

# Chapter08. Celeb CNN

## 이미지 분석

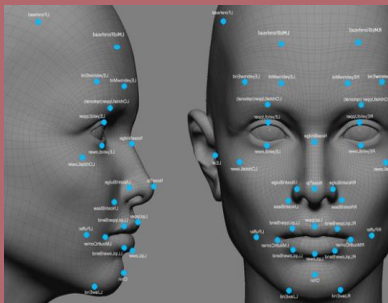
# 딥 러닝 적용 이미지 분석 절차

STEP 01



Data Crawling  
(Selenium)

STEP 02



Face\_Recognition  
(Opencv, dlib)

STEP 03



Deep\_Learning  
(Tensorflow)

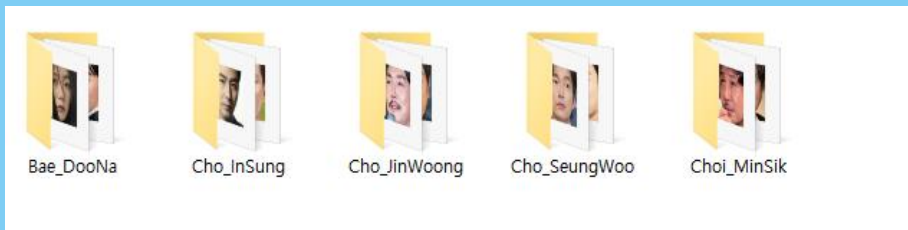
## STEP 01 : 이미지 자료수집

### 이미지 자료 수집 계획

- 5명 연예인( $5 * 200 = 1,000$ )

