



**Brain AI**

**Intel® AI For Youth**

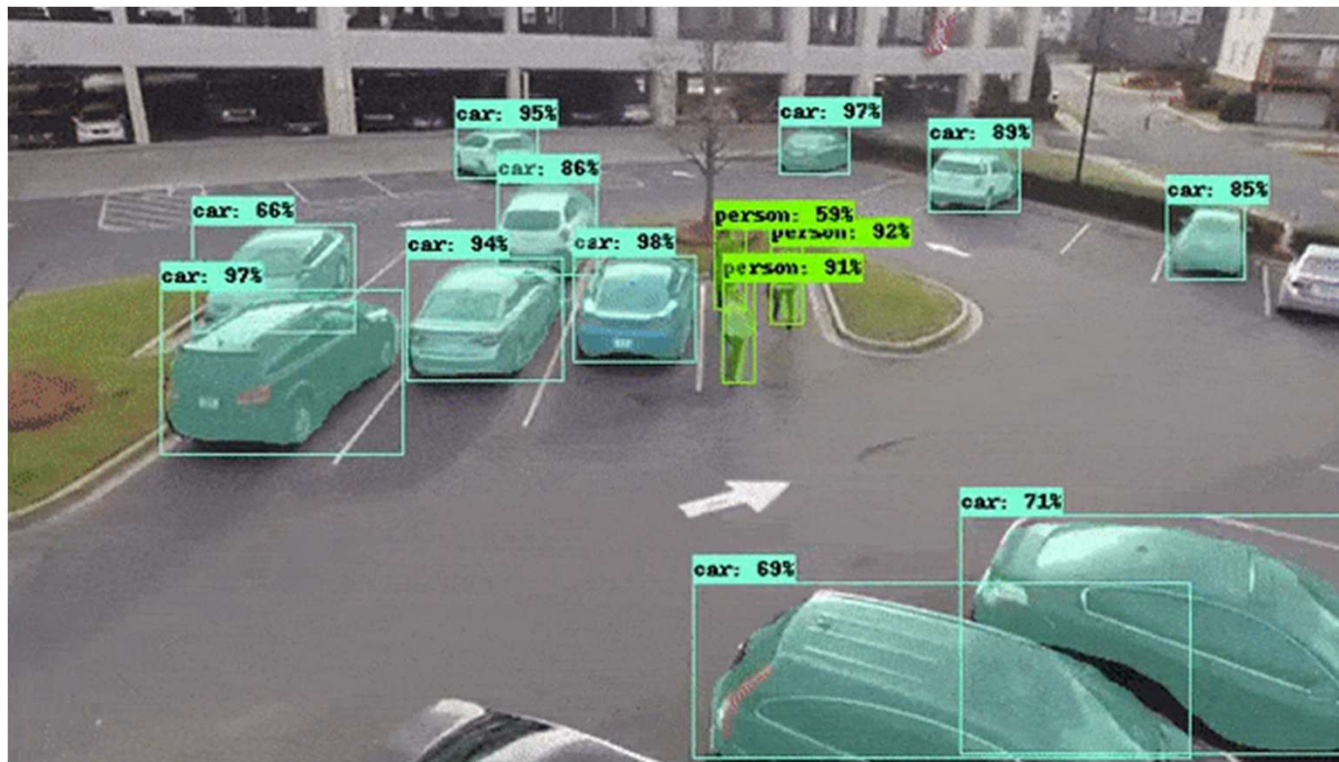
# 사전과제3. Intel OpenVINO

---

설치 및 테스트

**컴퓨터비전**

# 컴퓨터 비전 실생활 활용



Source: <https://towardsdatascience.com/how-to-do-everything-in-computer-vision-2b442c469928>

# 컴퓨터비전 적용 사례(기계)



Source: <https://www.youtube.com/watch?v=rVlhMGQgDkY>

# 컴퓨터비전 적용 사례(전자)



Source: [https://www.youtube.com/watch?v=vL\\_QNy25n74](https://www.youtube.com/watch?v=vL_QNy25n74)



Source: <https://www.youtube.com/watch?v=mgiosWaYDWY>



# 컴퓨터비전 적용 사례(농업)



Source: <https://www.youtube.com/watch?v=4szyNJv-fo>

# 컴퓨터비전 적용 사례(상업)



Source: <https://www.youtube.com/watch?v=us9HiG-suKI>

# 컴퓨터비전 적용 사례(상업)



Source: <https://www.youtube.com/watch?v=k4P2ybwn1iM>



# Computer Vision Tasks

**Classification**



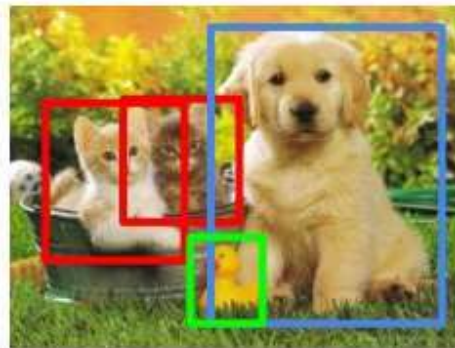
CAT

**Classification  
+ Localization**



CAT

**Object Detection**



CAT, DOG, DUCK

**Instance  
Segmentation**



CAT, DOG, DUCK

Single object

Multiple objects

Source: <http://cs231n.stanford.edu/> Credit For The Image Goes To: [Mike Tamir](#)





