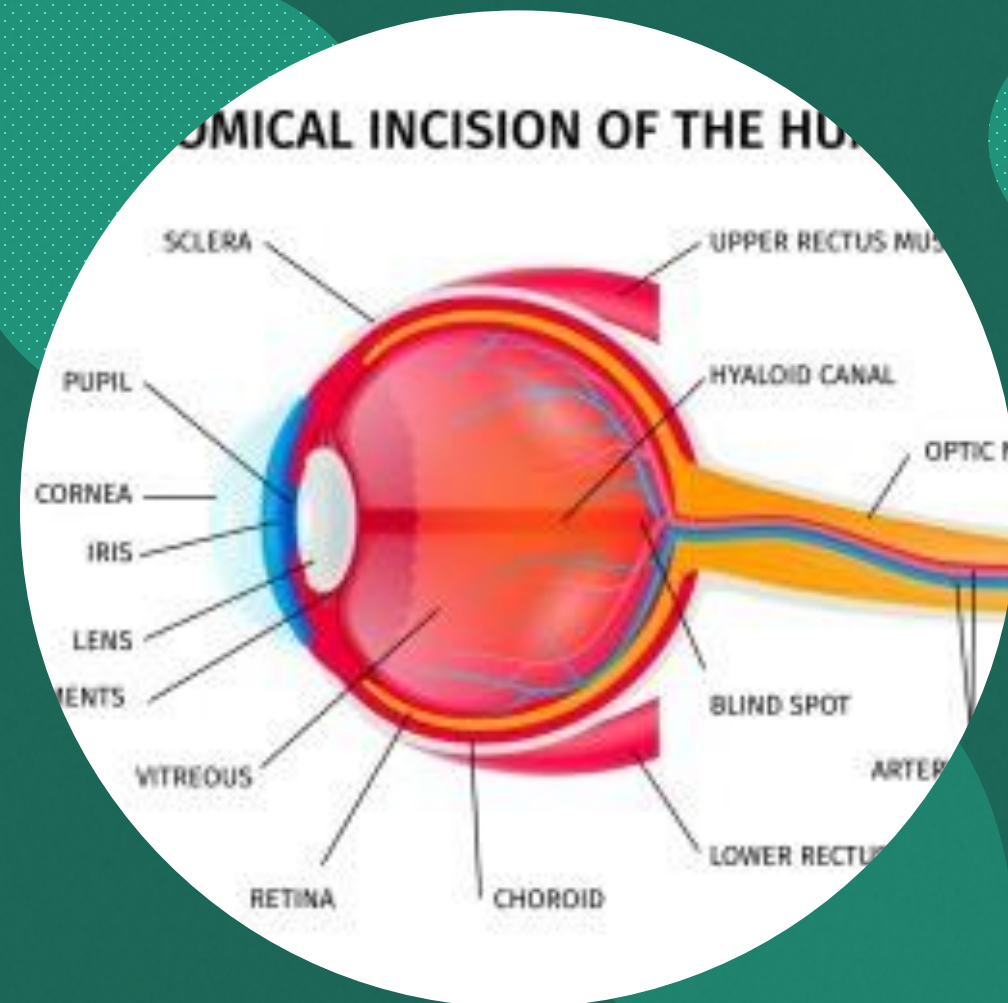


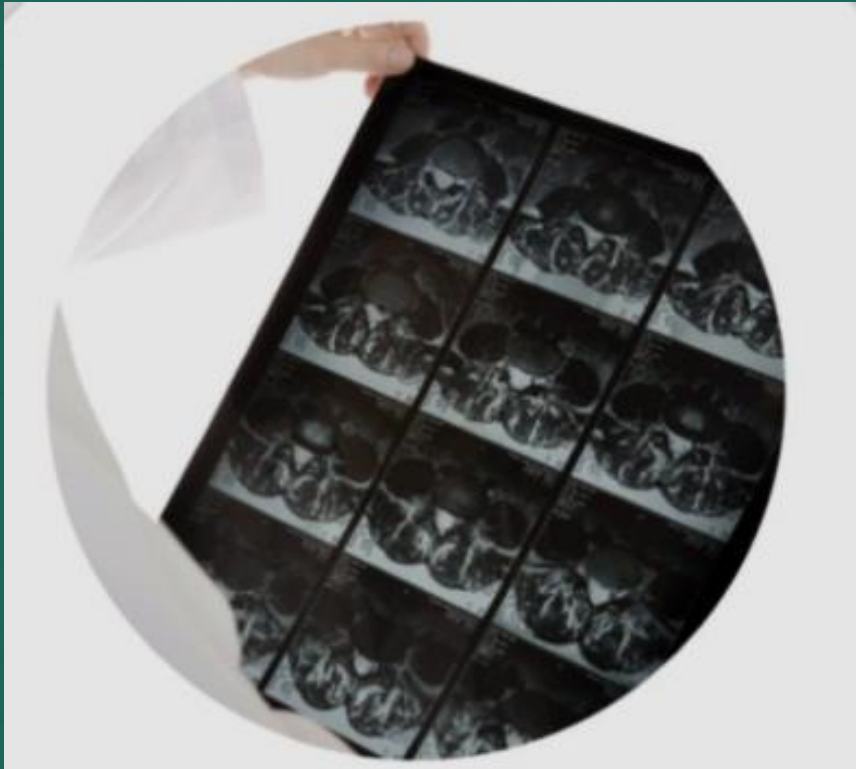
의료 이미지 증강을 활용한 모델 성능 극대화 전략



목차

- 1. 데이터 설명
- 2. 모델 알고리즘 설명
