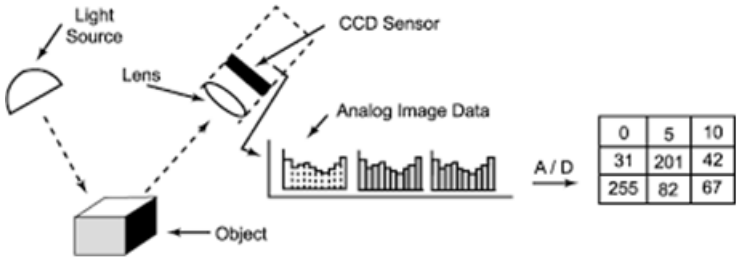
AI인력양성지원사업

- 이로스타일 알앤엑스 에이제이투 ITCG-

2주차(6월 22일)

정 준 수

실습 및 운영 환경



입력 데이터

실습 & 개발 Framework

구분	데이터 Featuring	영상 처리
이로스타일	• scikit-learn	▪ OpenCV ▪ Keras(TensorFlow) ▪ PyTorch3D
알앤엑스	• scikit-learn	▪ OpenCV ▪ Keras(TensorFlow) ▪ PyTorch3D
에이제이투	• scikit-learn	▪ OpenCV ▪ Keras(TensorFlow) ▪ TensorFlow Lite

영상처리 Edge Device

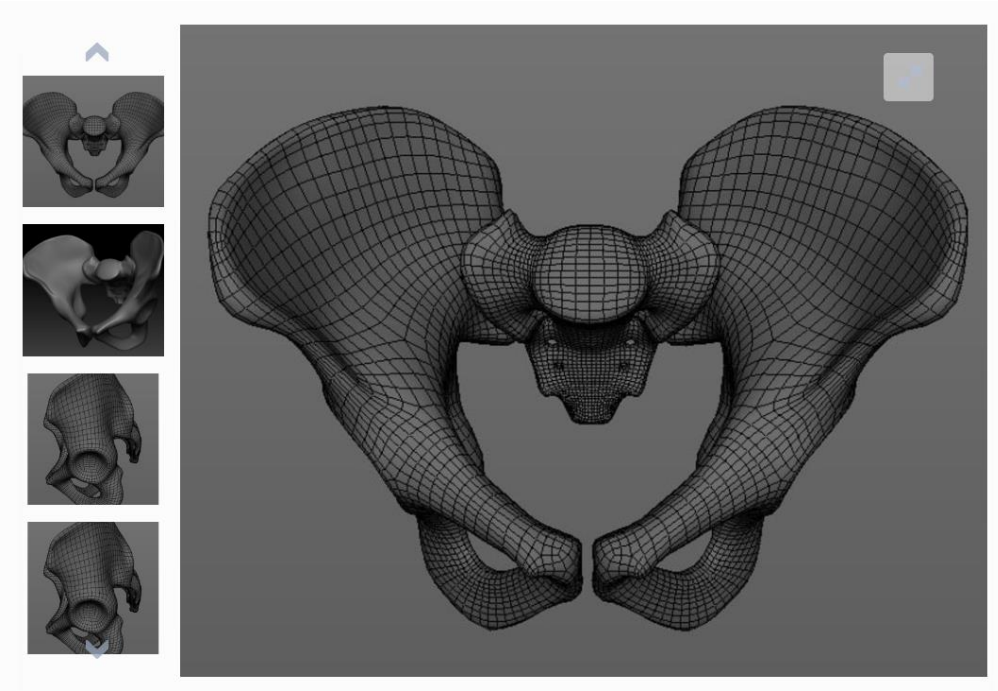
Jetson Nano 4GB (무선 키보드 & 마우스 별도)
(https://developer.nvidia.com/embedded/jetson-nano)

웹카메라

1080P USB 3.0 웹캠 MJPEG 50fps 고속 가변 초점 컴퓨터 PC 웹카메라 카메라

3D 교육용 영상 모델(3D Mesh)

https://free3d.com/3d-model/feet-2373.html



https://free3d.com/3d-model/pelvis-595.html

데이터 수집 & 모델 생성 자동화 (Python)

RPA.Cloud.AWS

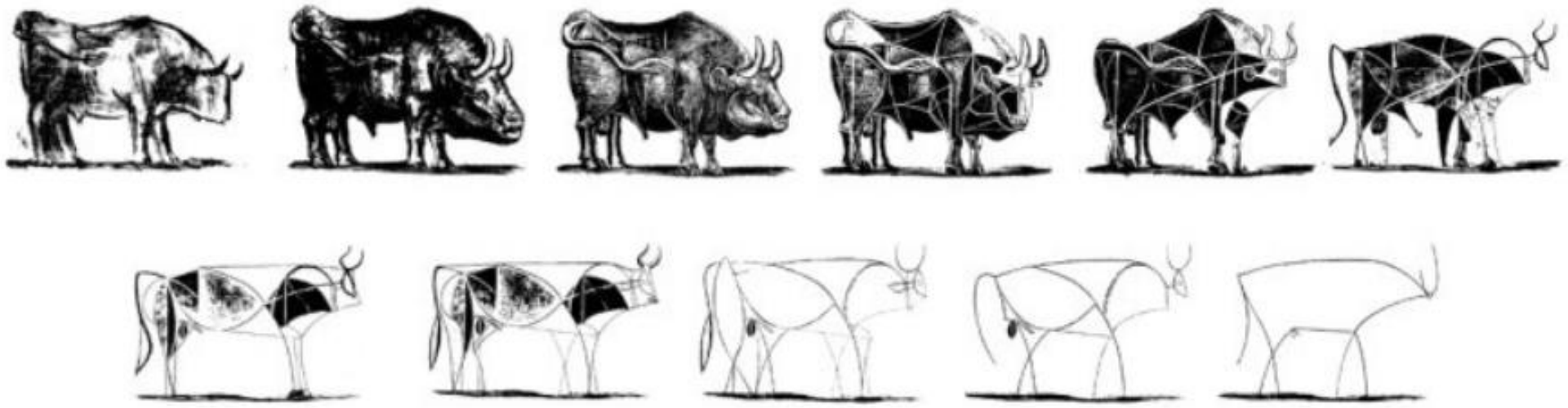
https://robocorp.com/docs/libraries/rpa-framework/rpa-cloud-aws