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**Open CV**



# OpenCV

- Open Source Computer Vision의 약자로 영상 처리에 사용할 수 있는 오픈 소스 라이브러리
- 실시간 컴퓨터 비전을 목적으로 한 프로그래밍 라이브러리
- 영상 데이터의 표현, 변환, 분석 등에 필요한 도구들을 제공
- 사물인식, 안면인식, 제스처 인식 등의 응용을 대상

# OpenCV 실습

## 1. OpenCV 라이브러리 불러오기

```
In [2]: import cv2  
import numpy as np  
import sys
```

# OpenCV 실습

## 2. 이미지 불러오기

```
In [5]: img = cv2.imread("student-group.jpg")  
cv2.imshow("image", img)  
  
cv2.waitKey(0)  
cv2.destroyAllWindows()
```



# OpenCV 실습

```
In [15]: from matplotlib import pyplot as plt  
  
img = cv2.imread("student-group.jpg")  
  
plt.imshow(img)  
plt.title('Brain AI Lab')  
plt.axis('on')  
plt.show()
```

# OpenCV 실습

```
In [17]: rgb = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
plt.imshow(rgb)
plt.title('Brain AI Lab')
plt.axis('on')
plt.show()
```

# OpenCV 실습

```
In [21]: grey = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
plt.imshow(grey)
plt.title('Brain AI Lab')
plt.axis('off')
plt.show()
```

# OpenCV 실습

```
In [2]: capture = cv2.VideoCapture(0)
```

```
In [3]: while True:
        ret, frame = capture.read()
        cv2.imshow('WebCam', frame)
        k = cv2.waitKey(10) & 0xFF
        if k == 27:
            break

        capture.release()
        cv2.destroyAllWindows()
```



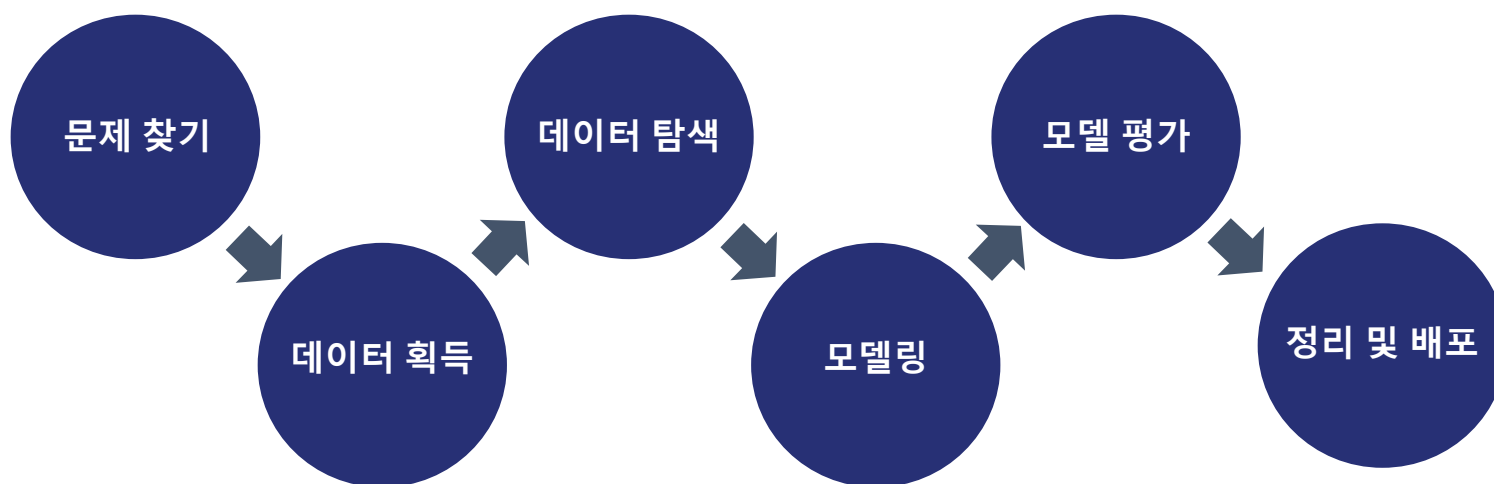


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# **OpenVINO Pre-trained Model**