- 3. 데이터 증강 알고리즘 설명
- 4. 실험 결과

동기

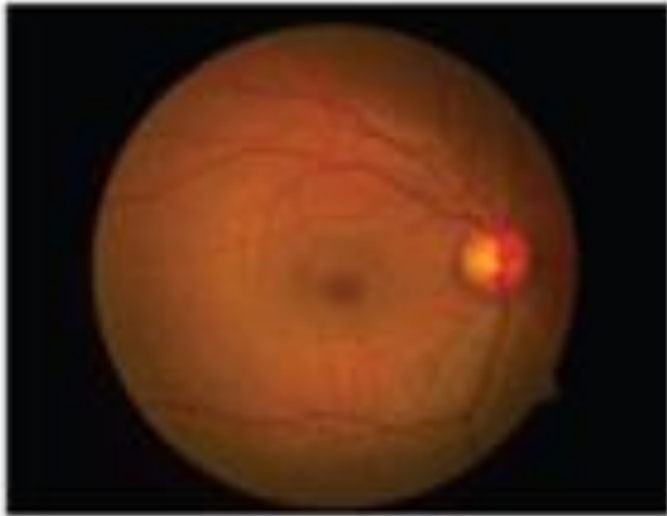
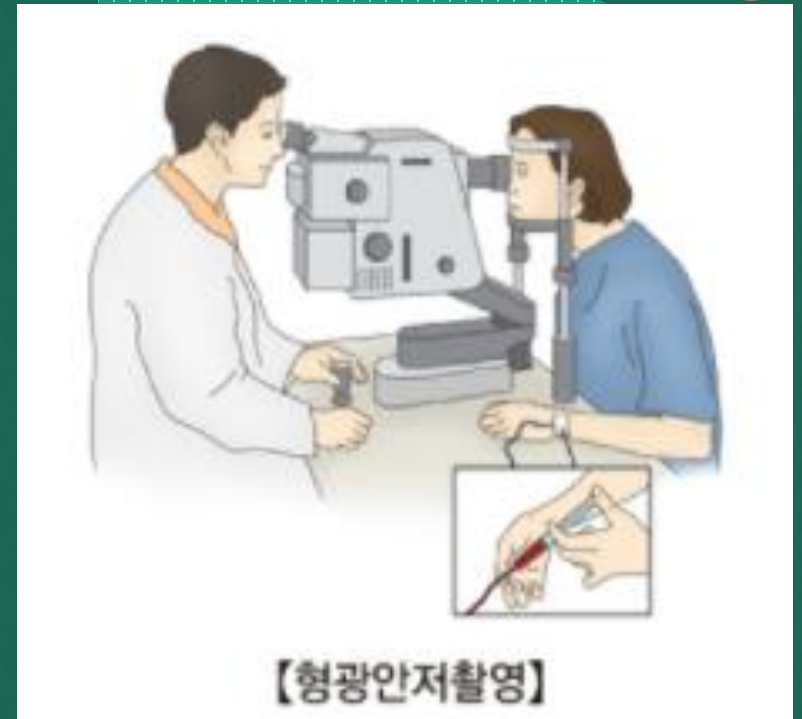
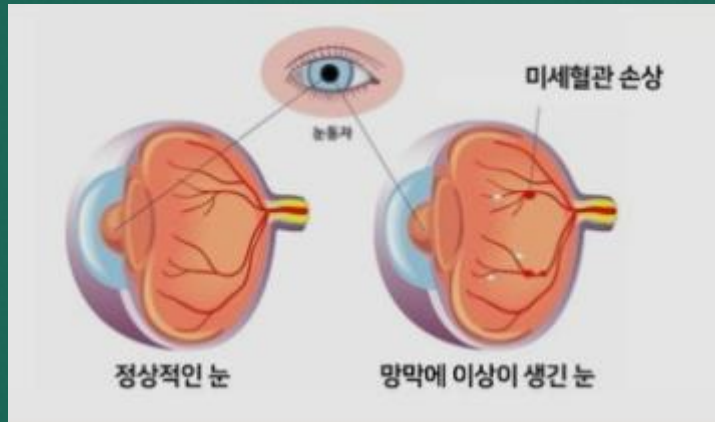


