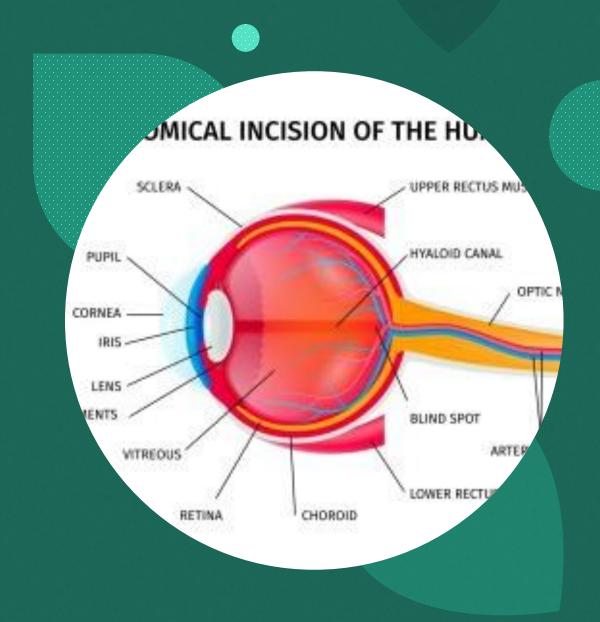
# 의료 이미지 증강을 활용한 모델 성능 극대화 전략



### 목차

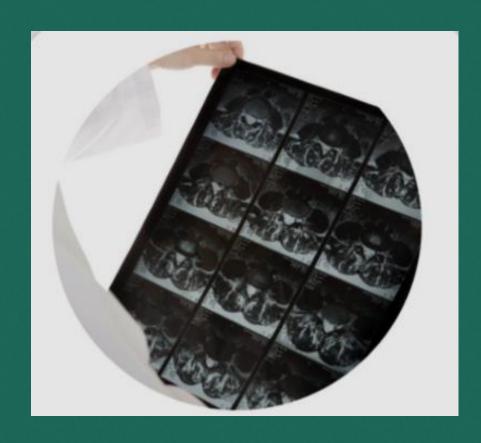
• 1. 데이터 설명

• 2. 모델 알고리즘 설명

• 3. 데이터 증강 알고리즘 설명

• 4. 실험 결과

# 동기

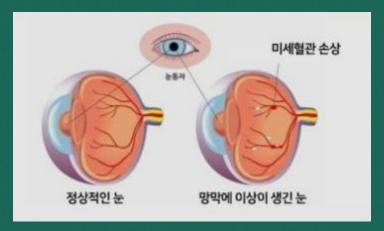


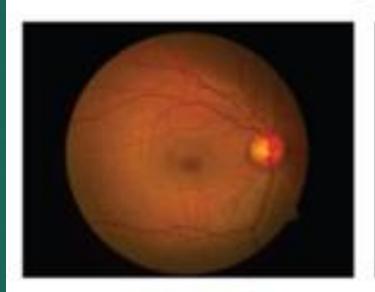
보건의료 데이터 활용 가이드라인

2020. 9.