# 인텔 AI 프로젝트 사이클



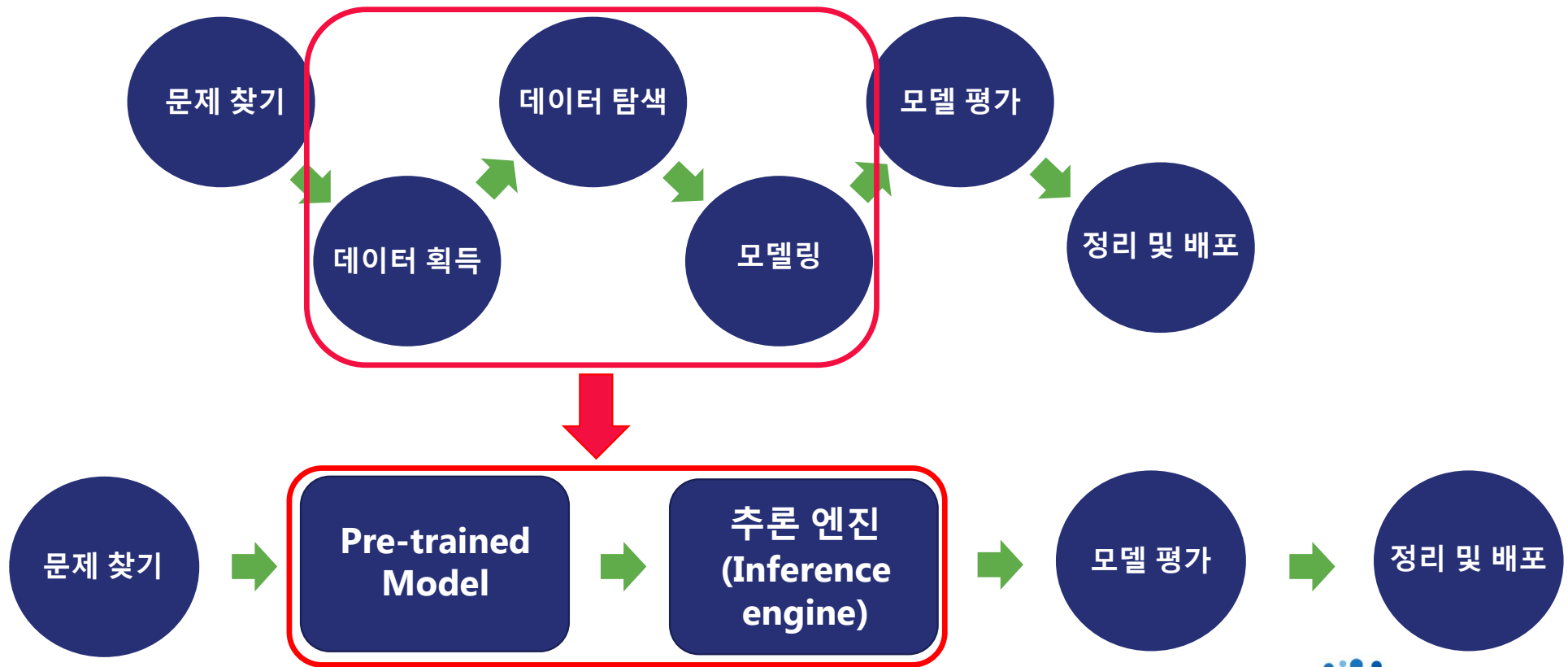
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# Pre-Trained Model

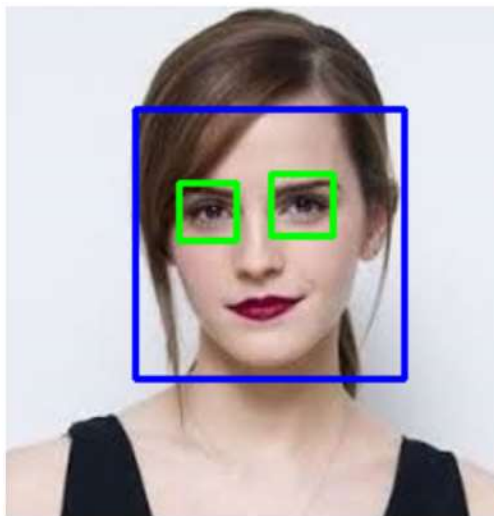
- training을 끝낸 이후에 산출물로 나온 모델
- 데이터 획득, 데이터 탐색, 데이터 모델링이 필요 없음.

# 인텔 AI 프로젝트 사이클





# Pre-Trained Model



Source : <https://medium.com/dataseries/face-recognition-with-opencv-haar-cascade-a289b6ff042a>

## Worksheet – 3 : OpenVINO Pre-Trained Model

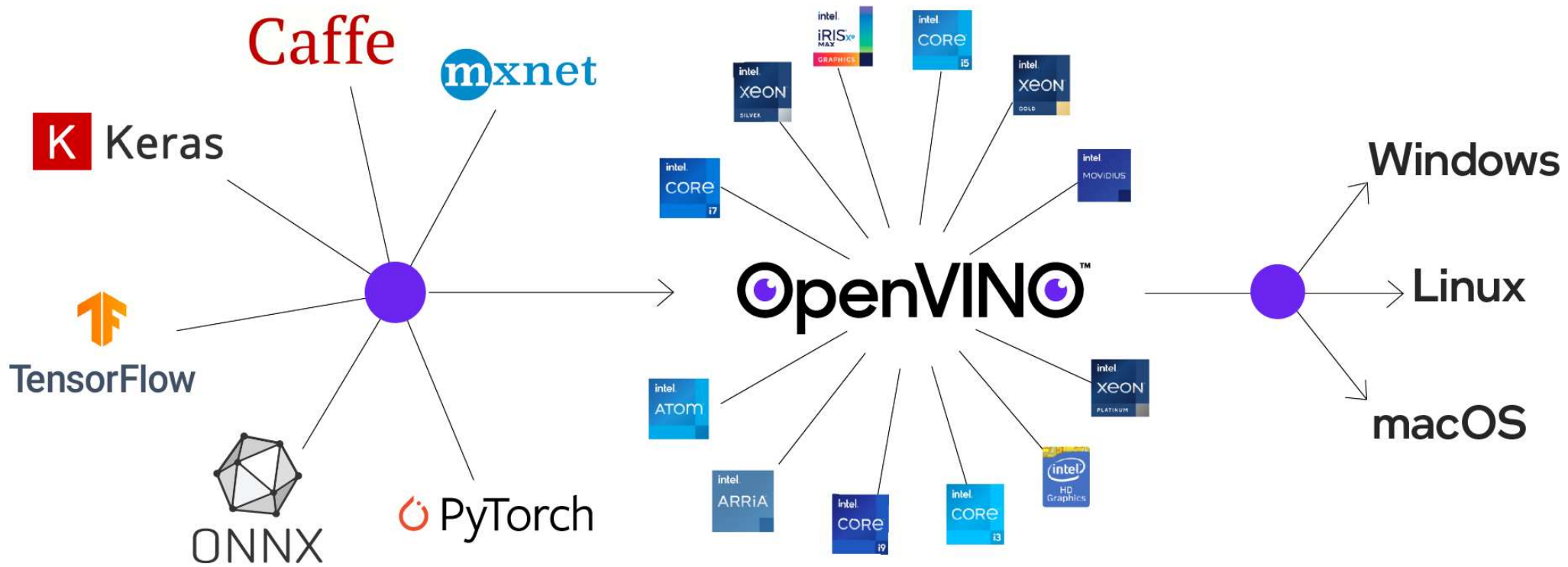
필수: <https://github.com/simpledevelopments/OpenVINO-Python-Utils>