보건의료 데이터 활용 가이드라인

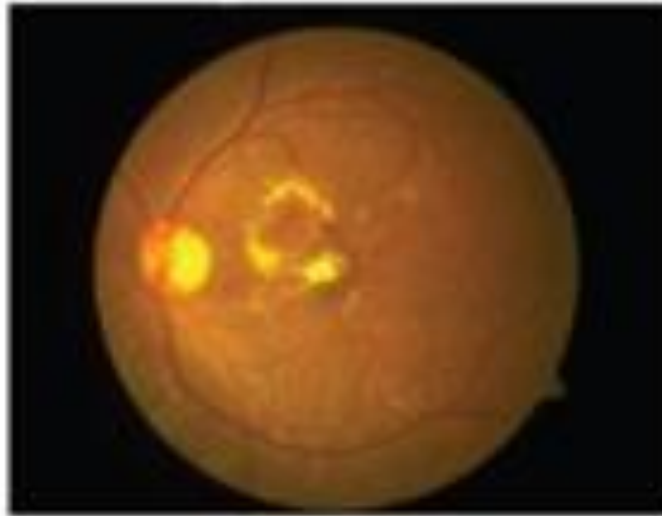
2020. 9.

개인정보보호위원회
보 건 복 지 부

당뇨망막병증



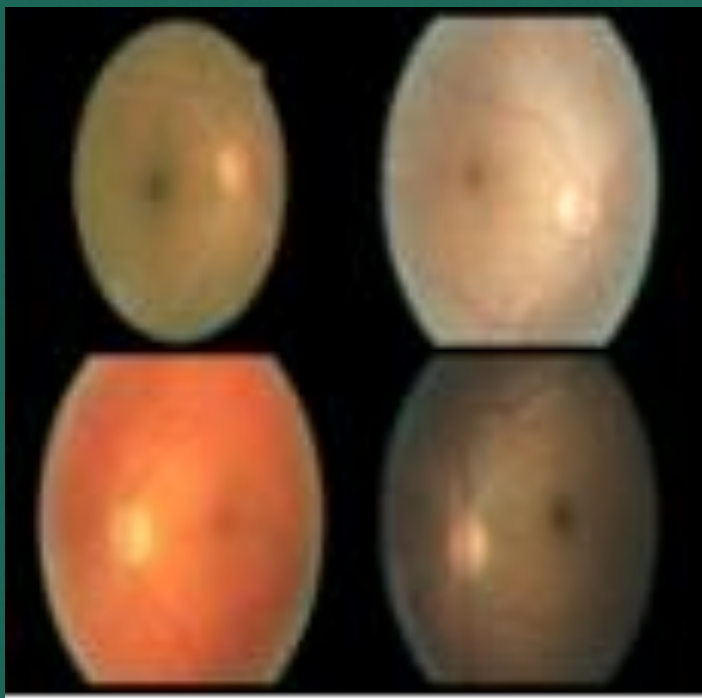
▲ 정상 망막 사진



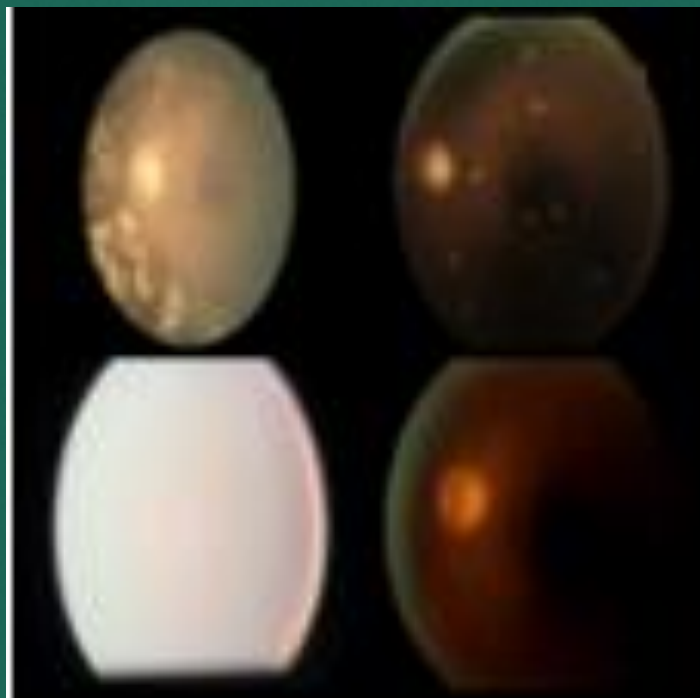
▲ 혈관내의 성분이 혈관 밖으로 빠져 나와 망막부종을 일으킨 상태

데이터 전처리 과정

정상 (No_DR)

