
Iteration 52, loss = 0.00444588
Iteration 53, loss = 0.00421400
Iteration 54, loss = 0.00397251
Iteration 55, loss = 0.00365958
Iteration 56, loss = 0.00354238
Iteration 57, loss = 0.00328264
Iteration 58, loss = 0.00290936
Iteration 59, loss = 0.00277624
Iteration 60, loss = 0.00266533
Iteration 61, loss = 0.00258080
Iteration 62, loss = 0.00237921
Iteration 63, loss = 0.00225523
Iteration 64, loss = 0.00215939
Iteration 65, loss = 0.00217407
Iteration 66, loss = 0.00186751
Iteration 67, loss = 0.00183878
Iteration 68, loss = 0.00175877
Iteration 69, loss = 0.00159786
Iteration 70, loss = 0.00146059
Iteration 71, loss = 0.00143468
Iteration 72, loss = 0.00146194
Iteration 73, loss = 0.00125195
Iteration 74, loss = 0.00119484
Iteration 75, loss = 0.00111463
Iteration 76, loss = 0.00107250
Iteration 77, loss = 0.00104081
Iteration 78, loss = 0.00100743
Iteration 79, loss = 0.00096740
Iteration 80, loss = 0.00091050
Iteration 81, loss = 0.00086888
Iteration 82, loss = 0.00925510
Iteration 83, loss = 0.00531615
Iteration 84, loss = 0.00161777
Training loss did not improve more than tol=0.000100 for 10 consecutive epochs. Stopping.
[[ 967    0    3    0    2    3    6    1    7    2]
 [   0 1126    1    0    0    0    3    4    0    2]
 [   2    2 1011    4    0    0    3    7    4    0]
 [   1    1    0  987    1   12    1    3   10    3]
 [   1    0    3    0  966    1    1    2    5   11]
 [   0    1    0    6    0  862    4    1    2    1]
 [   3    2    4    0    4    3  938    0    3    0]
 [   3    1    3    4    1    3    1 1002    3    6]
 [   2    2    6    3    1    4    1    5  934    3]
 [   1    0    1    6    7    4    0    3    6  981]]
테스트 집합에 대한 정확률은 97.74000000000001 %입니다.
```

```
Iteration 51, loss = 0.00443618
Iteration 52, loss = 0.00333789
Iteration 53, loss = 0.00300366
Iteration 54, loss = 0.00509523
Iteration 55, loss = 0.00683490
Iteration 56, loss = 0.00330853
Iteration 57, loss = 0.00355517
Iteration 58, loss = 0.00289370
Iteration 59, loss = 0.00222551
Iteration 60, loss = 0.00209556
Iteration 61, loss = 0.00205318
Iteration 62, loss = 0.01137441
Iteration 63, loss = 0.00375179
Iteration 64, loss = 0.00223157
Iteration 65, loss = 0.00188113
Iteration 66, loss = 0.00180557
Iteration 67, loss = 0.00206261
Iteration 68, loss = 0.01010693
Iteration 69, loss = 0.00290468
Iteration 70, loss = 0.00191141
Iteration 71, loss = 0.00171370
Iteration 72, loss = 0.00166227
Iteration 73, loss = 0.00163282
Iteration 74, loss = 0.00454240
Iteration 75, loss = 0.00760634
Iteration 76, loss = 0.00202279
Training loss did not improve more than tol=0.000100 for 10 consecutive epochs. Stopping.
[[ 966    0    4    0    0    2    8    0    5    1]
 [   0 1124    1    0    1    1    2    4    1    3]
 [   2    3  997    6    3    1    3    9    5    0]
 [   1    1    7  980    0   15    1    4    5    5]
 [   1    0    5    0  963    1    5    1    3    9]
 [   3    1    0   10    1  860    5    0    2    4]
 [   3    2    1    1    4    3  929    0    3    1]
 [   1    1    8    1    2    1    0 1004    5    7]
 [   2    3    8    5    0    4    4    1  942    4]
 [   1    0    1    7    8    4    1    5    3  975]]
테스트 집합에 대한 정확률은 97.39999999999999 %입니다.
```

결론

■ 회차에 따른 초기에는 loss가 급속히 줄어듬. 그러나 회차가 갈수록 줄어드는 loss 가 적어져 유의미한 결과가 나타나지않음

■ batch size와 은닉층의 사이즈 변화를 준 결과 정확도가 떨어짐
batch size와 은닉층의 사이즈 변화가 정확도에 영향을 끼친다는것을 알수있음