# Pre-Trained Model



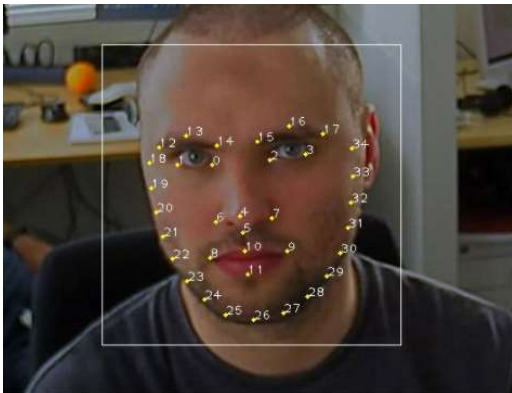
**Intel® Distribution of OpenVINO™**

# Pre-Trained Model



# OpenVINO™ 에서 제공하는 Model Zoo

## ■ 얼굴 인식(Face Detection)



### ● 얼굴 랜드 마크 감지(Facial Landmarks Detection)

이것은 컨볼루션 신경망을 기반으로 하는 사용자 지정 아키텍처입니다. 눈, 코, 입, 눈썹 및 얼굴 윤곽을 덮는 35 개의 얼굴 랜드 마크를 감지합니다.



### ● 가벼운 얼굴 랜드 마크 감지(Lightweight Facial Landmarks Detection)

이 경량 회귀 모델은 두 개의 눈, 코, 두 개의 입술 모서리 등 5 개의 얼굴 랜드 마크를 식별합니다. 이 모델은 스마트 교실 사용 사례에 가장 적합합니다.



# OpenVINO jupyter notebook에서 사용하기





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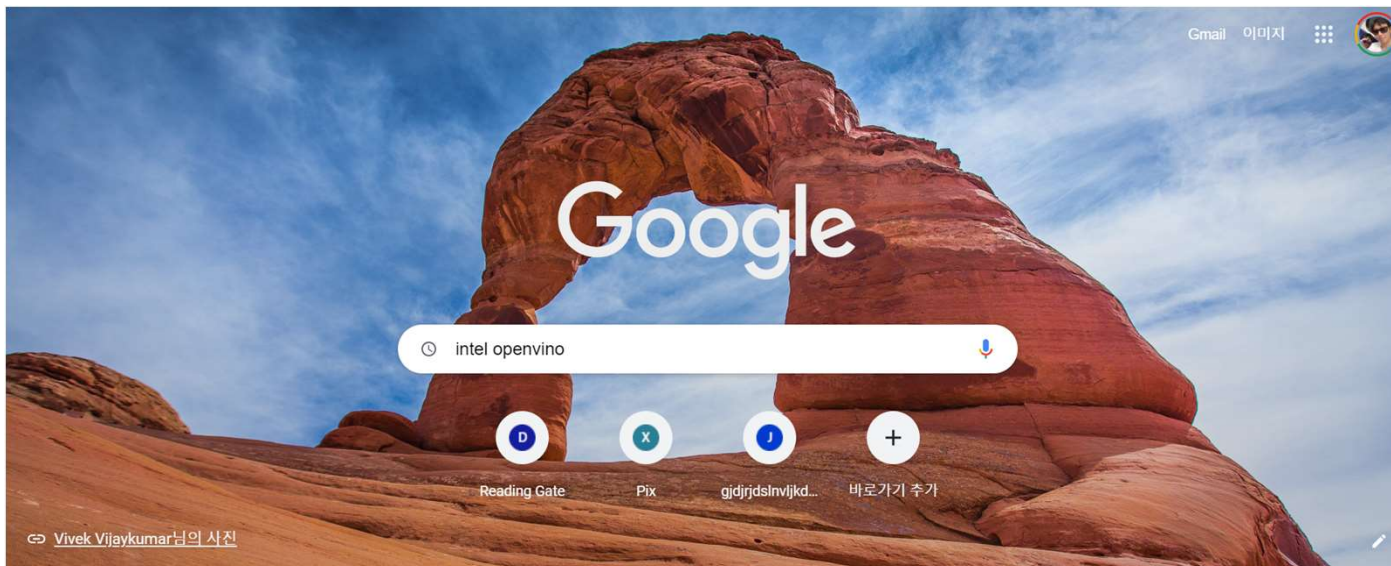
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# OpenVINO 다운로드 및 설치