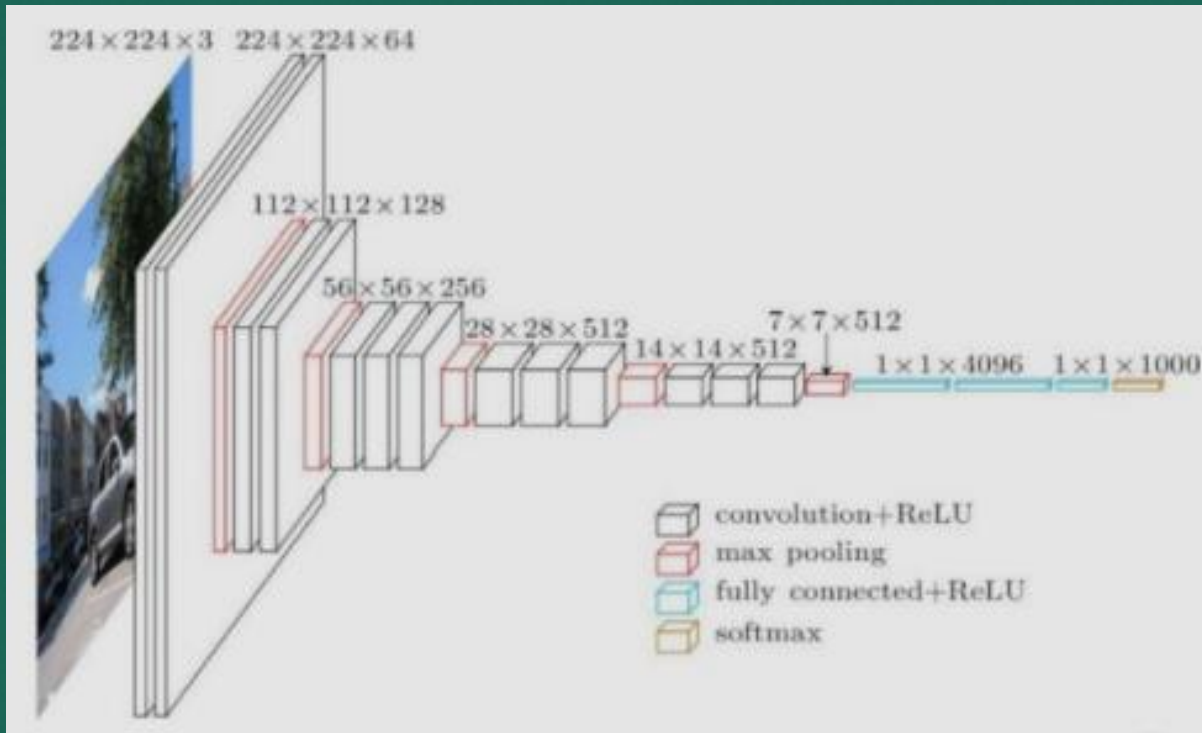


환자 (DR)



Preprocessing		Count
Train	DR	2266
	No_DR	2266
Test	DR	566
	No_DR	566

Baseline : CNN 모델 구성



DR

No_DR

lr	accuracy			loss		
	train	validation	test	train	validation	test
1.00E-02	0.5731	0.5856	0.59	0.676	0.6707	0.666
7.50E-05	0.7671	0.6513	0.66	0.4538	0.6652	0.597
5.00E-05	0.869	0.6716	0.7289	0.3053	0.837	0.5352
2.50E-05	0.9691	0.6642	0.8	0.08794	1.367	0.456
1.00E-05	0.9641	0.659	0.6314	0.1102	1.12	0.6721
1.00E-06	0.691	0.6081	0.6	0.5803	0.6691	0.664

Noisy Student

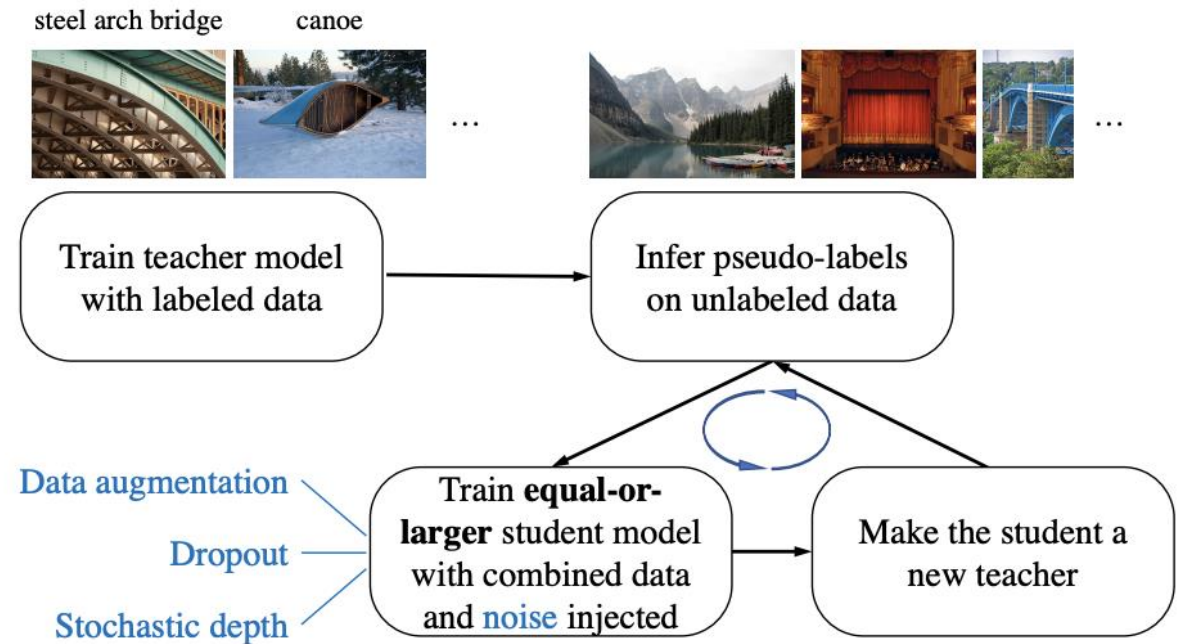
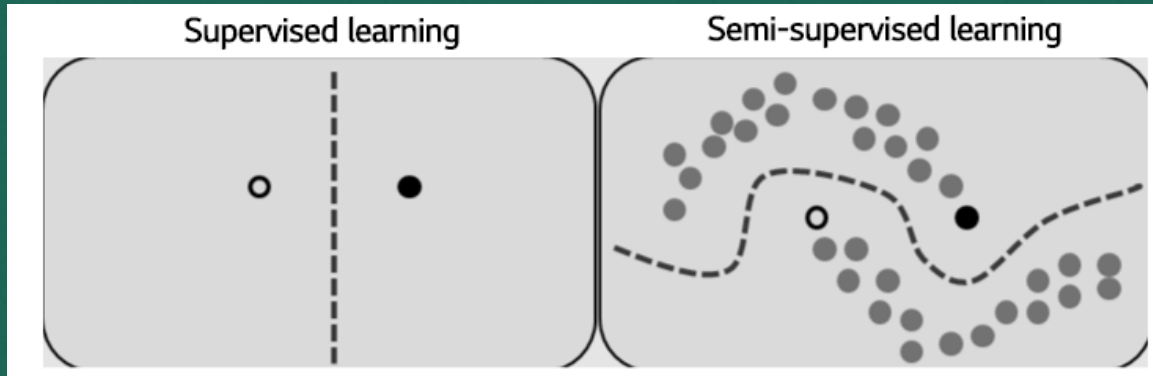