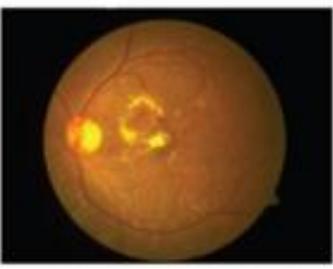
개인정보보호위원회 보 건 복 지 부

# 당뇨망막병증





▲ 정상 명약 사진



▲ 할만내의 성분이 할만 받으로 빠져 나와 암역부족을 얻으킨 상태

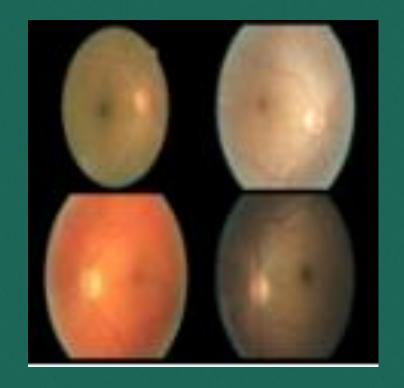


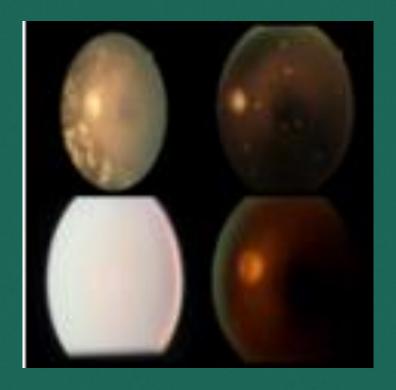
[형광안저촬영]

# 데이터 전처리 과정

정상 (No\_DR)

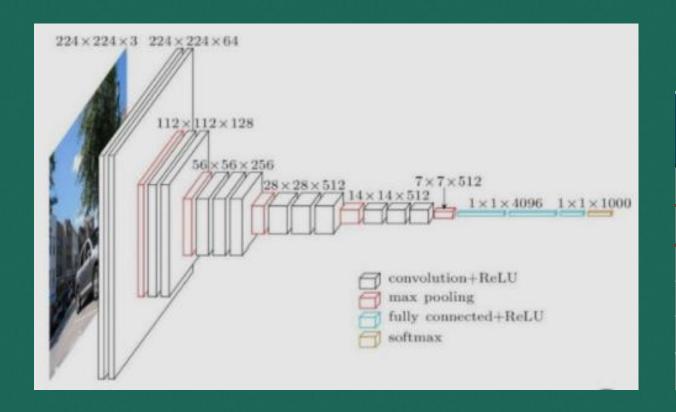






Preprocessing		Count
Train	DR	2266
	No_DR	2266
Test	DR	566
	No_DR	566

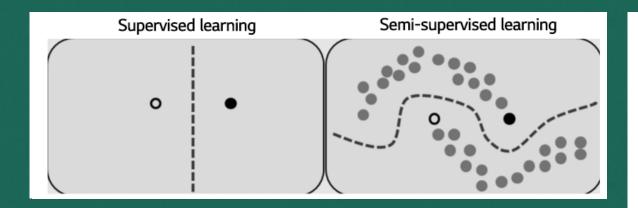
# Baseline : CNN 모델 구성





l-d	accuracy∉			loss#			
lr⊕	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



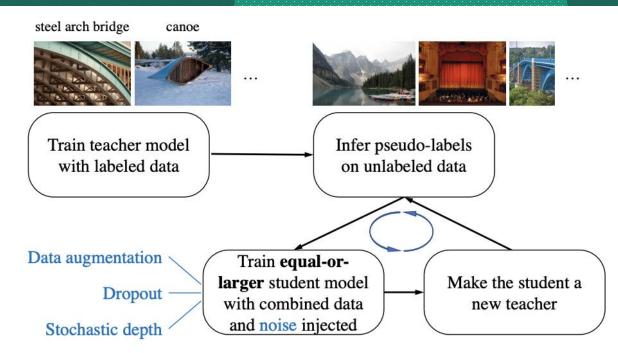


Figure 1: Illustration of the Noisy Student Training. (All shown images are from ImageNet.)

#### data augmentation

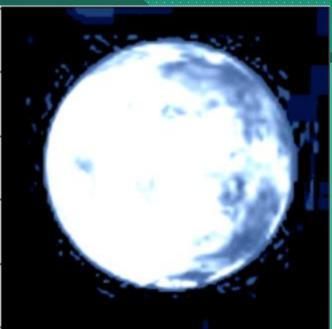
Horizontal

Vertical

Rotation

• Gaussian blur...



