

# 분류기 뉴럴 네트워크 개발

현재까지의 진행 상황 발표

## 환경 세팅



NVIDIA Driver 460



CUDA 11.1



Anaconda



Pytorch



Ubuntu 20.04



RTX 3090

- GPU 호환 문제
- Nvidia Driver 연결 오류
- CUDA 버전 문제

...

→ 많은 시간이 소요

## 데이터 전처리



Crop



Resize

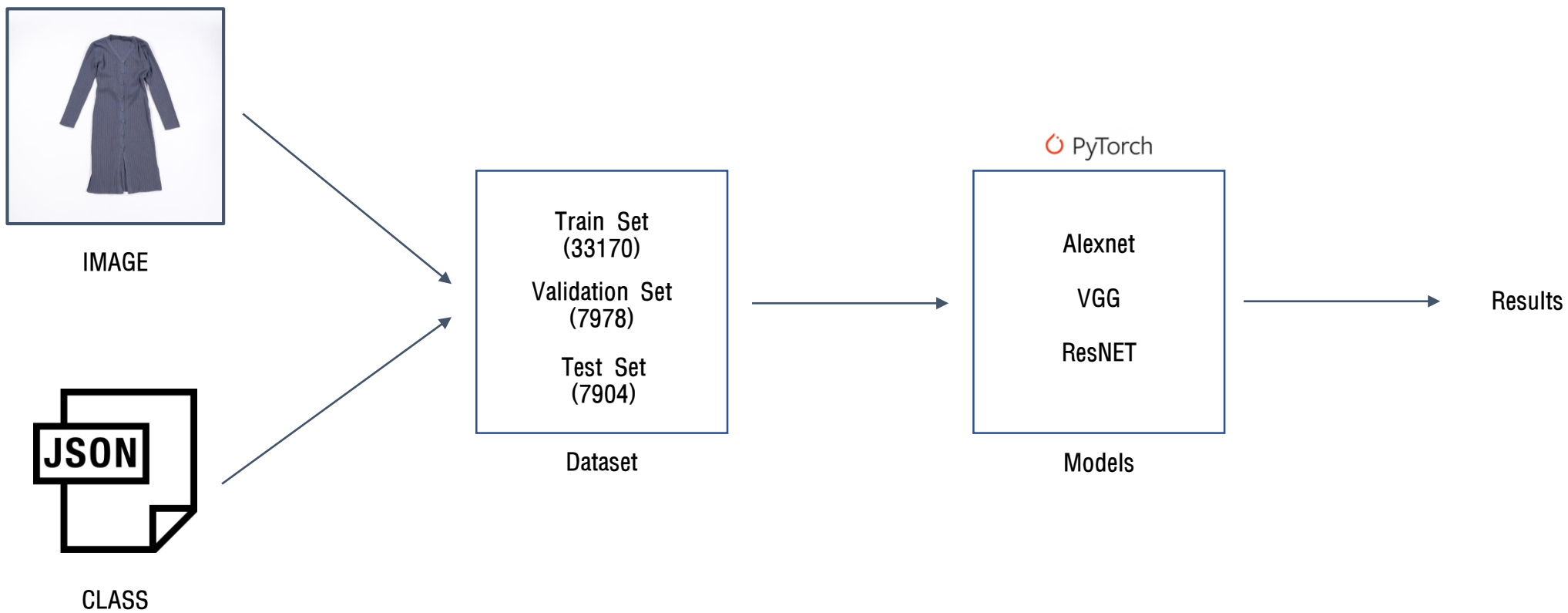


256

256

265 x 256의 통일된 크기의 이미지로 전처리

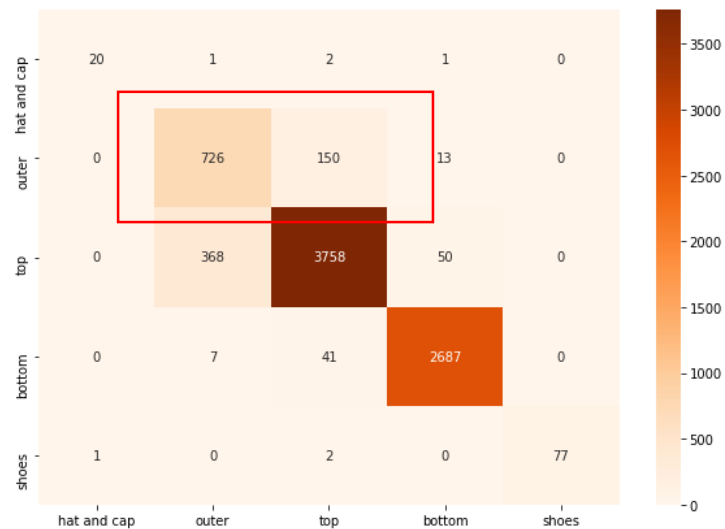
## 학습 모델



## 학습 결과

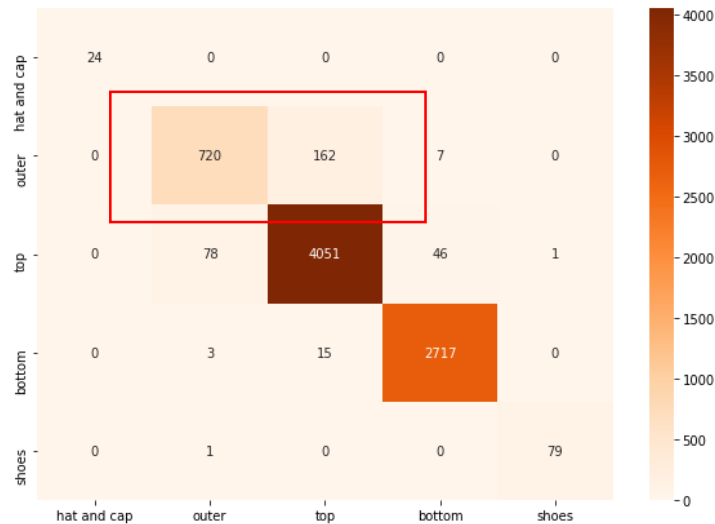
Alexnet

Accuracy of 0 : 83 %  
 Accuracy of 1 : 81 %  
 Accuracy of 2 : 89 %  
 Accuracy of 3 : 98 %  