Figure 1: Illustration of the Noisy Student Training. (All shown images are from ImageNet.)

data augmentation

- Horizontal
- Vertical
- Rotation
- Gaussian blur...

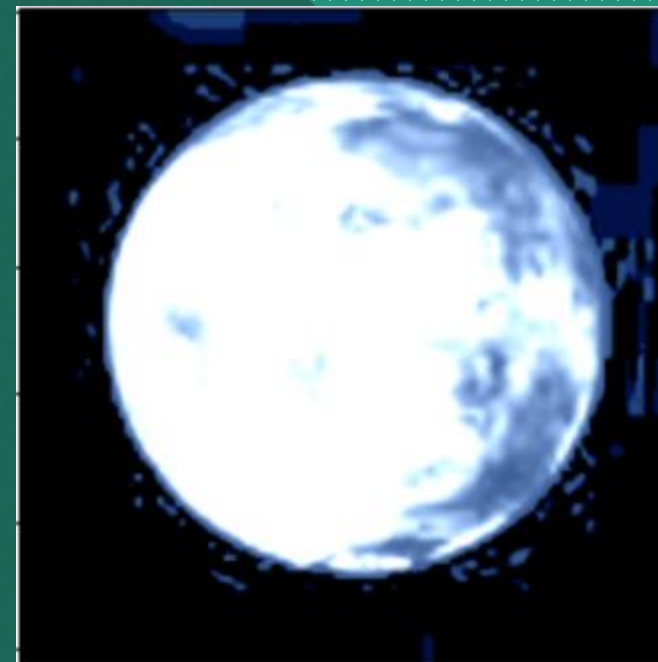
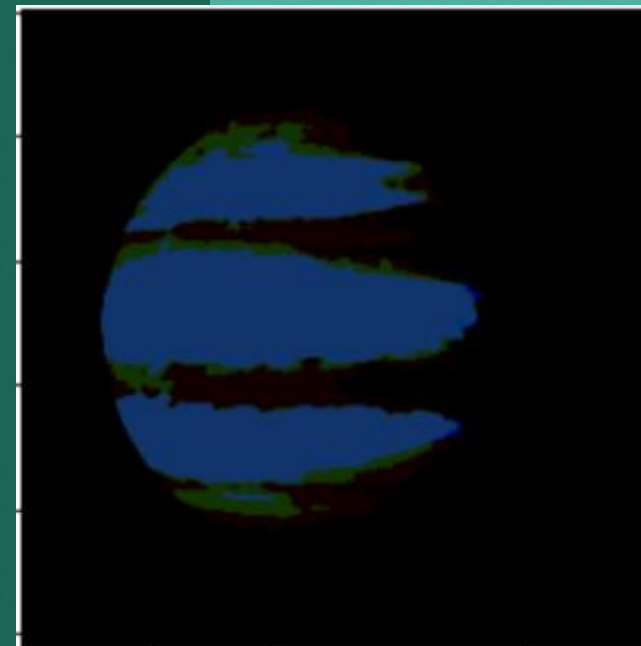