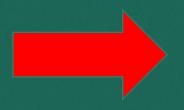


#### image crawling

Key word : 혜왕성

url: <u>혜왕성 - Google 검색</u>





[Data list]

#### 영상처리





Uranus57.png



Uranus49.png

Uranus58.png





Uranus50.png

Uranus59.png





Uranus51.png

Uranus60.png

Uranus33.png

Uranus15.png

Uranus24.png



Uranus52.png

Uranus61.png

Uranus34.png

Uranus7.png

Uranus16.png

Uranus25.png



Uranus17.png

Uranus26.png

Uranus35.png

Uranus53.png

Uranus62.png





Uranus9.png

Uranus18.png

Uranus27.png

Uranus36.png

Uranus54.png

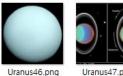
Uranus63.png

Uranus10.png

Uranus19.png

Uranus28.png

Uranus37.png



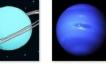


Uranus11.png

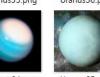
Uranus20.png

Uranus29.png





Uranus56.png

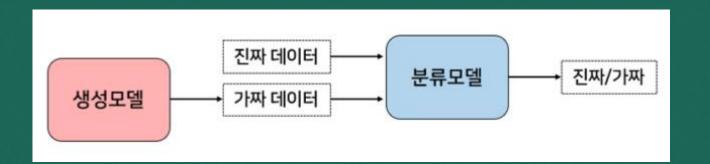


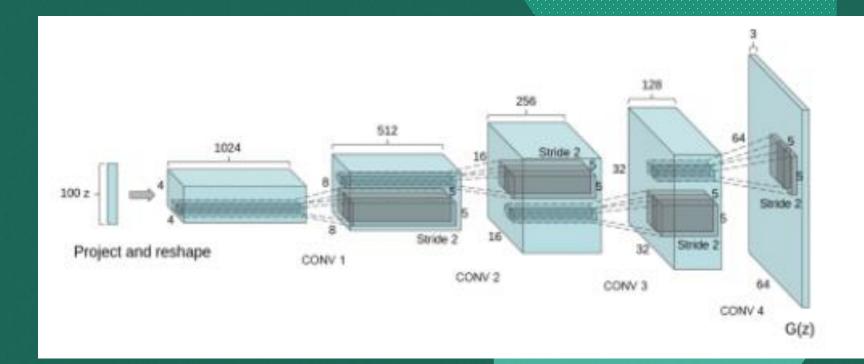
Uranus64.png



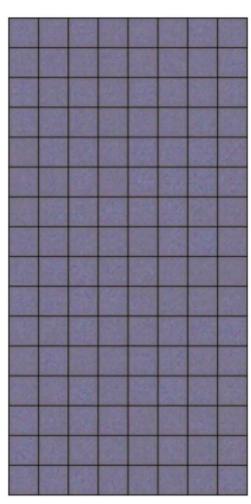
Uranus65.png

#### **DCGAN**





#### DCGAN



# Result1: augmentation + GAN

	augmentation₽	accuracy∈		loss₽			
<b>l</b> r₽		train∉	validati on∉	test≓	train∉	validation∉	test≓
	None	0.9968∂	0.6511∉	0.7202≓	9.13E-03≓	2.232⊖	0.5676∂
7.50E- 05	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₽

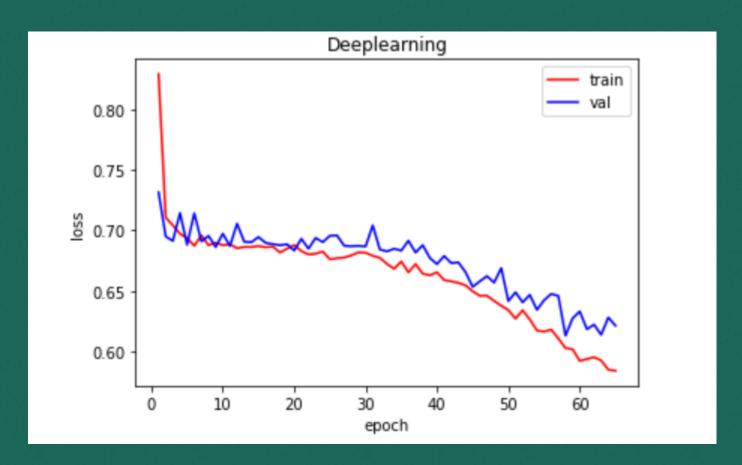
# Result2: NoisyStudent

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