 Accuracy of 4 : 96 %  
 total Accuracy : 91 %



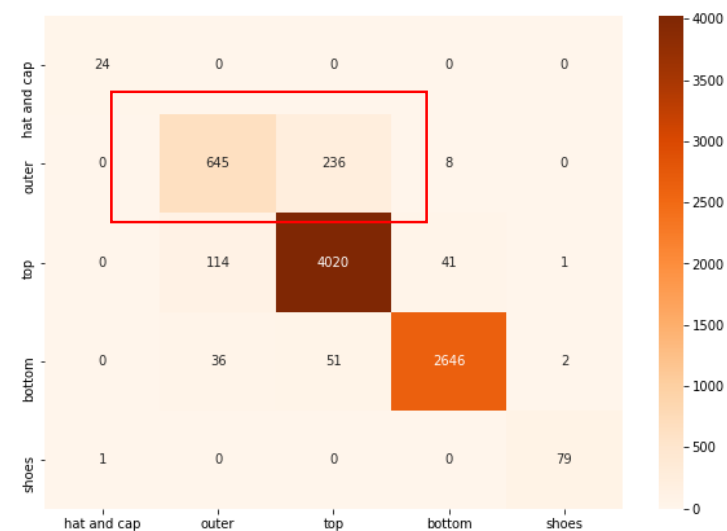
VGG

Accuracy of 0 : 100 %  
 Accuracy of 1 : 80 %  
 Accuracy of 2 : 97 %  
 Accuracy of 3 : 99 %  
 Accuracy of 4 : 98 %  
 total Accuracy : 96 %



ResNET

Accuracy of 0 : 100 %  
 Accuracy of 1 : 72 %  
 Accuracy of 2 : 96 %  
 Accuracy of 3 : 96 %  
 Accuracy of 4 : 98 %  
 total Accuracy : 93 %



## 문제점 분석

데이터 불균형?

모자 - 210  
외투 - 4984  
상의 - 20218  
하의 - 7304  
신발 - 454

TRAIN SET

외투와 상의의 모양이 유사  
But, 상의에 비해 외투의 데이터가 현저히 적음.