image crawling

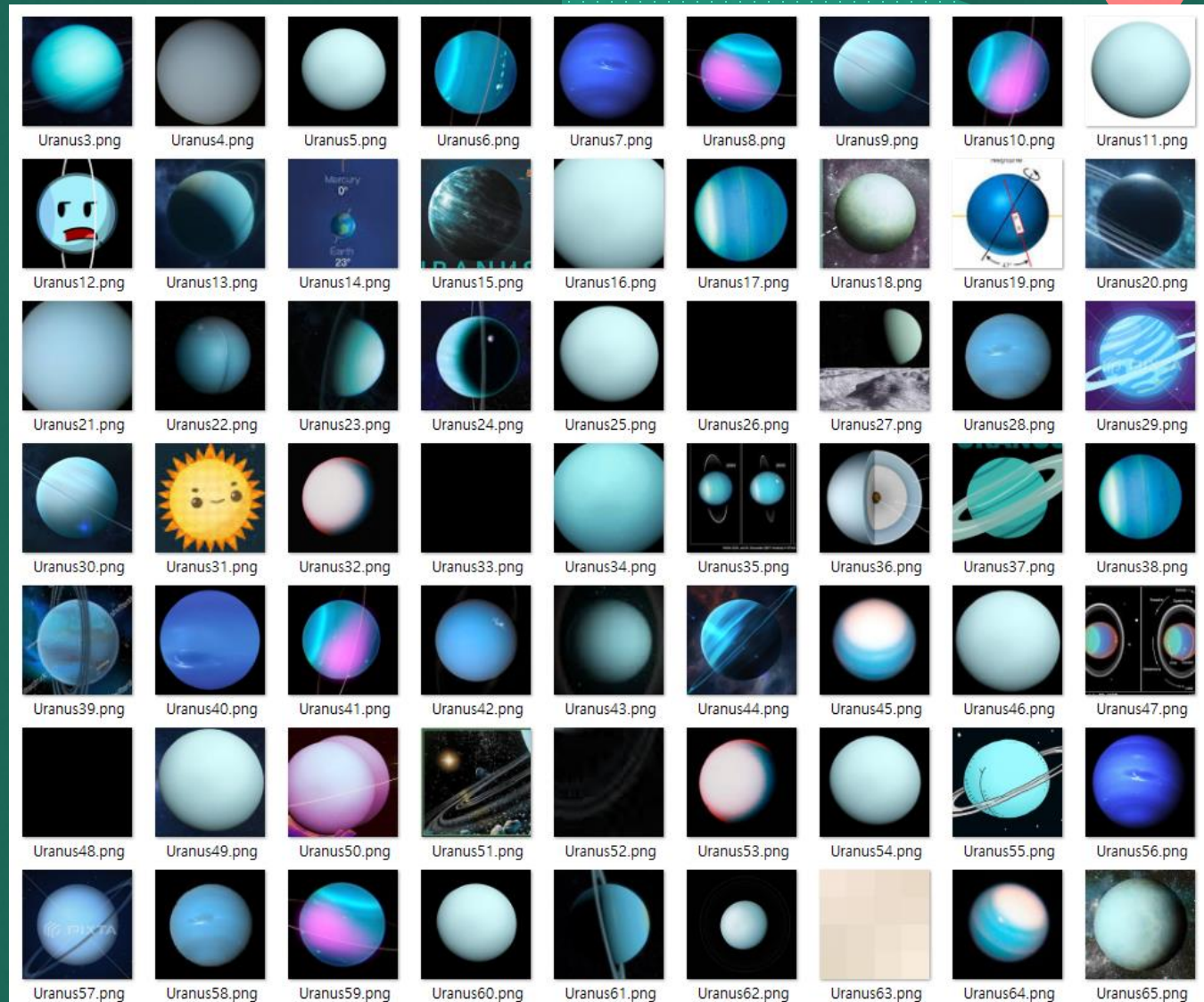
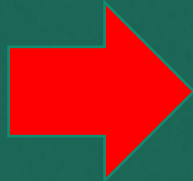
Key word : 혜왕성

url : [혜왕성 - Google 검색](#)