# OpenVINO™ 설치



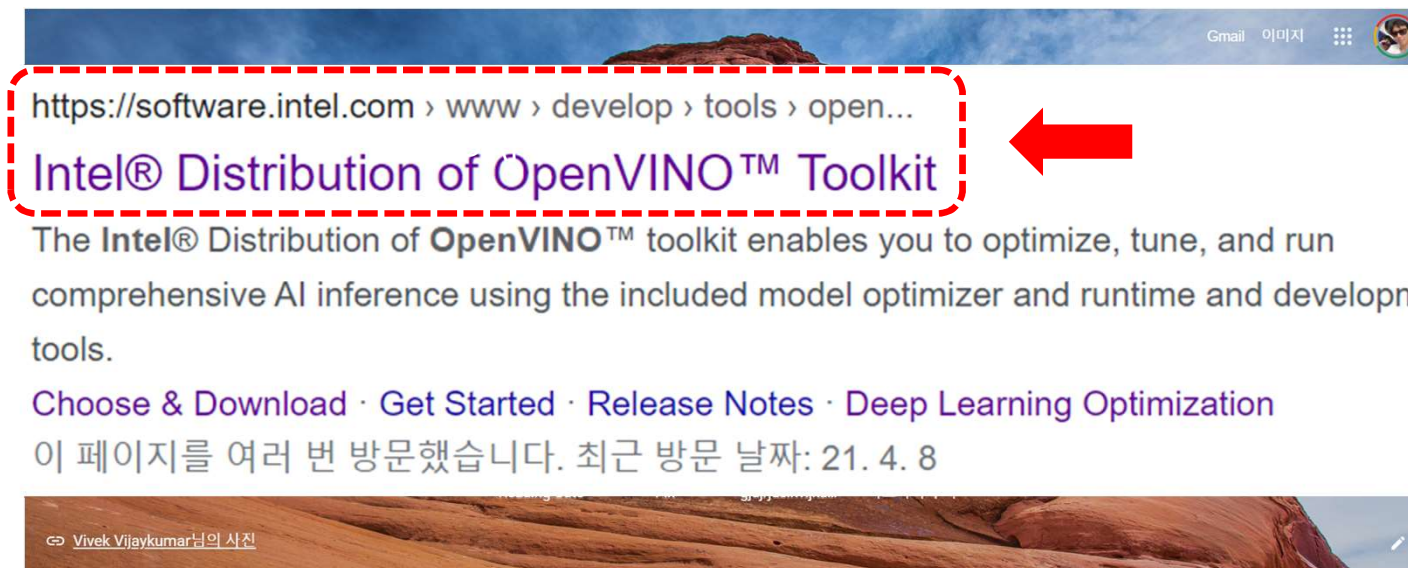
## "Intel OpenVINO" 검색



# OpenVINO™ 설치



## "Intel OpenVINO" 검색



# OpenVINO™ 설치

☰ Deep Learning & Vision Tools



USA (English) 🌐 Sign In 👤 🔍

## Deploy High-Performance Deep Learning Inference

Optimize models that you trained with TensorFlow\*, PyTorch\*, and more. Run high-performance inference with a write once, deploy anywhere efficiency using the Intel® Distribution of OpenVINO™ toolkit.

Choose & Download →



# OpenVINO™



Overview



Download



How It Works



Use Cases



Resources



# OpenVINO™ 설치

## Download the Intel® Distribution of OpenVINO™ toolkit today

Develop High Performance Computer Vision & Deep Learning Solutions from Device to Cloud

Please choose the operating system for your download \*

- ☒ Windows
- ☐ Linux
- ☐ Windows with FPGA Support
- ☐ Linux with FPGA Support
- ☐ macOS

선택

1

First Name \*

l iam

Last Name \*

lim

Business Email Address \*

kojang07@gmail.com

Company \*

Busan Computer Science High school

Country/Region \*

Korea, Republic of

Profession \*

Professor/Teacher

What best describes your business?\*

Academic Institution

입력

2

Submit

3





# OpenVINO™ 설치

## Intel® Distribution of OpenVINO™ toolkit for Windows\*

2021

Choose a Version

2020 4 ▼

Build date: 09 Jul 2020

[Release Notes](#) | [Installation Guide](#)

2020 4 버전 선택

1

2

### Choose a Download Option

I want to download only the components I need. Time and space are important to me. While I'm connected to the internet, I can install the components I choose. Initial download 18 MB, max download 199 MB based on component selection.

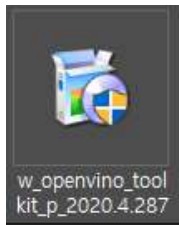
Customizable Package

I prefer a single large install package with all components. I can install offline after downloading the entire package. Download size 199 MB.