Data의 추상화 - Featuring

2022 05 16

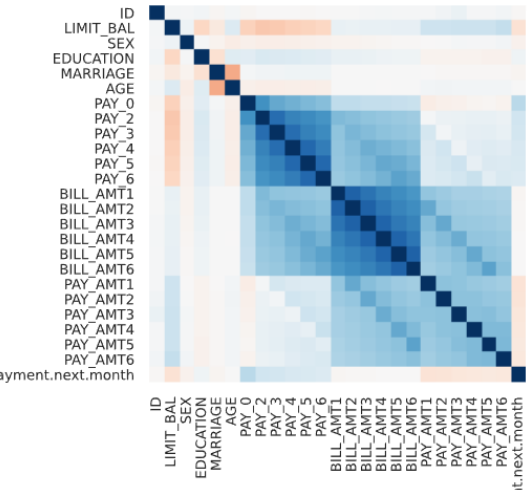
정 준 수

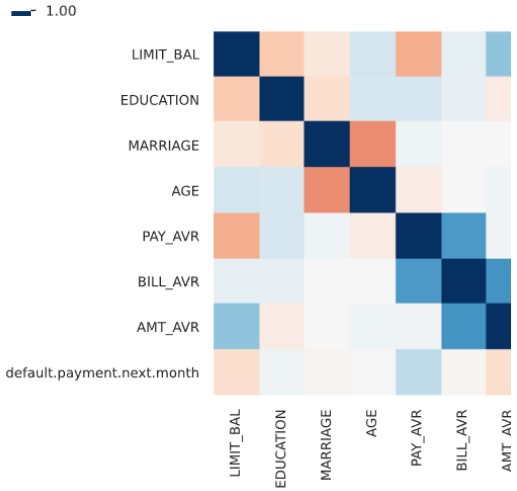
The Evolution of Picasso Bull

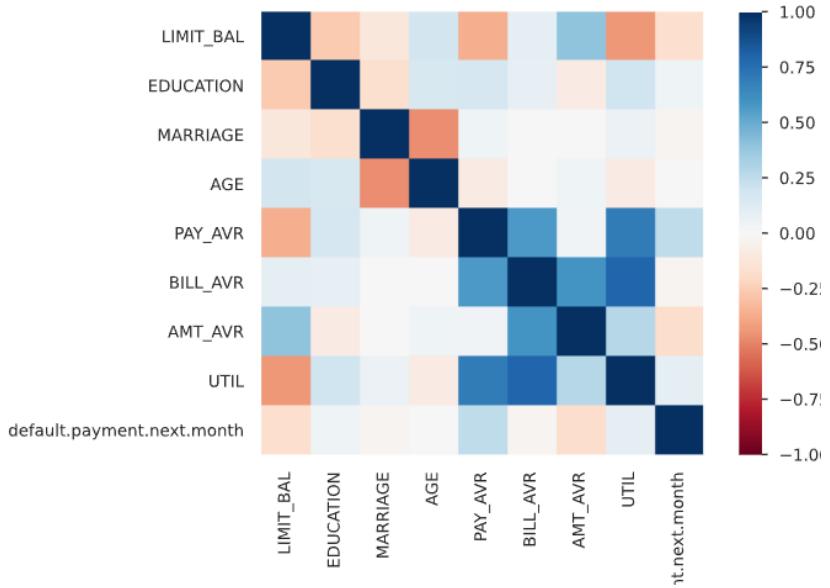


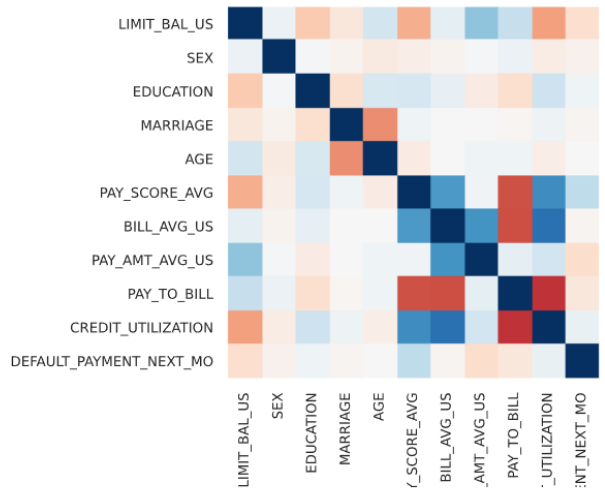
다중공선성(Multicollinearity)의 제거

독립변수간의 상관성(Correlation) 을 제거

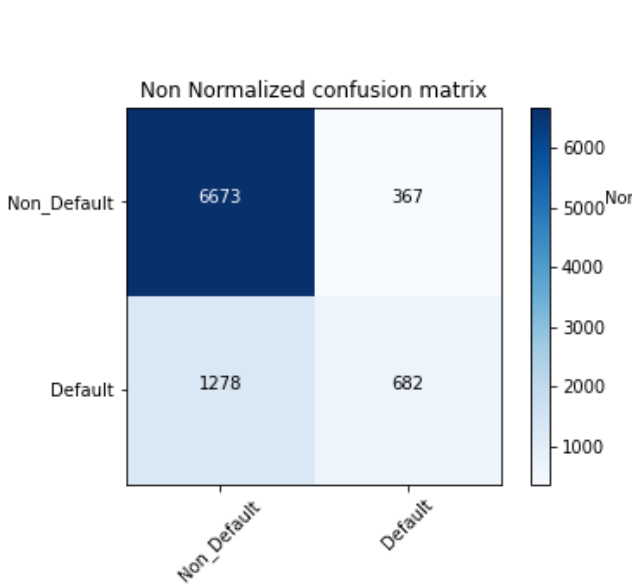








결과 비교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1278
682
Non_Default
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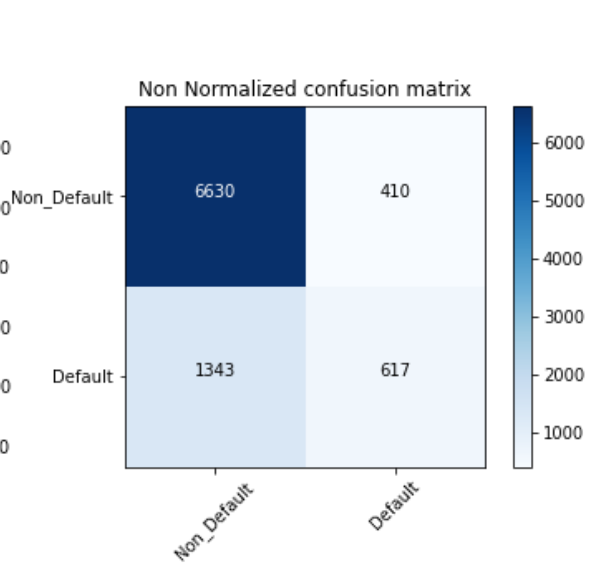
5000
4000
3000
2000
1000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1343
617
Non_Default
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2000