Train\_Data :  $150 * 5 = 750$

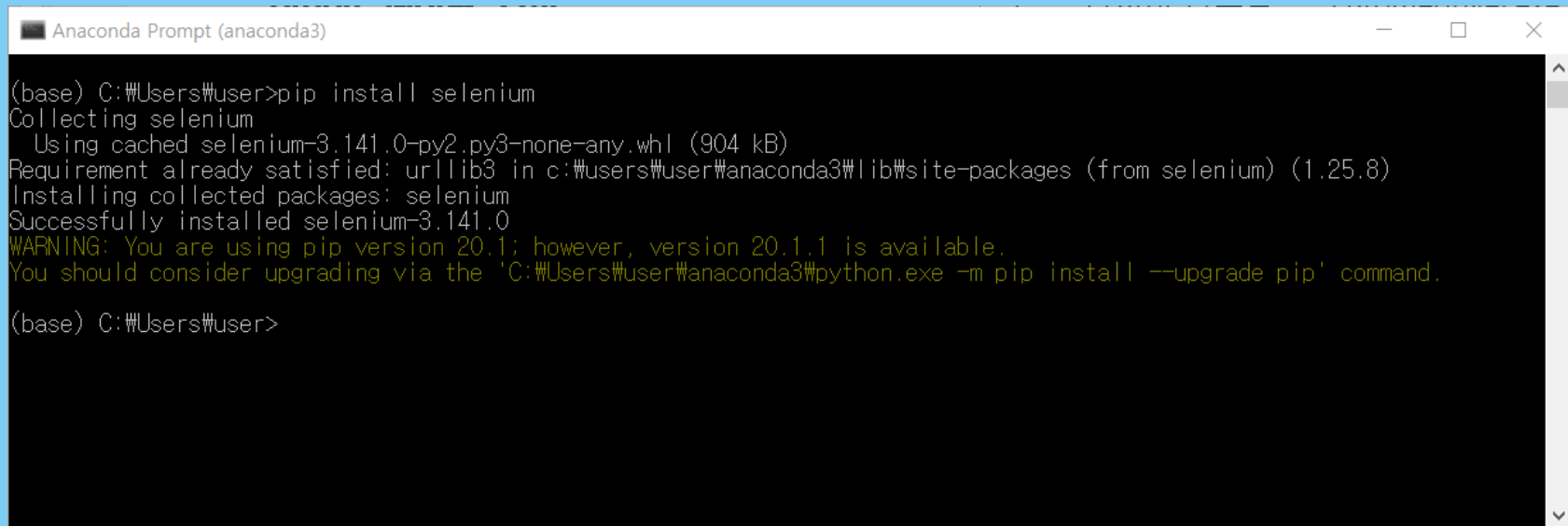
Test\_Data :  $50 * 5 = 250$



배두나	조인성
조진웅	조승우
최민식	

- Selenium 설치

pip install selenium



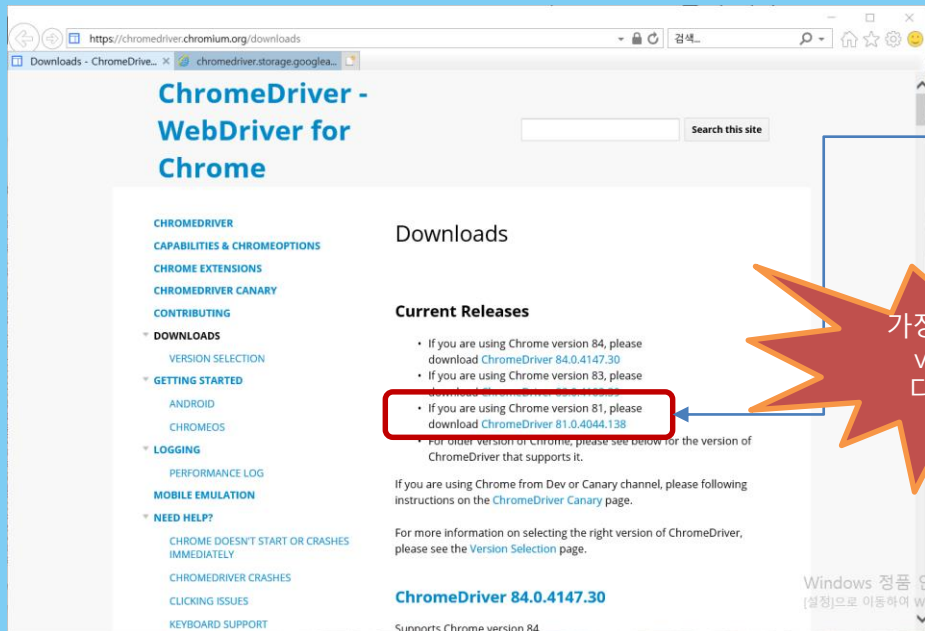
```
Anaconda Prompt (anaconda3)

(base) C:\Users\user>pip install selenium
Collecting selenium
  Using cached selenium-3.141.0-py2.py3-none-any.whl (904 kB)
Requirement already satisfied: urllib3 in c:\users\user\anaconda3\lib\site-packages (from selenium) (1.25.8)
Installing collected packages: selenium
Successfully installed selenium-3.141.0
WARNING: You are using pip version 20.1; however, version 20.1.1 is available.
You should consider upgrading via the 'C:\Users\user\anaconda3\python.exe -m pip install --upgrade pip' command.

(base) C:\Users\user>
```

- 크롬 드라이버 다운로드(chromedriver.exe)