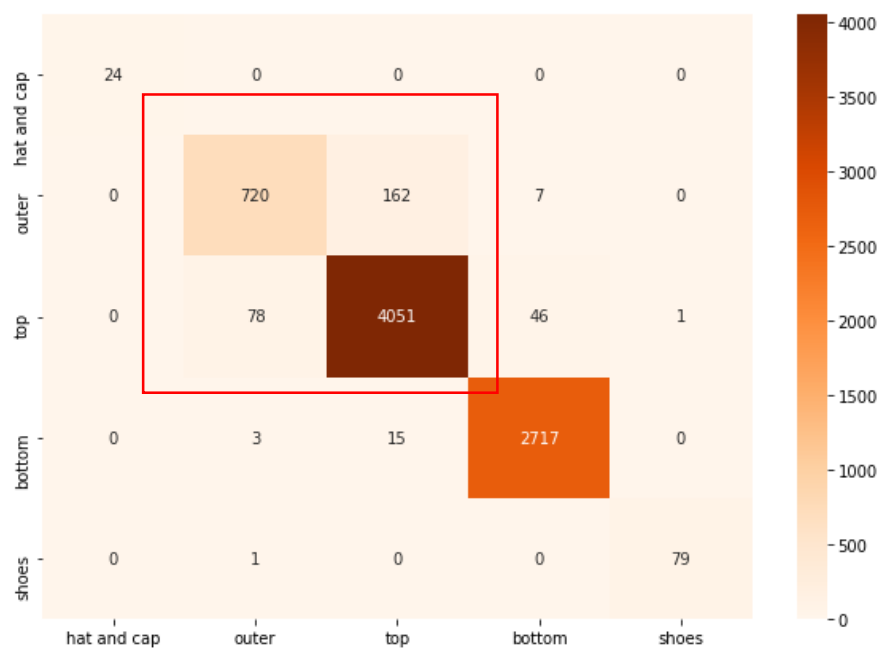
(외투 사진에 대한)  
Augmentation

4984개 → 19936개  
(x4)

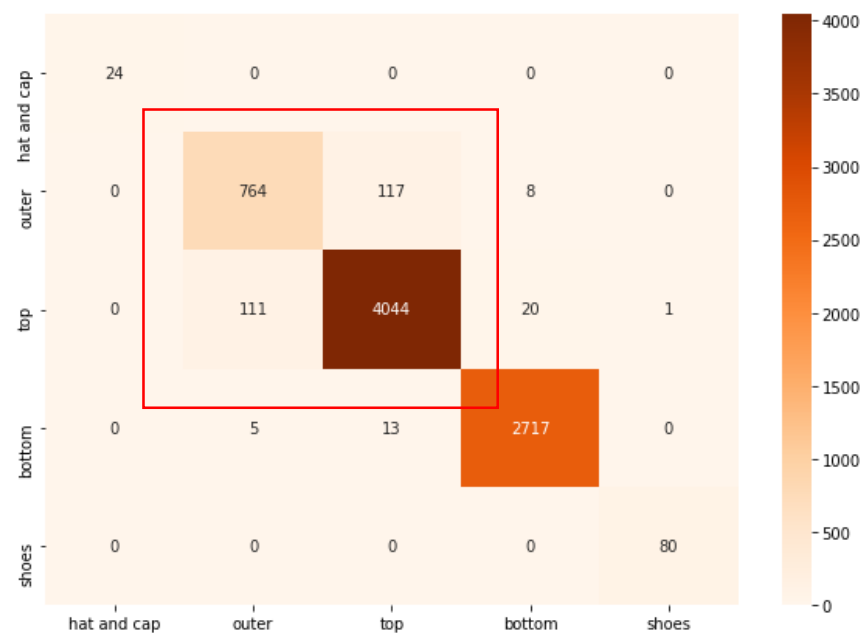
외투 사진 하나 당 3개의 랜덤 변형 이미지를 생성하여  
외투 이미지를 4배로 증폭

## 학습 결과 - VGG

Accuracy of 0 : 100 %  
 Accuracy of 1 : 80 %  
 Accuracy of 2 : 97 %  
 Accuracy of 3 : 99 %  
 Accuracy of 4 : 98 %  
 total Accuracy : 96 %