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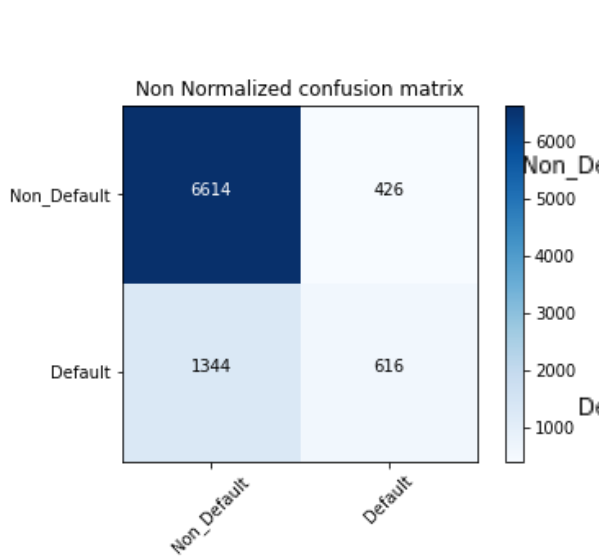
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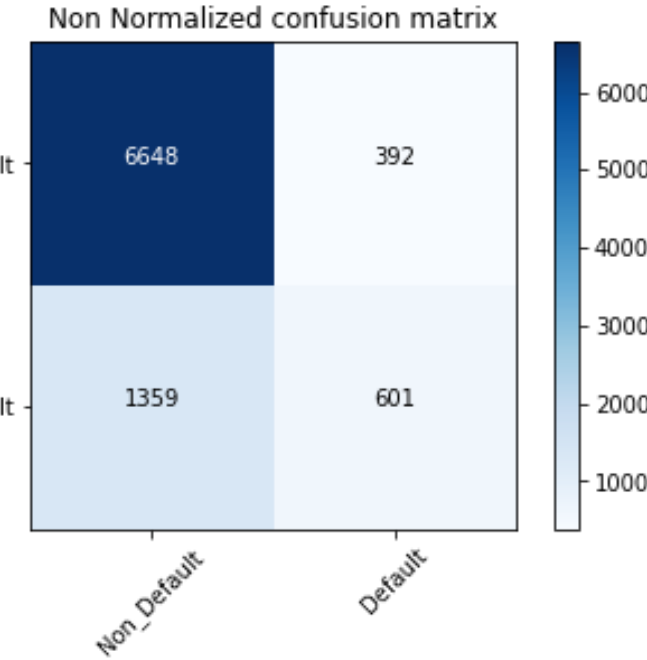
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Non_Default
Default
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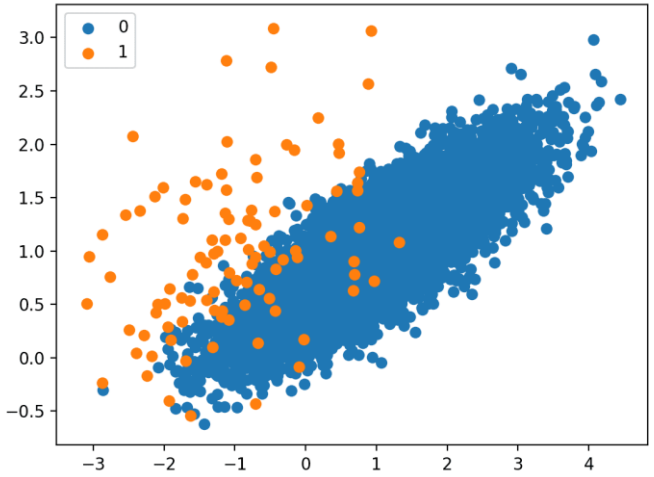
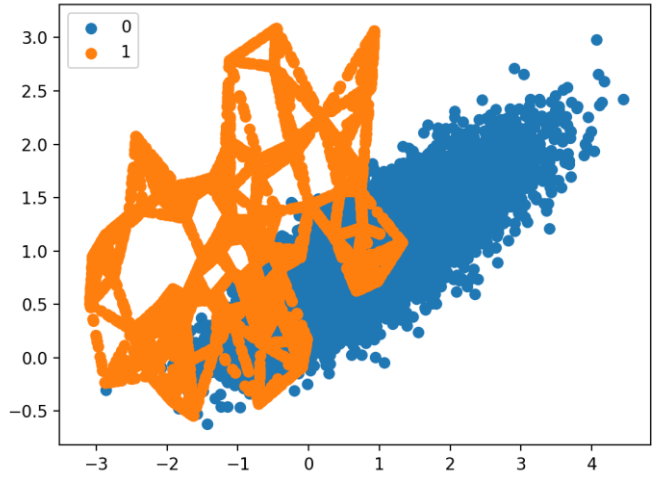
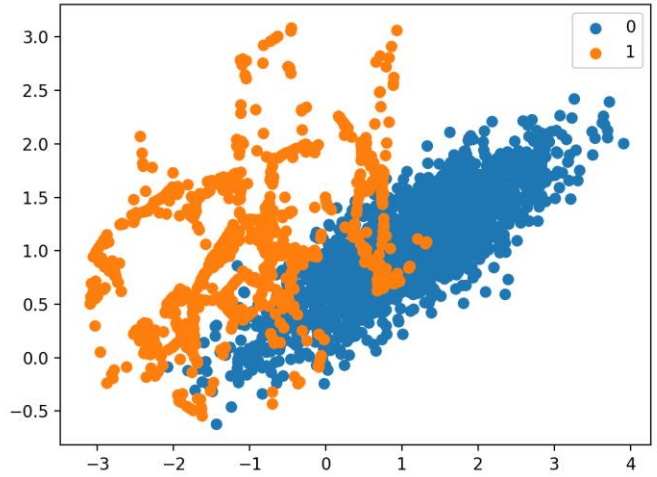
5000
4000
3000
2000
1000

SMOTE for Balancing Data

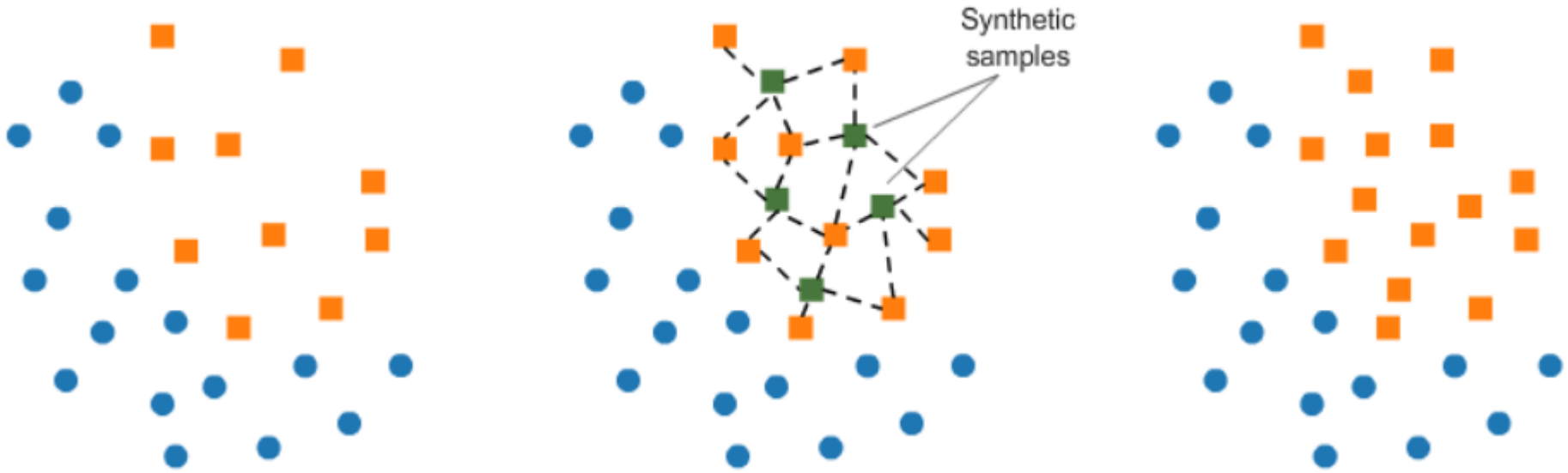






https://machinelearningmastery.com/smote-oversampling-for-imbalanced-classification/