<https://chromedriver.chromium.org/downloads>



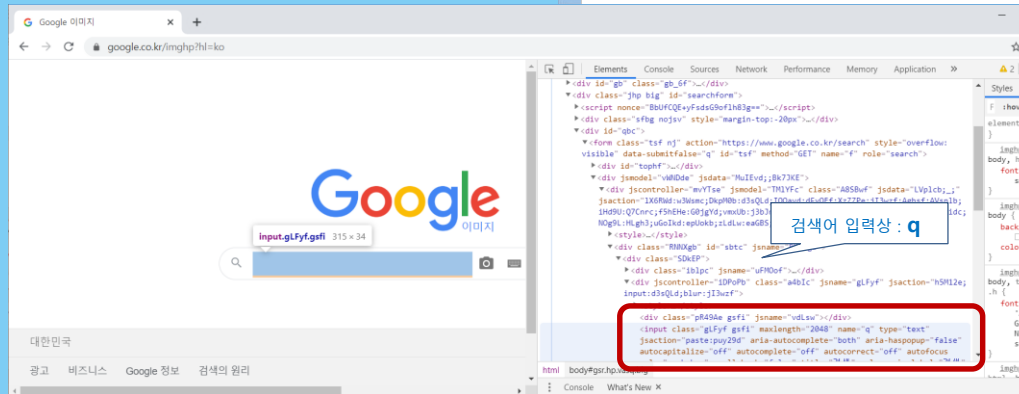
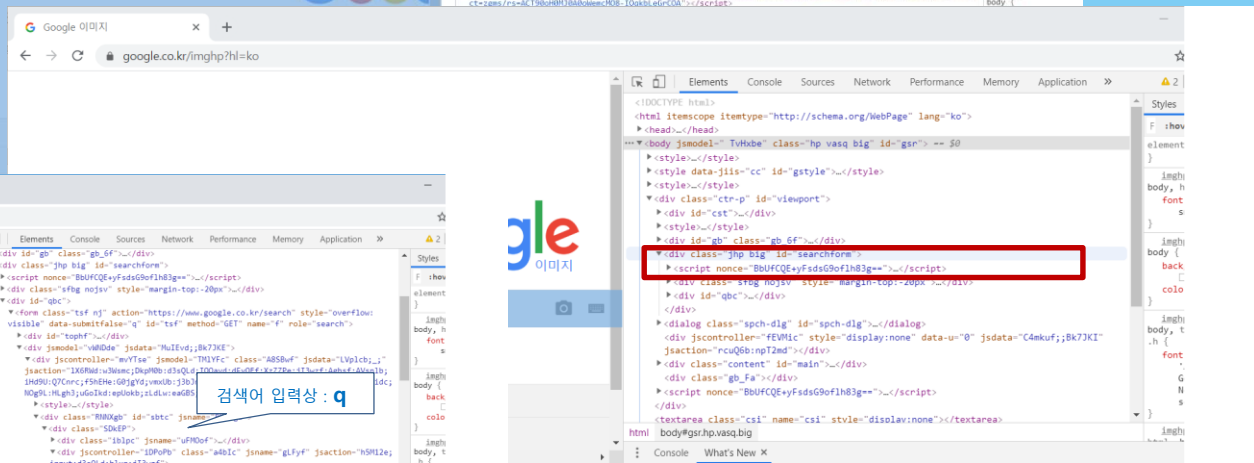
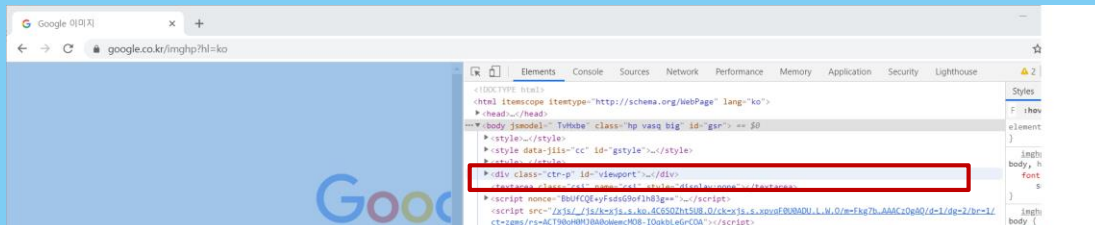
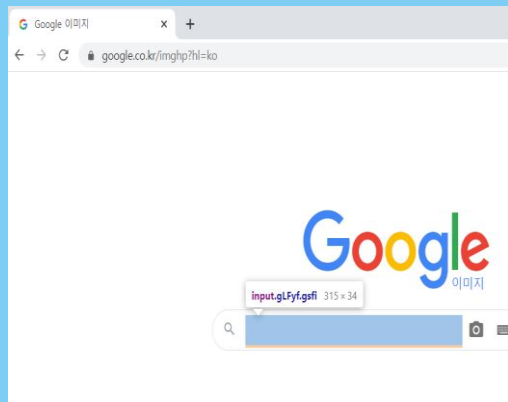
My 크롬드라이버 Version 확인 :  
설정 > Chrome 정보  
(버전 83.0.4103.97(공식 빌드) (64비트))