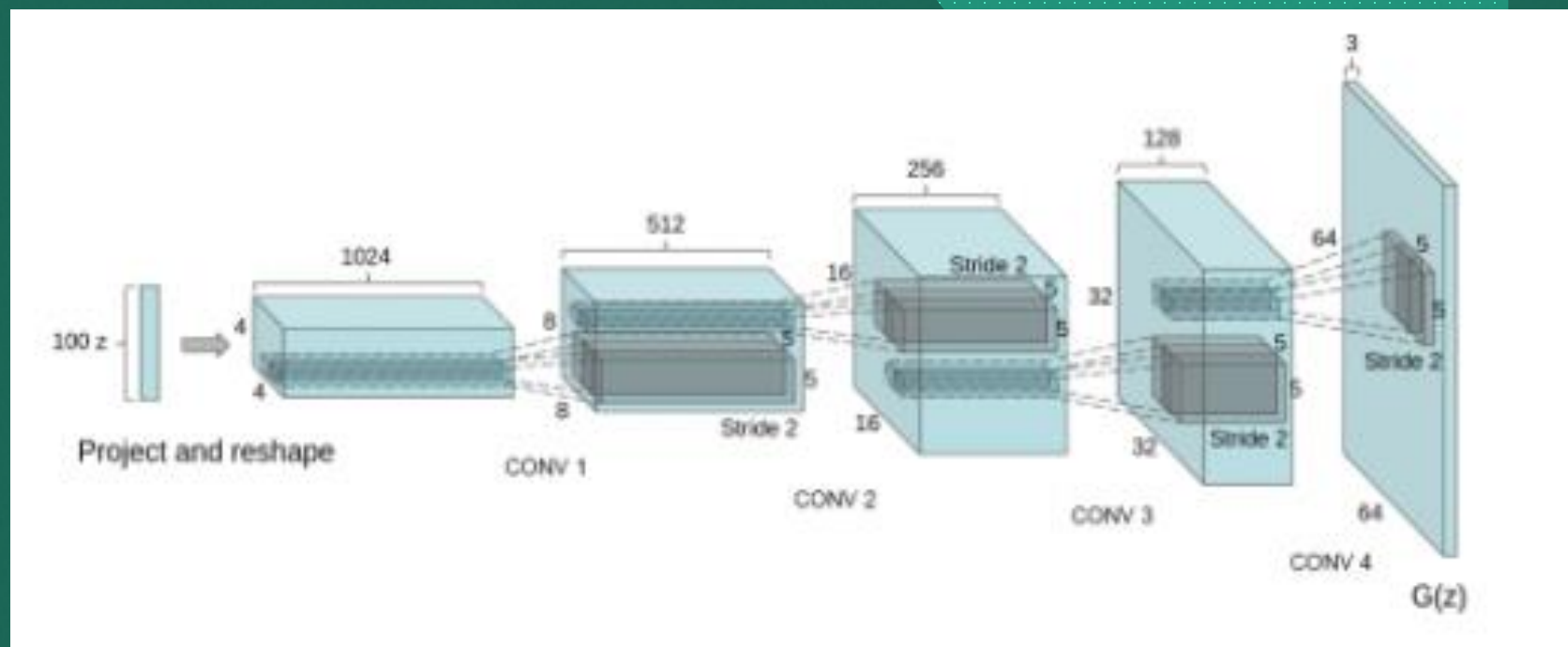
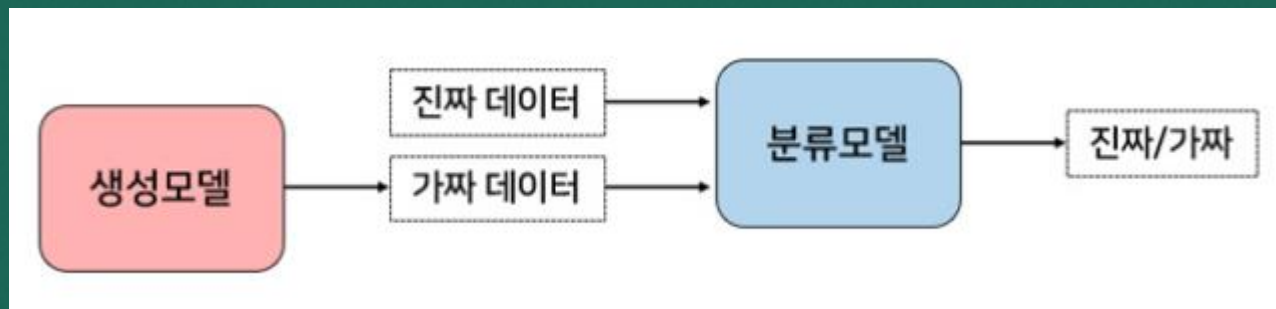


[Data list]