SMOTE 의 작동 방식



OpenCV

색공간

https://github.com/JSJeong-me/OpenCV_Practitioner_Guide_1

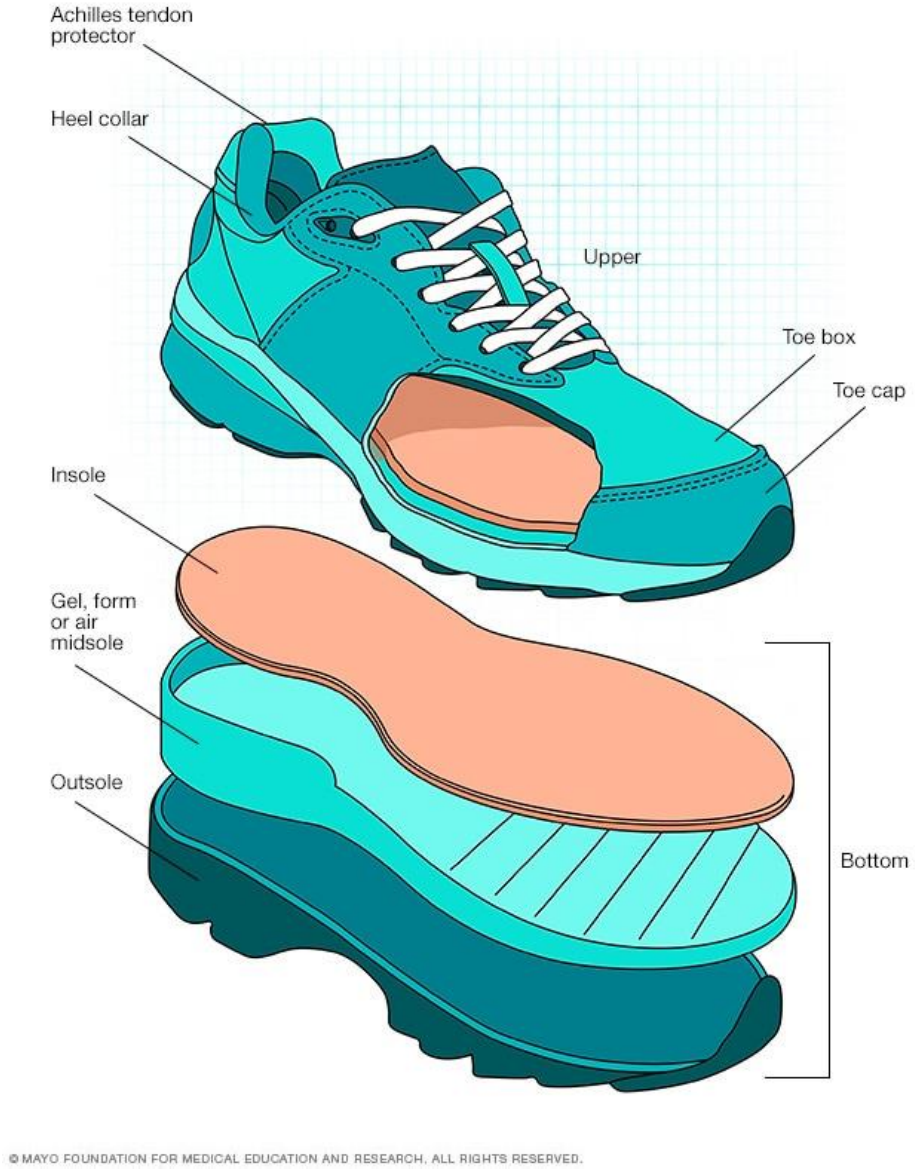
이미지 프로세싱

https://github.com/JSJeong-me/OpenCV_Practitioner_Guide_2/blob/main/counts_contours.ipynb

Vision Tasks

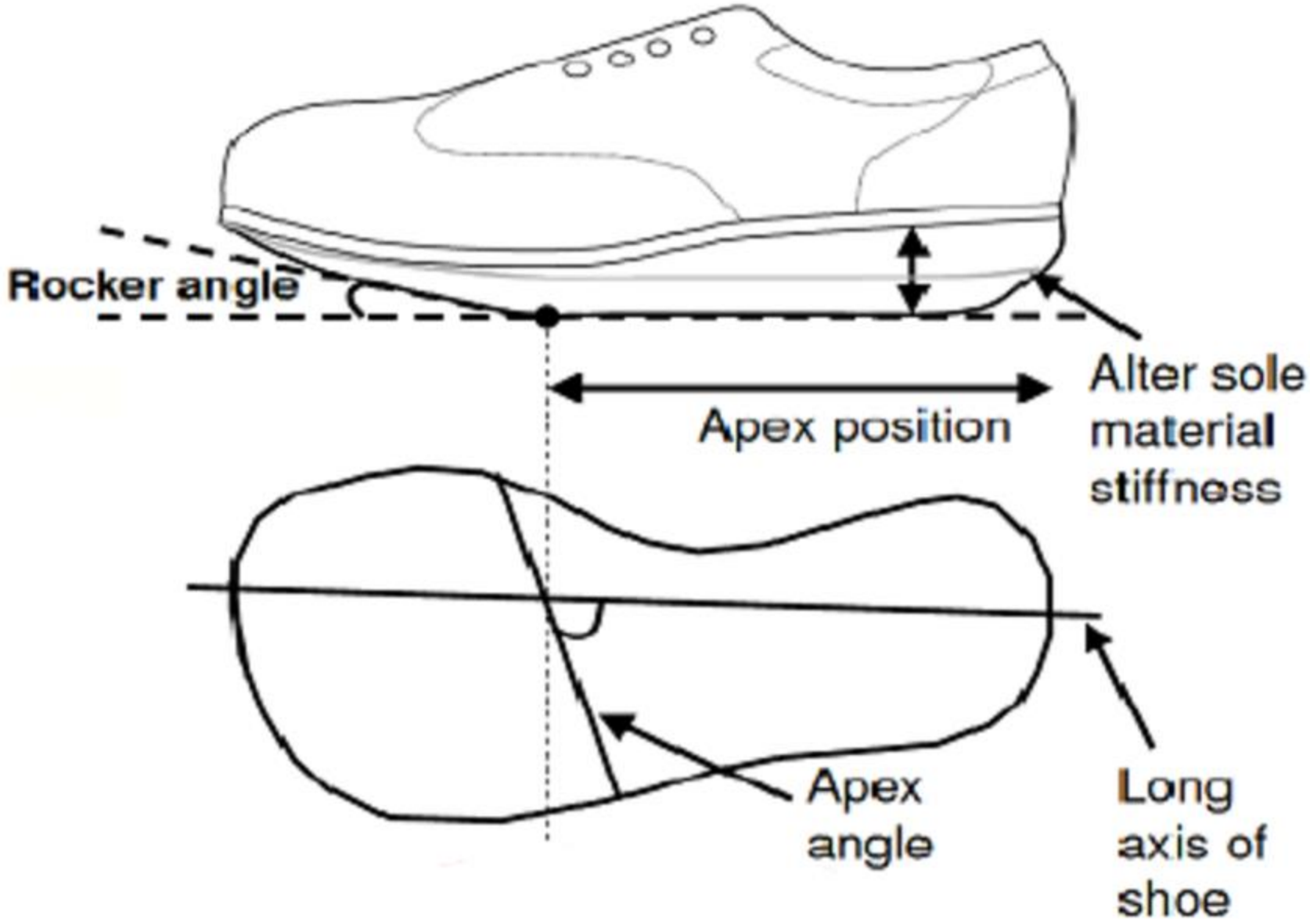
https://github.com/JSJeong-me/Vision_tasks