가장 유사한  
version  
다운로드

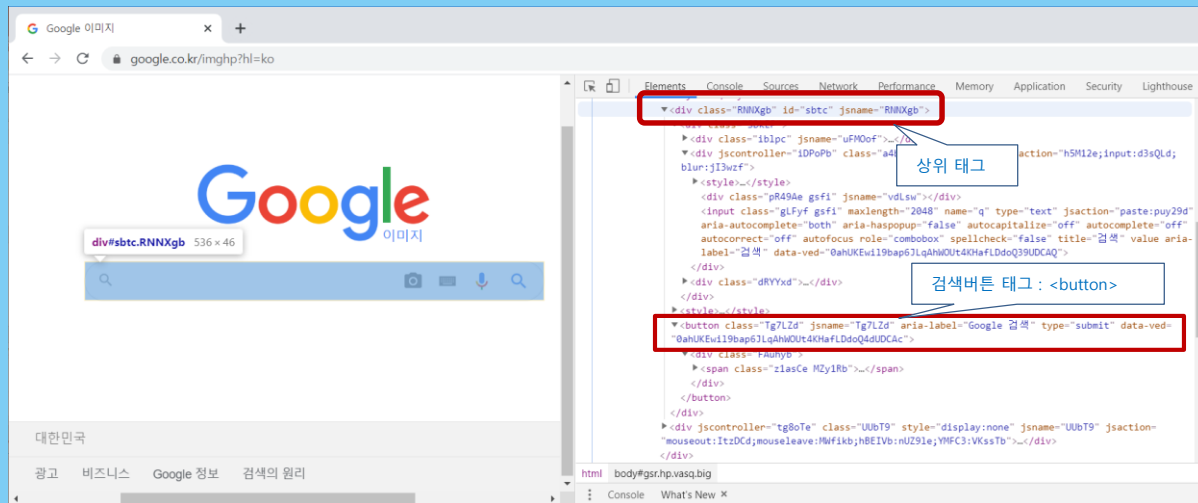
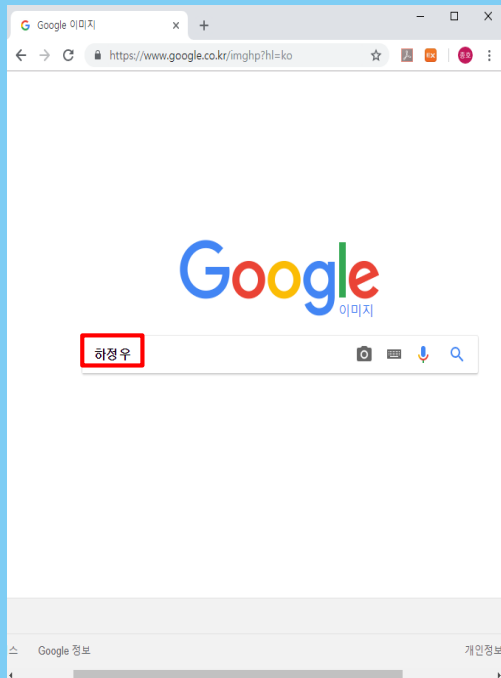
# 1. 검색어 입력상자 찾기

## 검색어 입력상자 찾기

1. <https://www.google.co.kr/imghp?hl=ko> 접속
2. F12 단축키 누름
3. <body> 태그 시작으로 순차적으로 마우스 오버 시 활성화된 tag 선택
4. 선택한 tag의 하위 tag 순차적으로 마우스 오버하여 입력상자 영역 찾기