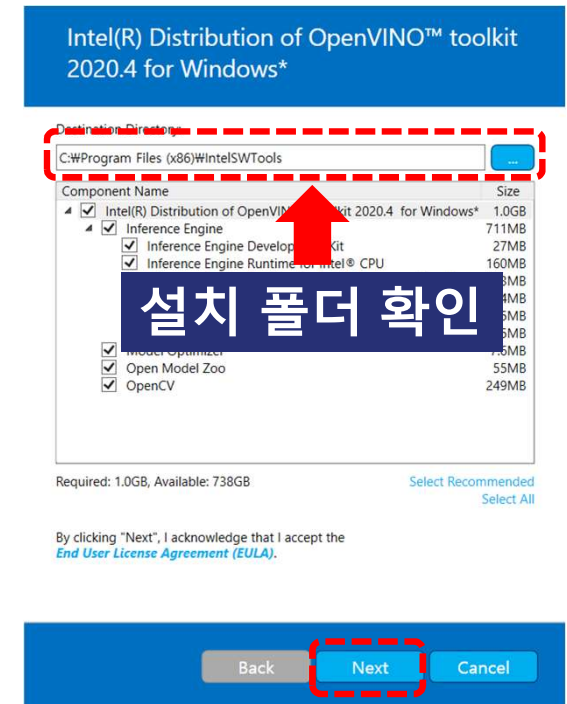
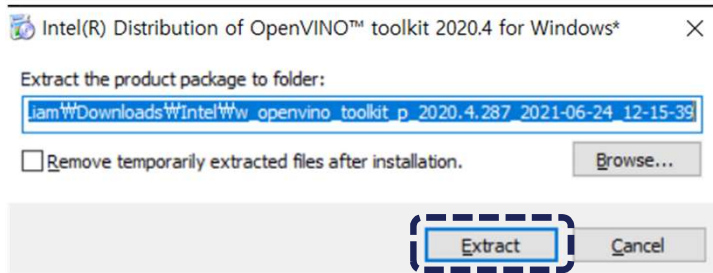
Full Package

[Related downloads](#) ▶

# 다운로드한 OpenVINO 설치 파일 실행



← 클릭하여 실행  
**1**



# 설치한 OpenVINO 확인

- Anaconda Prompt(BrainAI) 실행
- 아래 그림과 같이 설치 경로로 이동후 환경변수 실행

- ✓ 해당 경로로 이동 : `(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino\bin>`
- ✓ 환경변수 실행 : `setupvars.bat`

```
(BrainAI) C:\Program Files (x86)\Intel>cd..  
(BrainAI) C:\Program Files (x86)>cd IntelSWTools  
(BrainAI) C:\Program Files (x86)\IntelSWTools>cd openvino  
(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino>cd bin  
(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino\bin>setupvars.bat  
Python 3.7.7  
[setupvars.bat] OpenVINO environment initialized  
(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino\bin>cd  
(BrainAI) C:\>cd BrainAI  
(BrainAI) C:\BrainAI>jupyter notebook
```

1

2





**Brain AI**

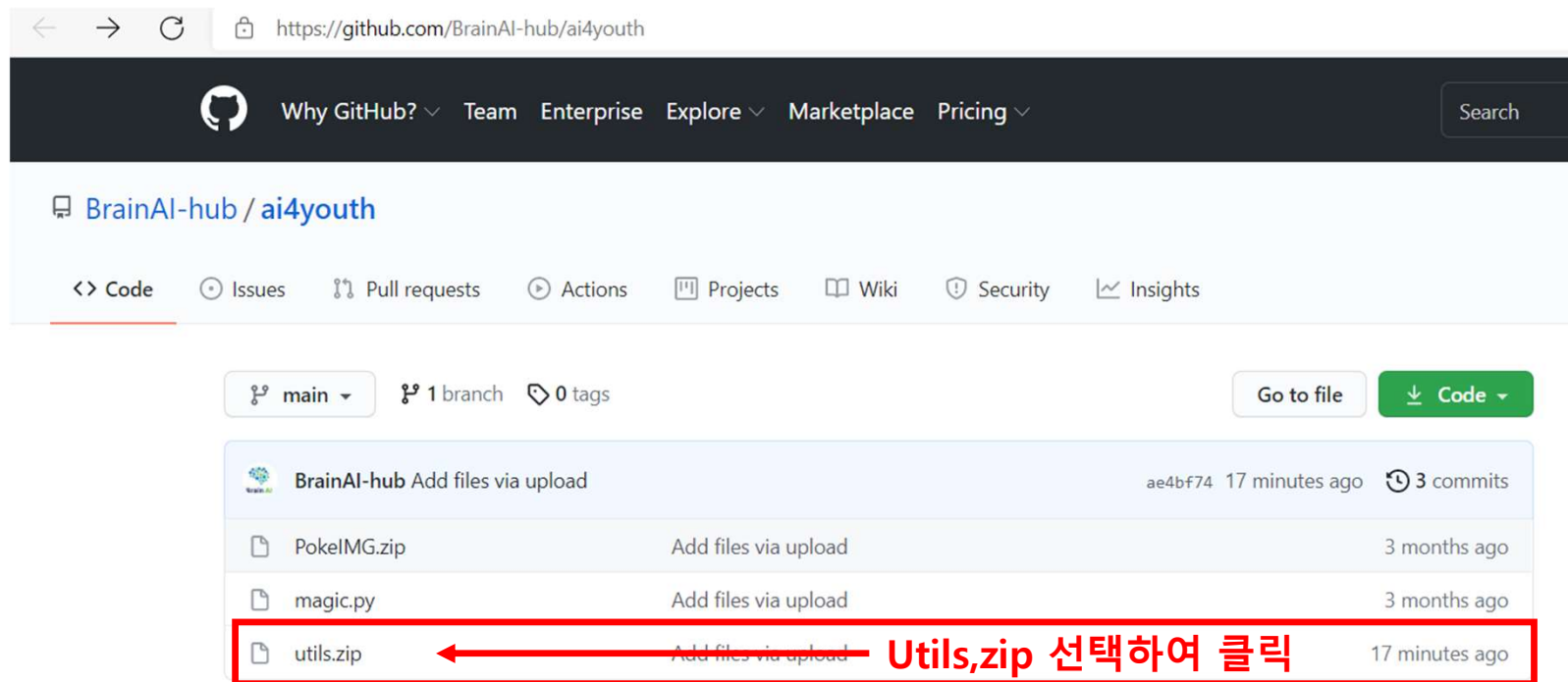
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**utils 폴더 다운로드**

## ● utils 다운로드 방법

- Github 접속해서 utils 다운로드

<https://github.com/BrainAI-hub/ai4youth>



- utils 다운로드 방법
  - Github 접속해서 utils 다운로드

BrainAI-hub / ai4youth

Notifications

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<> Code

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Pull requests

Actions

Projects

Wiki

Security

Insights

main ai4youth / utils.zip

Go to file

...

