중간과제 - CIFAR10 인식 정확도 챌린지

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● 최종정확도

Accuracy of Test Data: **76.9831771850586**

```
# 성능 확인
model.eval()
ComputeAccr(test_loader, model)
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: UserWarning: volatile was removed and now has no effect. Use `with torch.no_grad():` instead.

Accuracy of Test Data: 76.9831771850586
```

● 선택한 방법

- Activation Function: ReLU
- Loss Function: CrossEntropyLoss
- batch size: 32
- learning rate: 0.001
- number of epoch: 10
- Data augmentation: x
- Data Normalization: x
- Dropout: 0.2
- Batch normalization: o
- Weight initialization: o
- Scheduler
  - └ Optimizer: Adam
  - └ step size: 100
  - └ gamma: 0.2

* Loss Function: CrossEntropyLoss

try	Activation Function	Scheduler			Dropout	Batch normalization	Weight initialization	Data Augmentation	Data Normalization	batch size	learning rate	number of epoch	Accuracy
		Optimizer	step size	gamma									
1	ReLU	x	x	x	x	x	x	x	x	16	0.002	10	10.0
2	ReLU	SGD	20	0.2	x	x	x	x	x	16	0.002	10	55.93
3	ReLU	Adam	20	0.2	x	x	x	x	x	16	0.002	10	67.68
4	ReLU	Adam	100	0.2	x	x	x	x	x	16	0.002	10	67.90
5	ReLU	Adam	140	0.2	x	x	x	x	x	16	0.002	10	65.34
6	ReLU	Adam	170	0.2	x	x	x	x	x	16	0.002	10	66.43
7	ReLU	Adam	160	0.2	x	x	x	x	x	16	0.002	10	65.56
8	ReLU	Adam	150	0.1	x	x	x	x	x	16	0.002	10	66.15
9	ReLU	Adam	150	0.3	x	x	x	x	x	16	0.002	10	66.08
10	ReLU	Adam	150	0.2	x	x	x	x	x	16	0.002	10	67.22
11	ReLU	Adam	150	0.2	0.2	x	x	x	x	16	0.002	10	68.48
12	ReLU	Adam	150	0.2	0.3	x	x	x	x	16	0.002	10	59.12
13	ReLU	Adam	150	0.2	0.4	x	x	x	x	16	0.002	10	51.55
14	ReLU	Adam	150	0.2	0.2	o	x	x	x	16	0.002	10	74.25
15	ReLU	Adam	150	0.2	0.2	o	o	x	x	16	0.002	10	75.44
16	ReLU	Adam	100	0.2	0.2	o	o	x	x	16	0.002	10	75.66
17	ReLU	Adam	20	0.2	0.2	o	o	x	x	16	0.002	10	75.81
18	ReLU	Adam	20	0.2	0.2	o	o	o	x	16	0.002	10	27.76
19	ReLU	Adam	100	0.2	0.2	o	o	o	x	16	0.002	10	28.42
20	ReLU	Adam	150	0.2	0.2	o	o	x	o	16	0.002	10	75.11
21	ReLU	Adam	100	0.2	0.2	o	o	x	o	16	0.002	10	74.43
22	ReLU	Adam	20	0.2	0.2	o	o	x	o	16	0.002	10	74.25
23	ReLU	Adam	150	0.2	0.2	o	o	x	x	16	0.002	10	75.27
24	ReLU	Adam	100	0.2	0.2	o	o	x	x	16	0.002	10	75.08
25	ReLU	Adam	20	0.2	0.2	o	o	x	x	16	0.002	10	75.58
26	ReLU	Adam	150	0.2	0.2	o	o	x	x	32	0.002	10	74.98
27	ReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.002	10	76.14
28	ReLU	Adam	20	0.2	0.2	o	o	x	x	32	0.002	10	75.02

29	ReLU	Adam	150	0.2	0.2	o	o	x	x	64	0.002	10	74.85
30	ReLU	Adam	100	0.2	0.2	o	o	x	x	64	0.002	10	74.75
31	ReLU	Adam	20	0.2	0.2	o	o	x	x	64	0.002	10	74.76
32	ReLU	Adam	150	0.2	0.2	o	o	x	x	32	0.001	10	76.18
33	ReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.001	10	76.98
34	ReLU	Adam	20	0.2	0.2	o	o	x	x	32	0.001	10	76.13
35	ReLU	Adam	150	0.2	0.2	o	o	x	x	32	0.003	10	74.56
36	ReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.003	10	75.96
37	ReLU	Adam	20	0.2	0.2	o	o	x	x	32	0.003	10	76.11
38	ReLU	Adam	150	0.2	0.2	o	o	x	x	32	0.001	20	76.32
39	ReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.001	20	75.90
40	ReLU	Adam	20	0.2	0.2	o	o	x	x	32	0.001	20	75.75
41	ReLU	Adam	150	0.2	0.2	o	o	x	x	32	0.001	30	76.06
42	ReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.001	30	75.79
43	ReLU	Adam	20	0.2	0.2	o	o	x	x	32	0.001	30	75.70
44	ReLU	Adam	150	0.2	0.2	o	o	x	x	32	0.002	30	74.57
45	LeakyReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.001	10	73.97
46	RReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.001	10	73.87
47	PReLU	Adam	100	0.2	0.2	o	o	x	x	32	0.001	10	75.50

● 결론 및 느낀점

위의 표와 같이 실험을 진행하였다. 이번 실험을 통해 훈련에 있어 GPU 가속이 얼마나 중요한 역할을 하는지 느낄 수 있었다. 하지만 GPU 가속을 받아도 집중력과 인내심이 요구되는 것 같다. 이번에는 수정하지 않았지만 CNN 구조부터 Activation function, Normalization, 파라미터들 등의 조합을 통해 성능이 향상되는 것을 직접 시도해보니 수업시간에 이론으로만 배웠던 내용들을 실감할 수 있었다. 다음에 기회가 된다면 validation 세트에 대한 정확도를 높인 후에 test해보고 싶다.