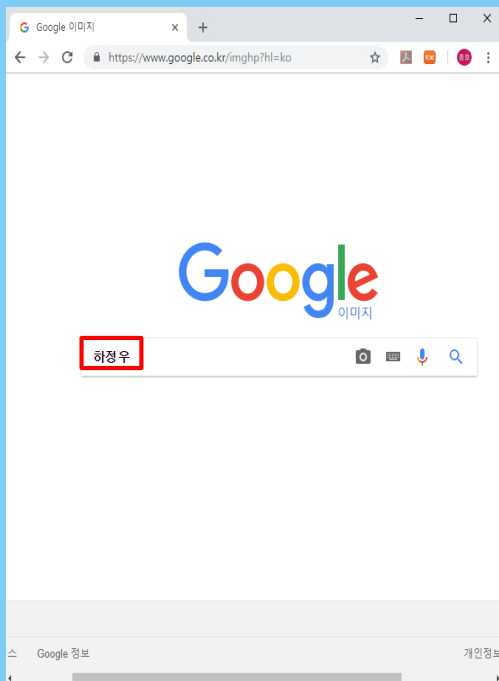


## 2. 검색어 입력 후 전송 버튼 찾기

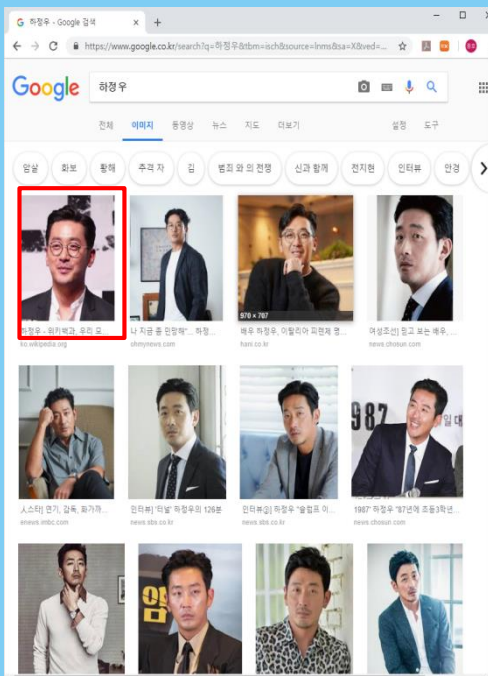


# ● Selenium 데이터 수집 절차

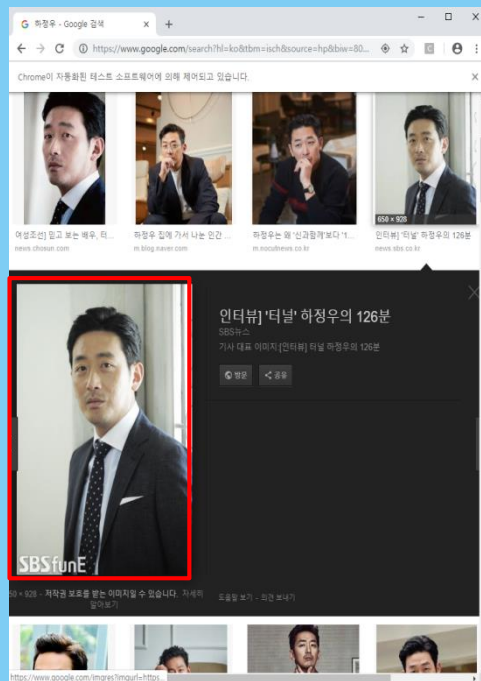
## 1. 문자 삽입 및 찾기



## 2. 순서대로 선택



## 3. 