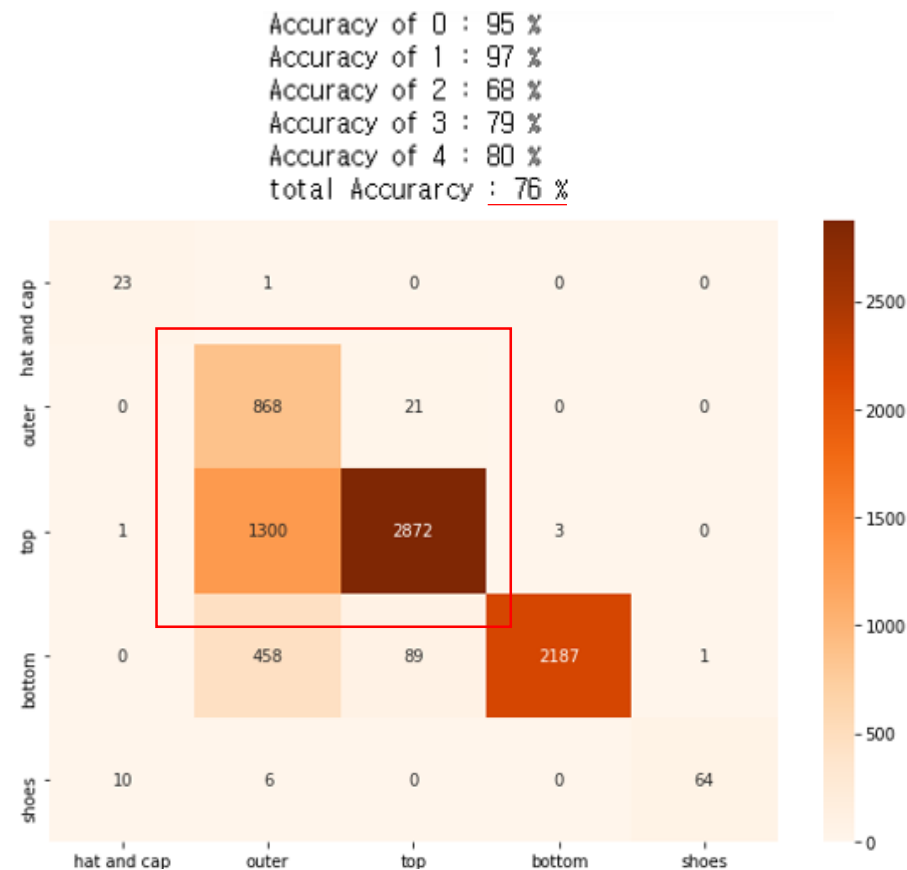
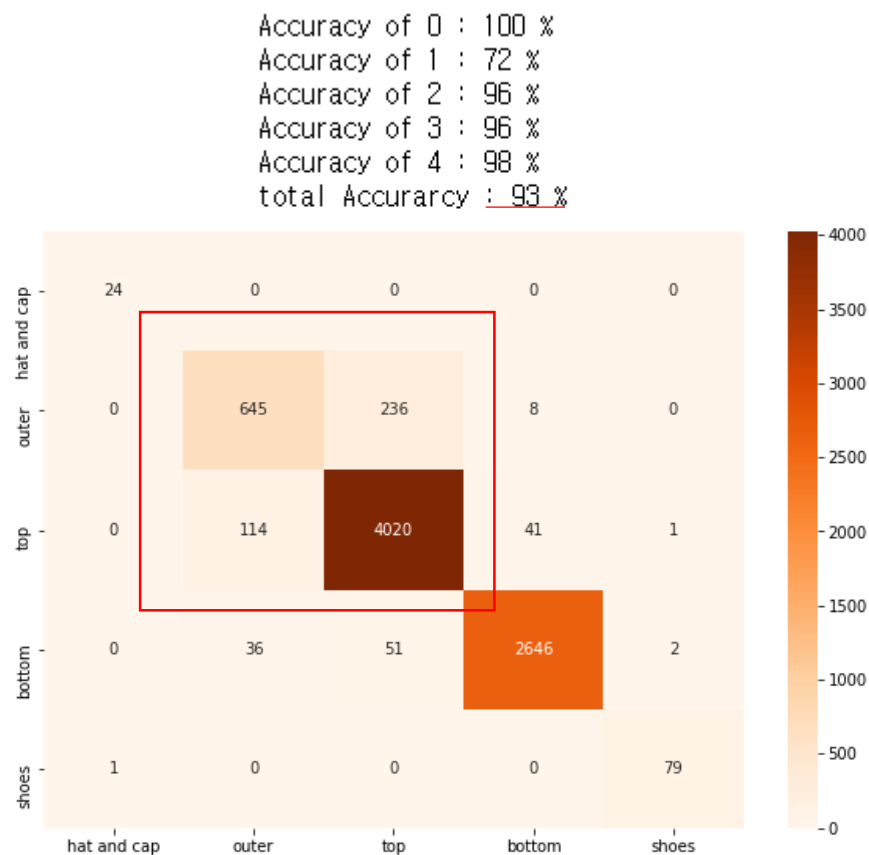


Accuracy of 0 : 100 %  
 Accuracy of 1 : 85 %  
 Accuracy of 2 : 96 %  
 Accuracy of 3 : 99 %  
 Accuracy of 4 : 100 %  
 total Accuracy : 96 %