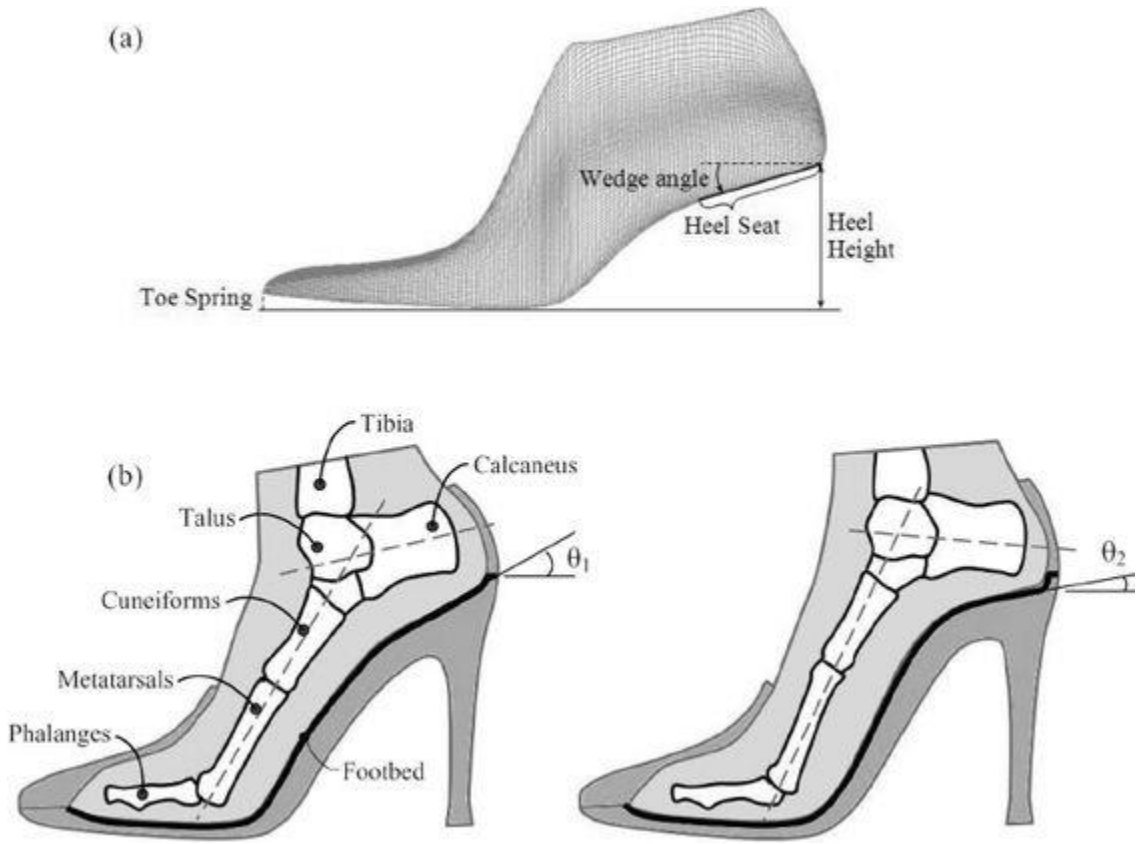
이로스타일 – Features of a shoe



Achilles tendon protector. Reduces stress on the Achilles tendon by locking the shoe around the heel.
Heel collar. Cushions the ankle and ensures proper fit.
Upper. Holds the shoe on your foot and is usually made of leather, mesh or synthetic material. Mesh allows better ventilation and is lighter weight.
Insole. Cushions and supports your foot and arch. Removable insoles can be laundered or taken out to dry between walking sessions.
Gel, foam or air midsole. Helps cushion and reduce impact when your foot strikes the ground.
Outsole. Makes contact with the ground. Grooves and treads can help maintain traction.
Toe box. Provides space for the toes. A roomy and round toe box helps prevent calluses.

https://www.mayoclinic.org/healthy-lifestyle/fitness/multimedia/walking-shoe/img-20307328


Rocker angle
Apex position
Alter sole material stiffness
Apex angle
Long axis of shoe



(a) Shoe-last characteristics that determine footbed shape; (b) two footbed shapes, which on left and right have the same heel height, heel seat length and toe spring but different wedge angles of y 1 and y 2 resulting in different foot postures.