이미지 저장

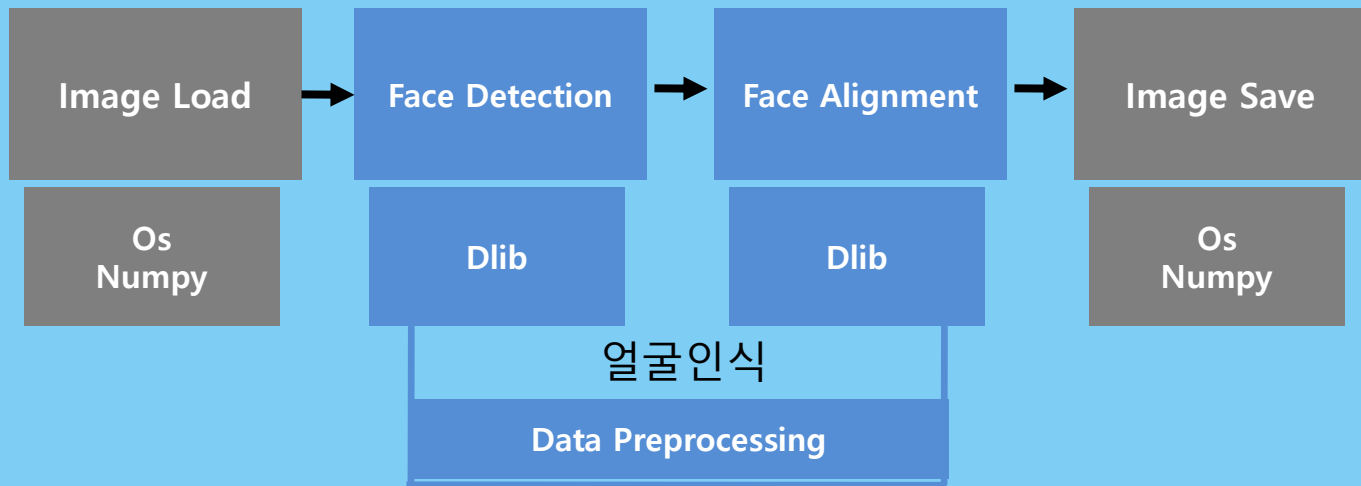




## STEP 02 : 이미지 정제

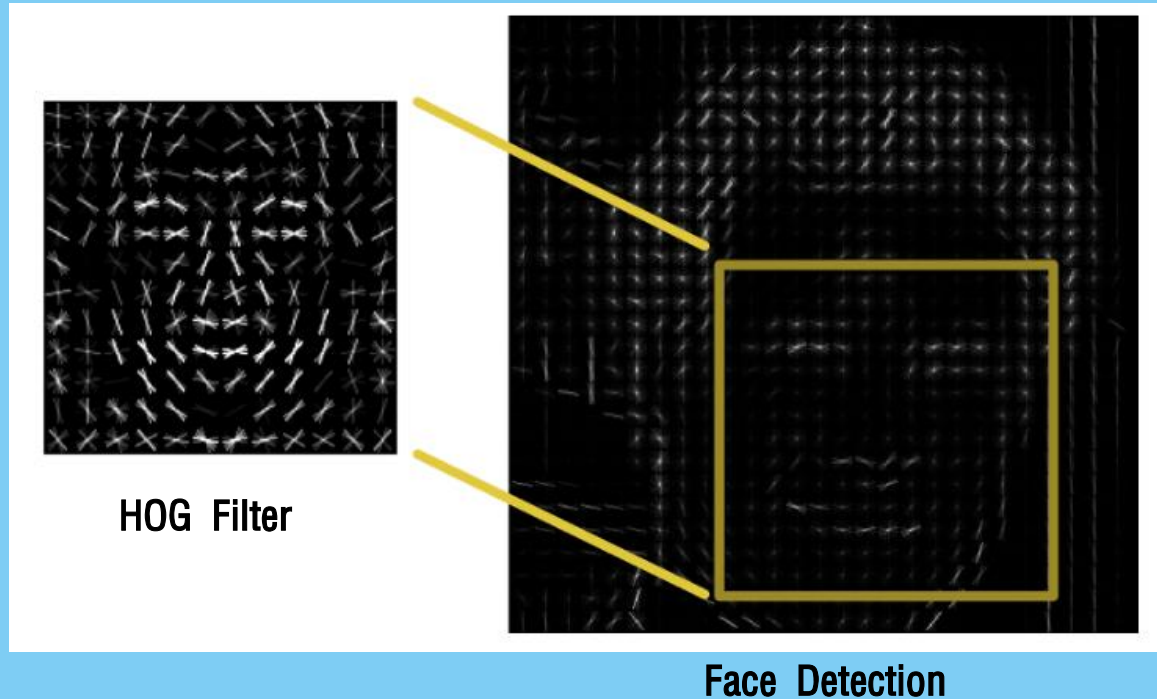
### 이미지 데이터 정제

#### - Work Flow



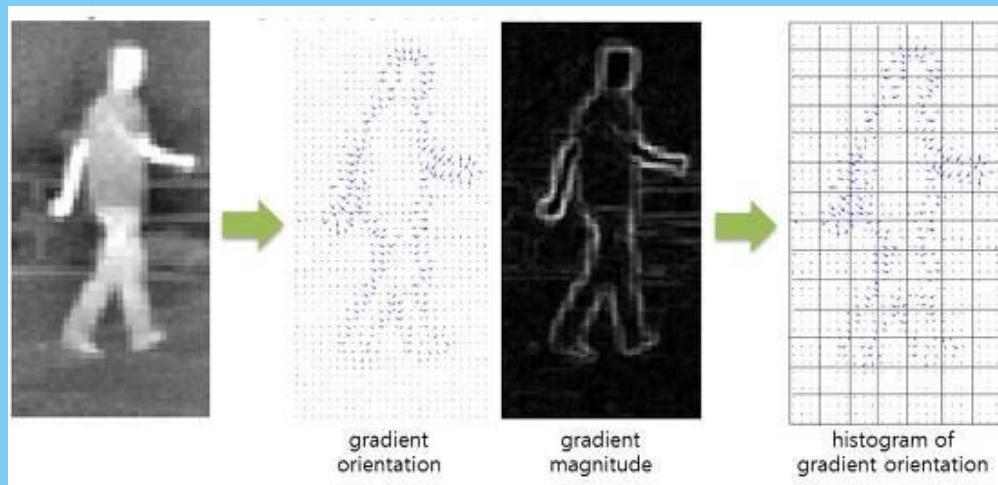
## 1) Face Detection

HOG – Histogram of Gradient : 이미지에서 face 감지 알고리즘



## HOG - Histogram of Gradient

HOG는 대상 영역을 일정 크기의 셀로 분할하고, 각 셀마다 edge 픽셀 (gradient magnitude가 일정 값 이상인 픽셀)들의 방향에 대한 히스토그램을 구한 후 이들 히스토그램 bin 값들을 일렬로 연결한 벡터이다. 즉, HOG는 edge의 방향 히스토그램 템플릿으로 볼 수 있다.