BrainAI-hub Add files via upload

Latest commit ae4bf74 19 minutes ago History

1 contributor

6.93 KB

Download 클릭



Download



View raw



## ● utils 다운로드 방법

- Github 접속해서 utils 다운로드



OpenVINO\_Test 프로젝트 폴더에 복사해서 압축을 풀어주세요.



↑ << BrainAI > OpenVINO\_Test

Windows (C:) > BrainAI > OpenVINO\_Test > utils

☐ 이름

\_\_pycache\_\_

\_\_init\_\_.py

opv.py





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# OpenVINO 테스트

# OpenVINO 환경 실행

- Anaconda Prompt(BrainAI) 실행
- 아래 그림과 같이 설치 경로로 이동후 환경변수 실행
  - ✓ 해당 경로로 이동 : (BrainAI) C:\Program Files (x86)\Intel\openvino\bin>
  - ✓ 환경변수 실행 : setupvars.bat

```
(BrainAI) C:\Program Files (x86)\Intel>cd ..  
(BrainAI) C:\Program Files (x86)>cd IntelSWTools  
(BrainAI) C:\Program Files (x86)\IntelSWTools>cd openvino  
(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino>cd bin  
(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino\bin>setupvars.bat  
Python 3.7.7  
[setupvars.bat] OpenVINO environment initialized  
(BrainAI) C:\Program Files (x86)\IntelSWTools\openvino\bin>cd ..  
(BrainAI) C:\>cd BrainAI  
(BrainAI) C:\BrainAI>jupyter notebook
```

← OpenVINO 사용시 반드시  
환경변수를 먼저 실행해  
주어야 합니다.  
매번 실행 해 주셔야 합니다.



# OpenVINO 테스트



Quit

Logout

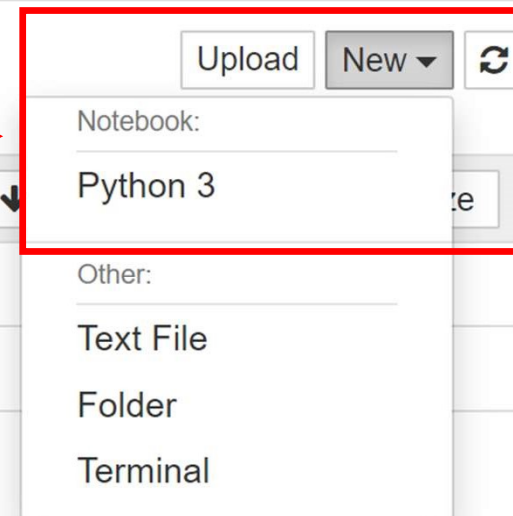
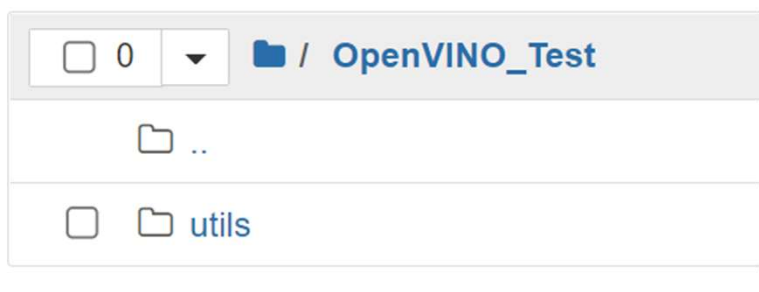
Files

Running

Clusters

Select items to perform actions on them.

OpenVINO\_Test 폴더로 이동한 후  
[New - Python 3] 클릭



# OpenVINO 테스트

 jupyter Untitled (autosaved)



Logout

File

Edit

View

Insert

Cell

Kernel

Widgets

Help

Notebook saved

Trusted

Python 3 



Run



Code



In [ ]:



Brain AI

# OpenVINO 테스트

Jupyter

```
from utils.opv import OpvModel
```

Logout

File

Edit

View

Insert

Cell

Kernel

Widgets

Help

Trusted

Python 3



Run



Code



```
In [1]: from utils.opv import OpvModel
```

```
In [ ]: 에러 없이 실행되면 성공적으로 OpenVINO를 설치한 것입니다.
```



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# Pre trained Model Zoo 다운로드

# Model zoo 다운로드 방법

- 공개 모델 세트(Public Model Set) python

[https://download.01.org/opencv/2021/openvinotoolkit/2021.2/open\\_model\\_zoo/models\\_bin/3/](https://download.01.org/opencv/2021/openvinotoolkit/2021.2/open_model_zoo/models_bin/3/)

에서 Model zoo를 다운 받을 수 있습니다.