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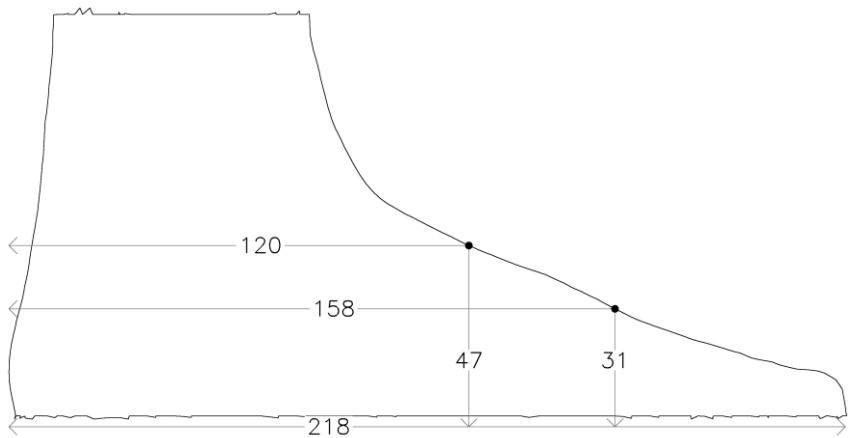
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47
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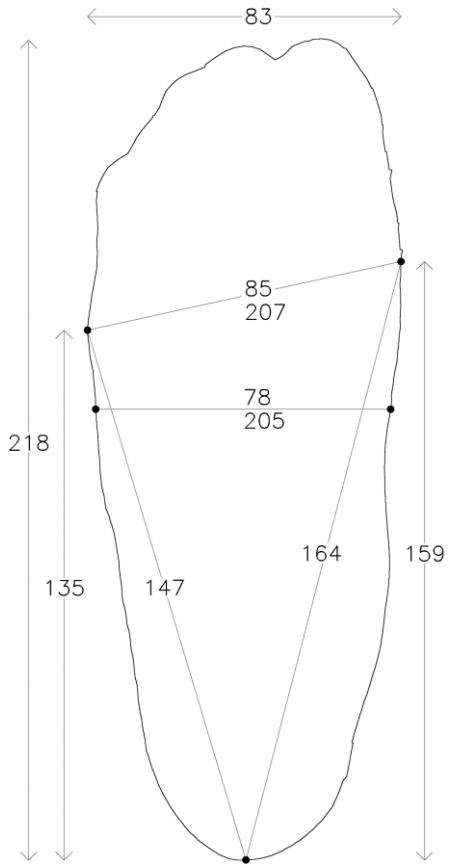

83
85
207
78
205
218
135
147
164
159

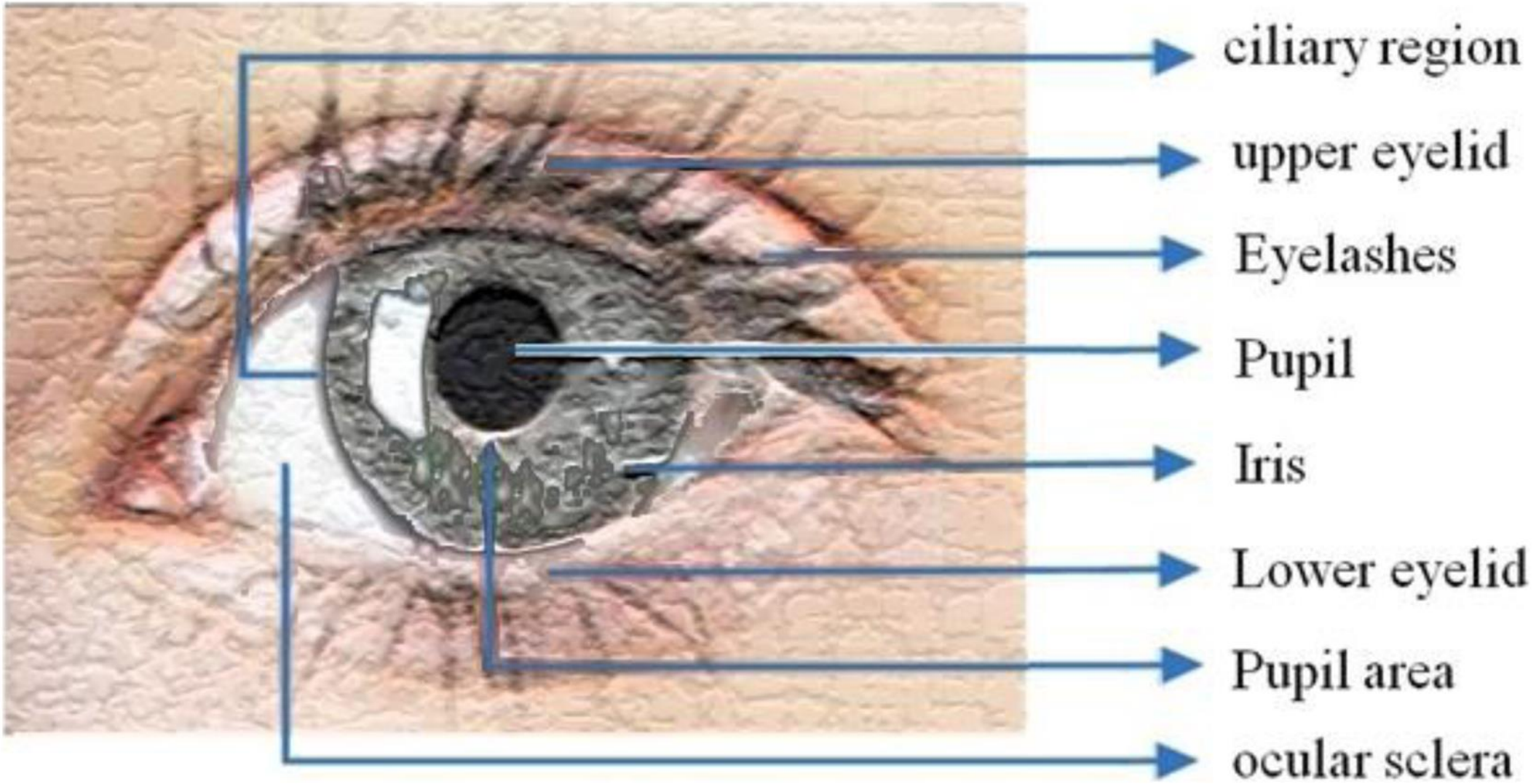
https://jfootankleres.biomedcentral.com/articles/10.1186/1757-1146-7-3

에이제이투 – Iris Classification

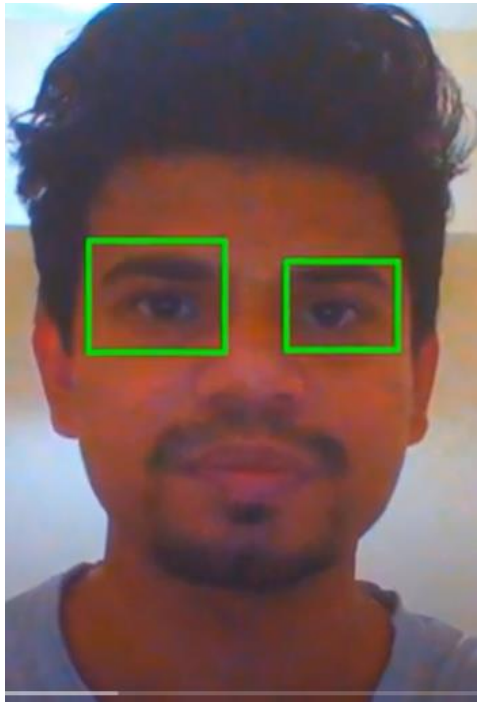
Deep Learnig을 이용한 홍채인식 과정

	AJ2	iris recognition
1	- 동영상 입력	
2	- 입력영상 Frame 처리	
3	- 동공탐지	
4	- 홍채이미지 추출	YOLO 학습
5	- 원본 이미지를 그레이스케일로 변환	
6	- 이미지 이진화	
7	- 동일한 픽셀값을 가지며 상호 연결된 영역을 동일한 그룹으로 분류하는 픽셀 그룹화	
8	- 물리적인 수치가 기준 범위 내에 속하는 영역을 동공 영역으로 결정하는 단계	
9	- 동공 영역의 위치를 기초로 상기 원본 이미지 상에서 홍채 영역을 특정하는 단계	
10	- 학습데이터 생성	
11	- 모델 생성	
12	- 모델 평가	
13	- TensorFlow Lite migration	