외투에 대해서는 정확도가 높아졌지만, 상의에 대한 정확도가 떨어지며  
 전체적인 정확도는 유사

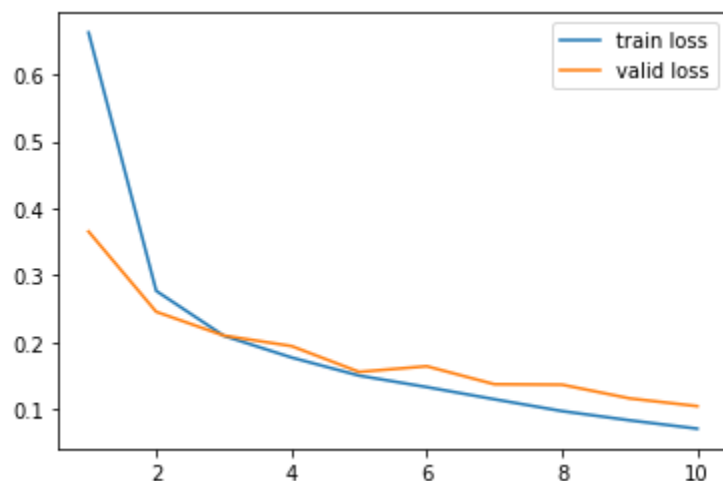
## 학습 결과 - ResNET



외투를 제외한 모든 클래스에 대해 학습 능력이 현저히 저하

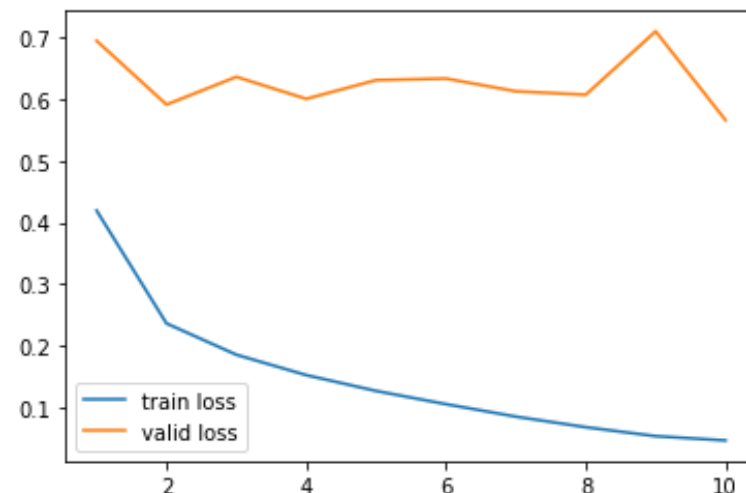


## 학습 결과 - ResNET



```
[Epoch: 1] cost = 0.662698686 val_cost = 0.365559697
[Epoch: 2] cost = 0.276873022 val_cost = 0.245663226
[Epoch: 3] cost = 0.209794775 val_cost = 0.210123241
[Epoch: 4] cost = 0.177407265 val_cost = 0.194469556
[Epoch: 5] cost = 0.150351599 val_cost = 0.155871719
[Epoch: 6] cost = 0.13321276 val_cost = 0.164326102
[Epoch: 7] cost = 0.115010738 val_cost = 0.137452394
[Epoch: 8] cost = 0.0973432511 val_cost = 0.136791244
[Epoch: 9] cost = 0.0835831314 val_cost = 0.116319157
[Epoch: 10] cost = 0.0711068213 val_cost = 0.10472101
```

VGG



```
[Epoch: 1] cost = 0.419369876 val_cost = 0.695462823
[Epoch: 2] cost = 0.235829934 val_cost = 0.591690779
[Epoch: 3] cost = 0.184946626 val_cost = 0.636839032
[Epoch: 4] cost = 0.151817381 val_cost = 0.601049602
[Epoch: 5] cost = 0.126046717 val_cost = 0.63150835
[Epoch: 6] cost = 0.104587086 val_cost = 0.634062231
[Epoch: 7] cost = 0.0842757523 val_cost = 0.613339603
[Epoch: 8] cost = 0.0671239421 val_cost = 0.607762456
[Epoch: 9] cost = 0.0525799319 val_cost = 0.710835338
[Epoch: 10] cost = 0.0455614515 val_cost = 0.566559911
```

ResNET

ResNET의 학습이 이상하게 되고 있다는 것을 확인할 수 있다.