## ● Model zoo 다운로드 방법

01 INTEL  
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SOURCE  
.org

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face-detection-0205/	-	2020-Dec-10 16:54
face-detection-0206/	-	2020-Dec-10 16:54
face-detection-adas-0001/	← 필요한 model 선택하여 클릭	2020-Dec-10 16:54
face-detection-retail-0004/	-	2020-Dec-10 16:54
face-detection-retail-0005/	-	2020-Dec-10 16:54
facial-landmarks-35-adas-0002/	-	2020-Dec-10 16:54
faster-rcnn-resnet101-coco-sparse-60-0001/	-	2020-Dec-10 16:54
formula-recognition-medium-scan-0001/	-	2020-Dec-10 16:54
formula-recognition-polynomials-handwritten-0001/	-	2020-Dec-10 16:54
gaze-estimation-adas-0002/	-	2020-Dec-10 16:54
handwritten-japanese-recognition-0001/	-	2020-Dec-10 16:54
handwritten-score-recognition-0003/	-	2020-Dec-10 16:54
handwritten-simplified-chinese-recognition-0001/	-	2020-Dec-10 16:54





## ● Model zoo 다운로드 방법

FILE NAME ↓	FILE SIZE ↓	DATE ↓
Parent directory/	-	-
FP16/	-	2020-Dec-10 16:54
FP16-INT8/	-	2020-Dec-10 16:54
FP32/	-	2020-Dec-10 16:54

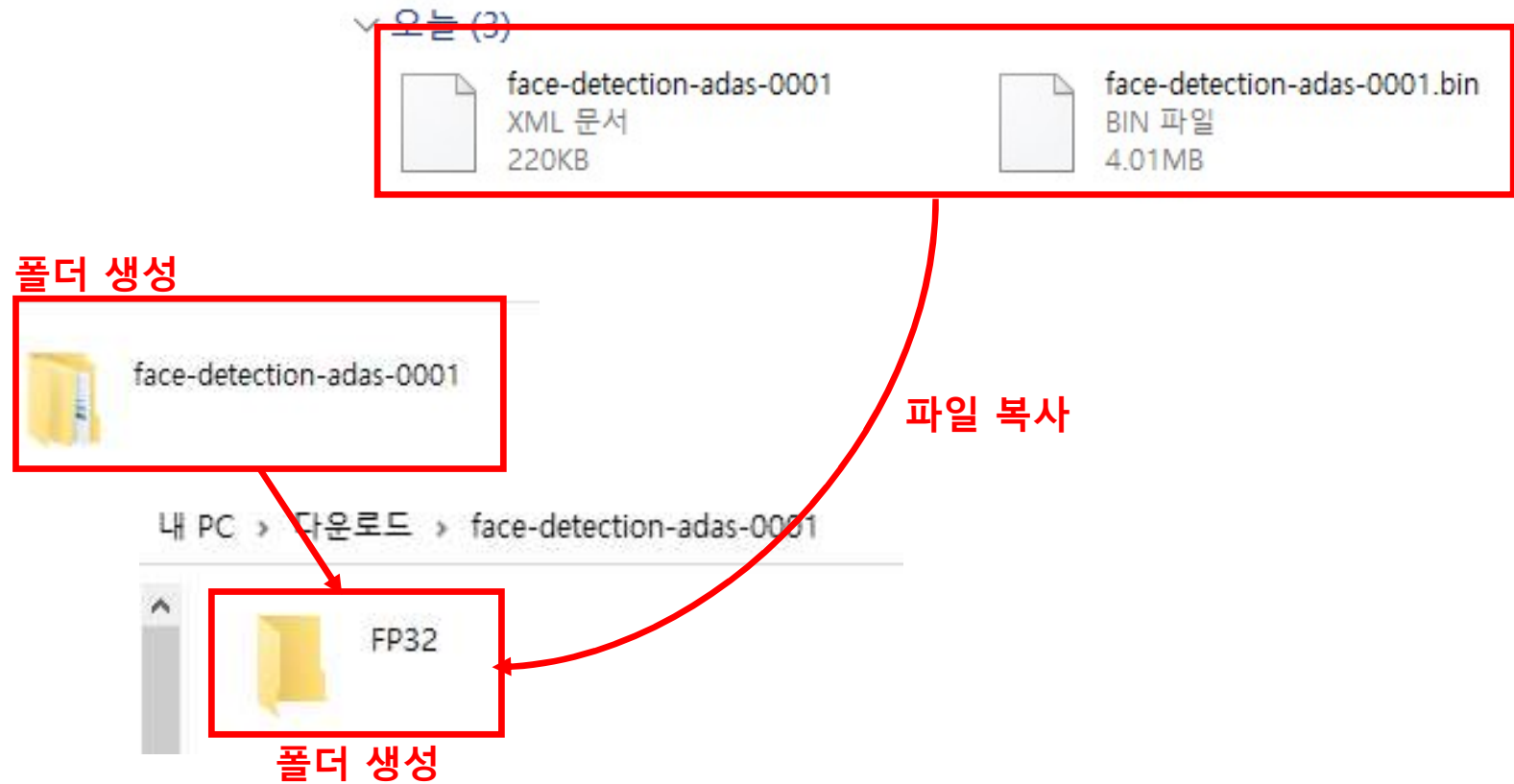
← CPU용 FP32 클릭



FILE NAME ↓	FILE SIZE ↓	DATE ↓
Parent directory/	-	-
face-detection-adas-0001.bin	4.0 MiB	2020-Dec-10 17:14
face-detection-adas-0001.xml	220.7 KiB	2020-Dec-10 17:14

← bin, xml 파일 각각 클릭하여 다운로드 후 폴더 저장

## ● Model zoo 다운로드 방법





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**수고하셨습니다.**