Deep Learnig 을 이용한 홍채인식 과정

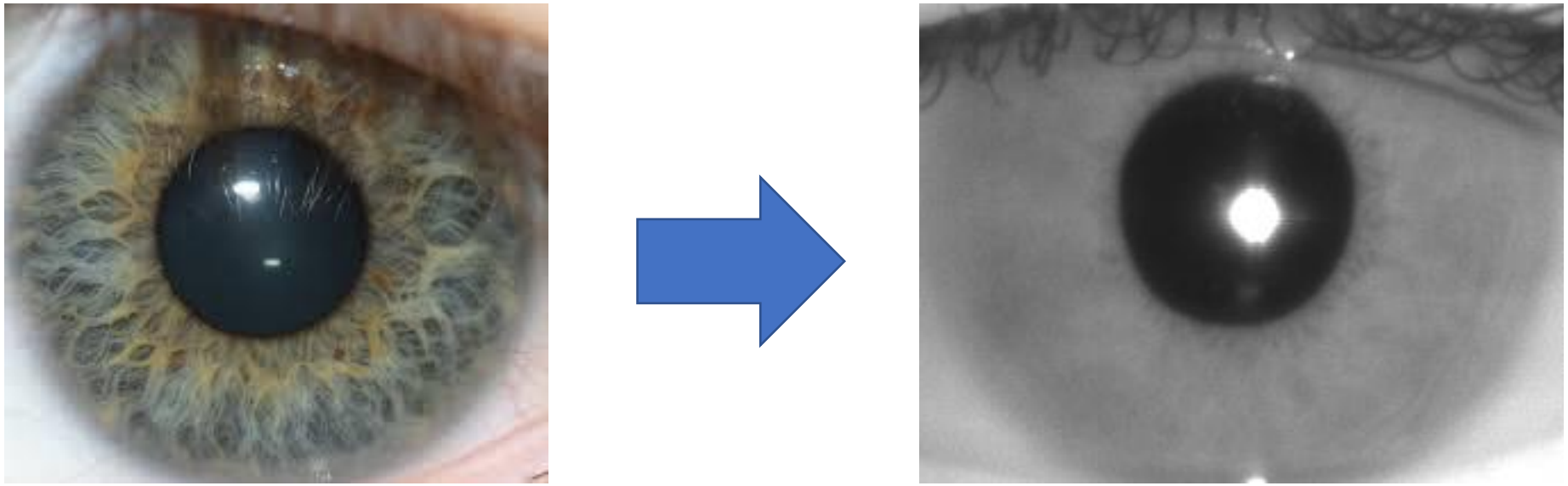


동영상 Frame 변환 및 동공탐지

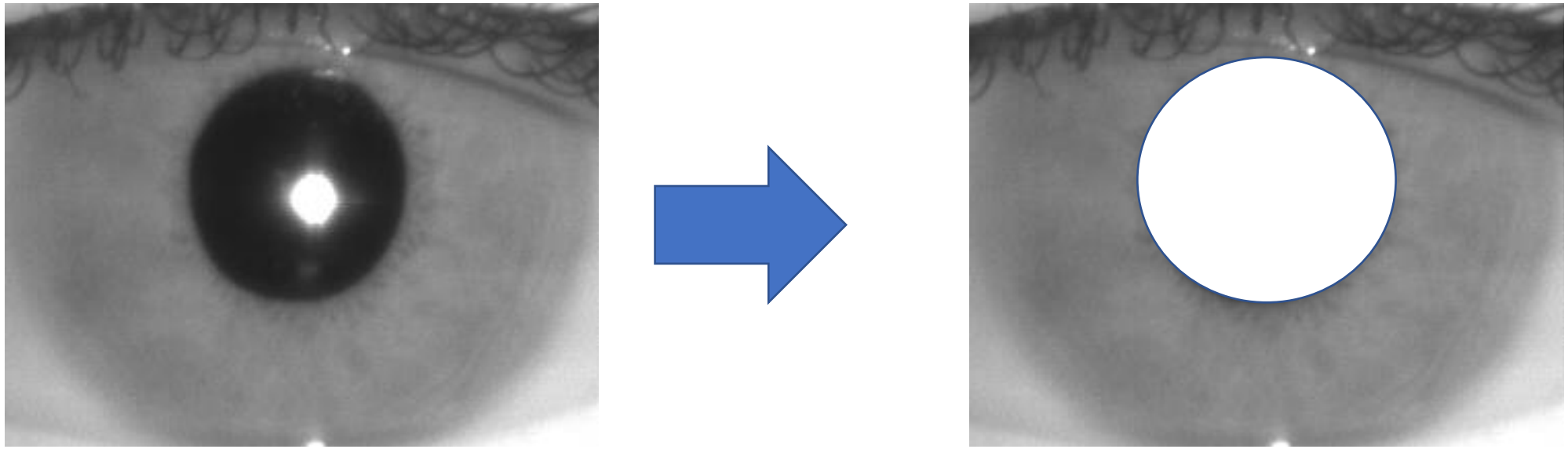


동공탐지

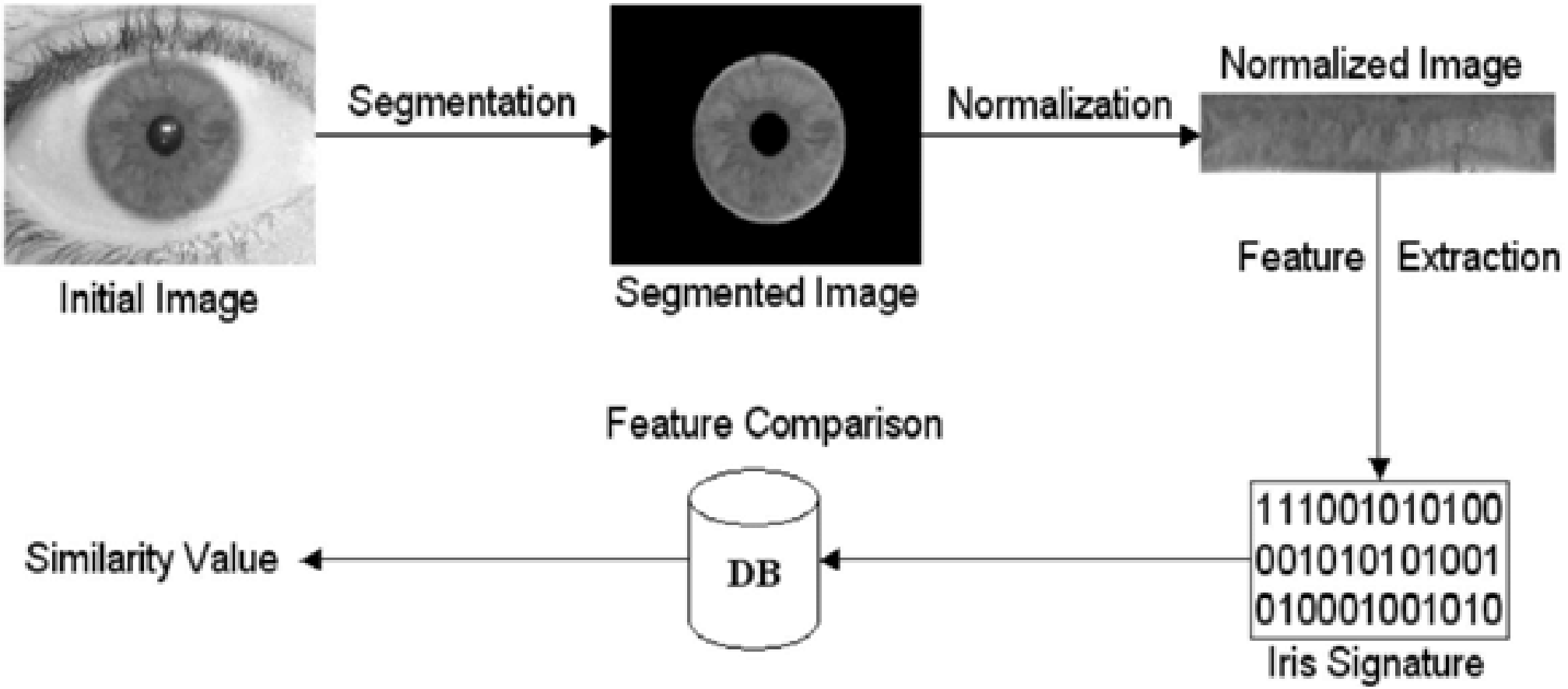
Iris 영역 찾기 및 Gray scale 변환



동공제거 및 Iris featuring



Iris Signature 학습 데이터 생성



CNN 모델 생성

https://github.com/JSJeong-me/Irostyle_consortium/blob/main/IrisClassification/0-IrisClassification.ipynb

CNN 모델 평가(Test Label: 100개)

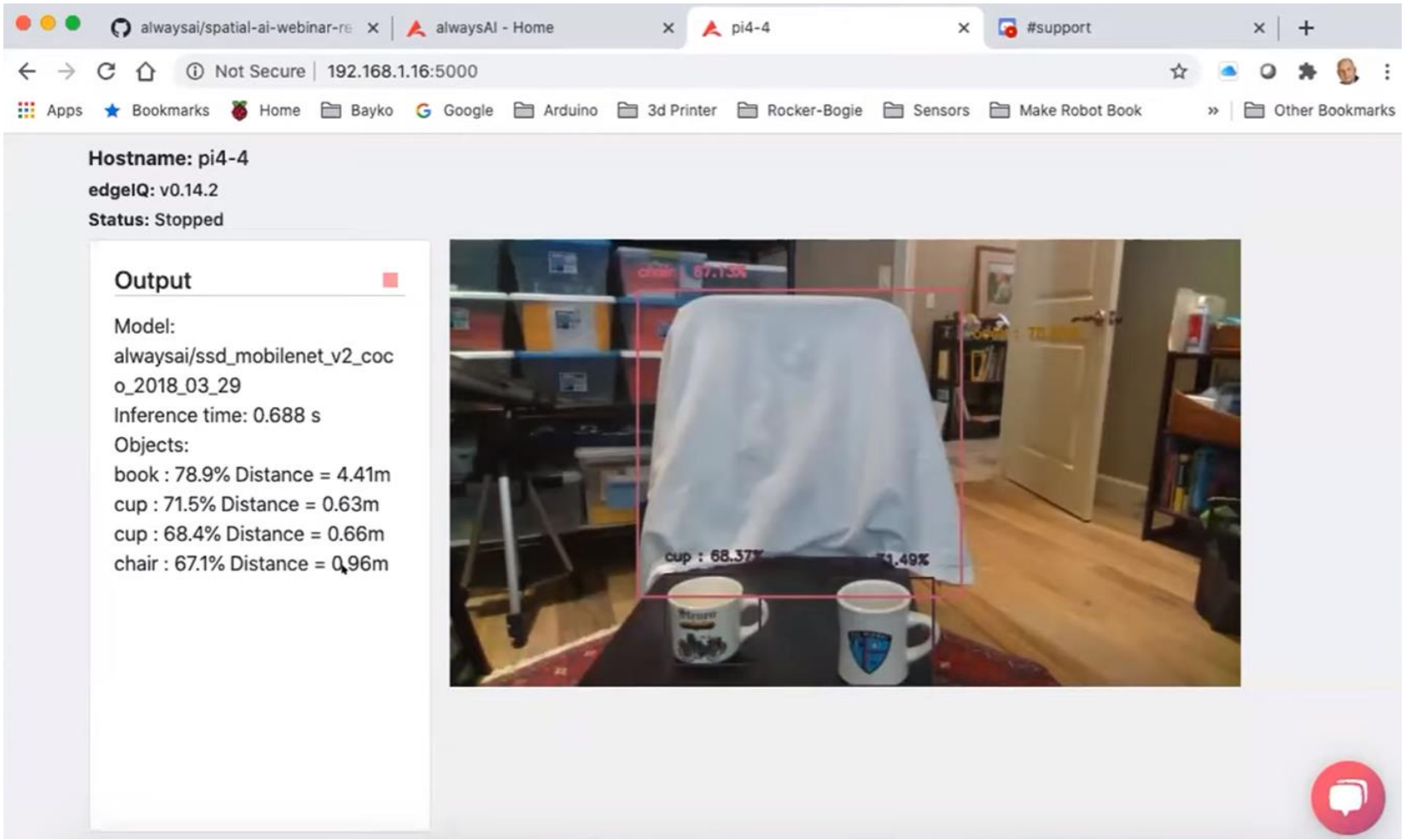
https://github.com/thuyngch/Iris-Recognition/blob/master/CASIA1/1/001_1_1.jpg

CNN 모델 성능 개선 및 경량화(TensorFlow Lite)

https://www.tensorflow.org/lite/guide?hl=ko

RNX – Depth AI

Depth AI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alwaysAI - Home
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#support
Not Secure | 192.168.1.16:5000
Apps
Bookmarks
Home
Bayko
Google
Arduino
3d Printer
Rocker-Bogie
Sensors
Make Robot Book
Other Bookmarks
Hostname: pi4-4
edgeIQ: v0.14.2
Status: Stopped
Output
Model:
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Inference time: 0.688 s
Objects:
book : 78.9% Distance = 4.41m
cup : 71.5% Distance = 0.63m
cup : 68.4% Distance = 0.66m
chair : 67.1% Distance = 0.96m