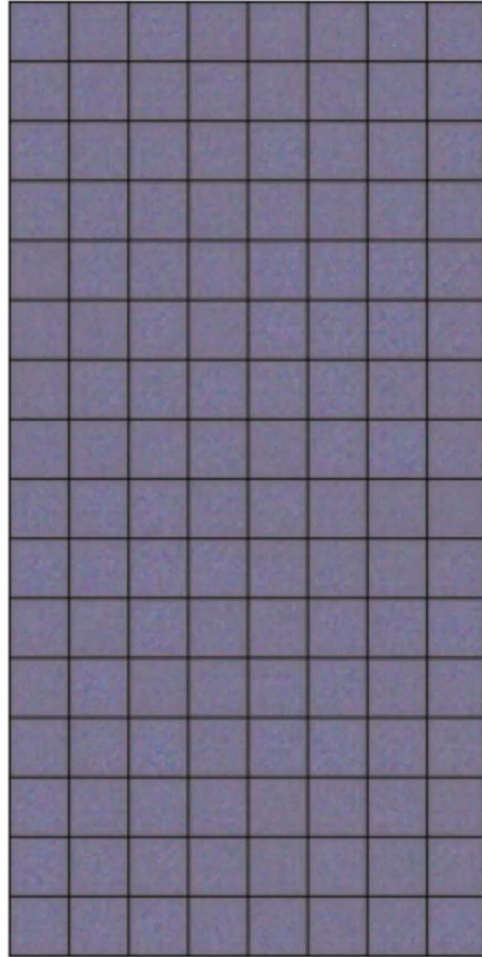
영상처리



DCGAN



DCGAN



Result1 : augmentation + GAN

lr	augmentation	accuracy			loss		
		train	validation	test	train	validation	test
7.50E-05	None	0.9968	0.6511	0.7202	9.13E-03	2.232	0.5676
	Rs <u>RO</u> (RH, RV, RA), N	0.7153	0.6564	0.7731	0.5386	0.5959	0.4913
	Rs <u>RO</u> (RH, RV, RA, RR180), N	0.6419	0.5964	0.6759	0.62	0.657	0.5854
	Rs <u>RO</u> (RH, RV, RA, RR180, GB), N	0.5942	0.5618	0.6027	0.6649	0.6816	0.6654
	Rs, <u>RO</u> (RH, RV, RA, RB, RAF, RP), N	0.6082	0.6252	0.671	0.6534	0.6506	0.6086
	Rs, <u>RO</u> (RH, RV, GB), N	0.7392	0.6512	0.7173	0.5136	0.648	0.5472
	Rs, <u>RO</u> (RH, RV, RA, GB), N	0.6455	0.6316	0.6574	0.6188	0.6471	0.6167
	Rs <u>RO</u> (RH, RV, RA), N + GAN284	0.6858	0.6427	0.6021	0.5705	0.626	0.6639

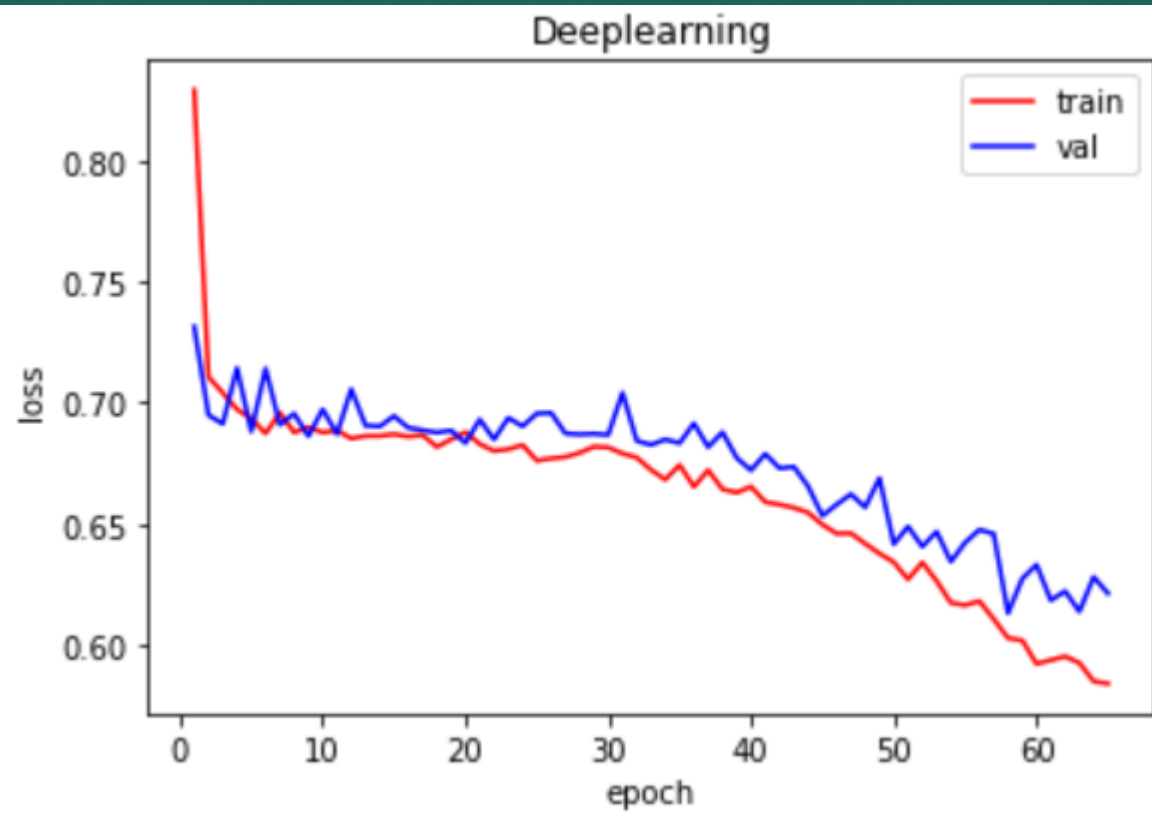
Result2 : NoisyStudent

- Crawling images

data	Crawling images
Train accuracy	0.99
Val accuracy	0.61
Test accuracy	0.76

- DCGAN

data	Crawling images
Train accuracy	0.98
Val accuracy	0.64
Test accuracy	0.78



accuracy : 0.6833333333333334