<https://darkpgmr.tistory.com/116>

# 1) Face Detection



원본 이미지



HOG를 이용한 얼굴 인식

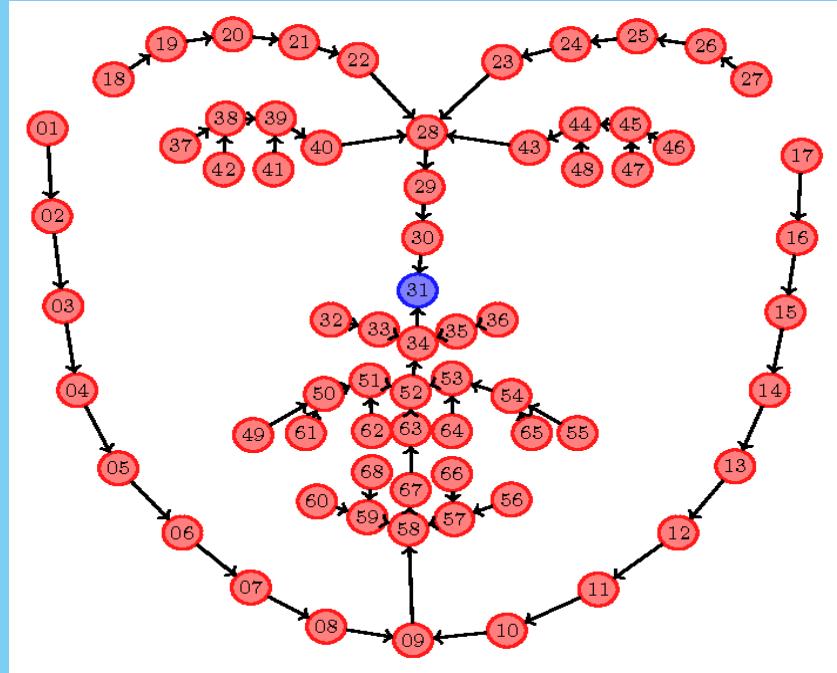


저장

- 한 장 사진에서 다수의 Face Detection



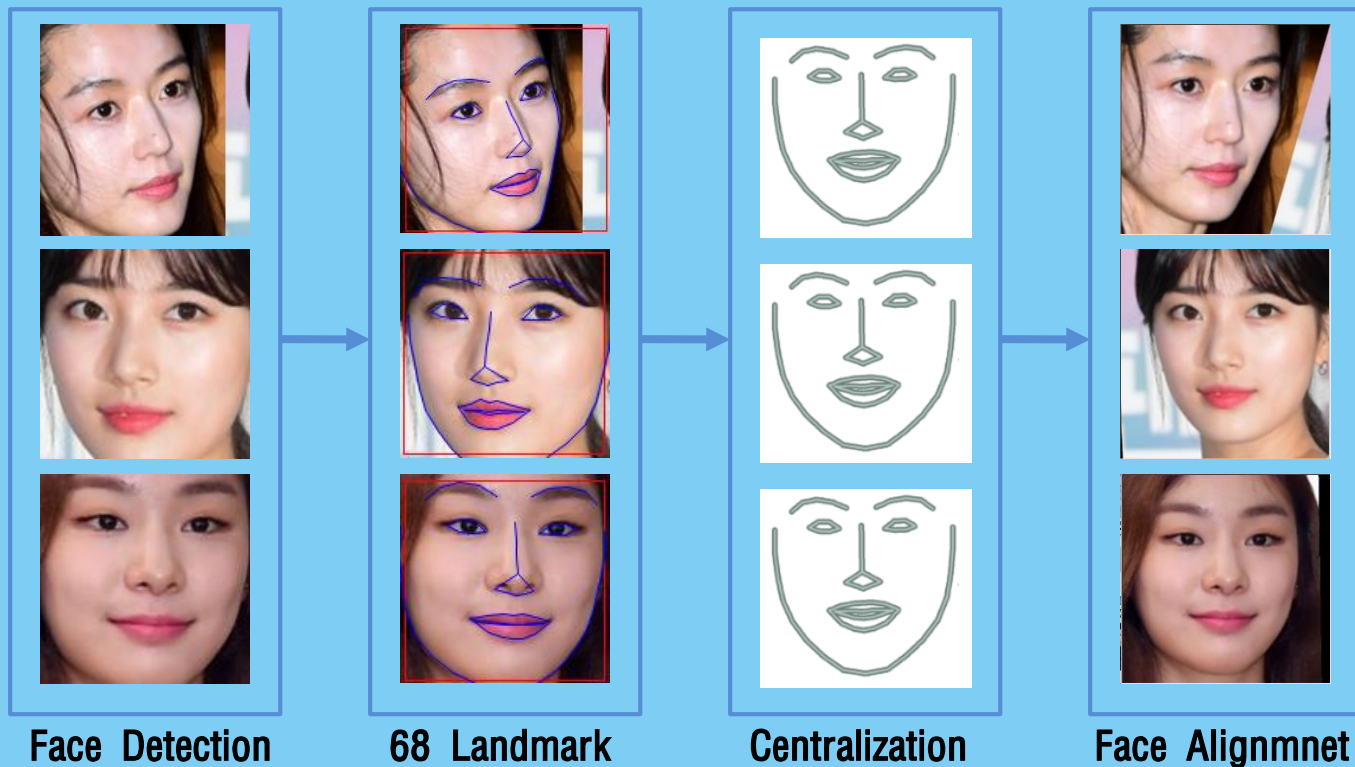
## 2) Face Alignment



68 LandMark Centralization

## 2) Face Alignment

### 68 Point Landmark Estimation





### 3) API Install

Anaconda python3.7에서 Conda 방식으로 dlib 설치

> conda install -c conda-forge dlib

```
Anaconda Prompt (anaconda3)
(base) C:\Users\User>conda install -c conda-forge dlib
Collecting package metadata (current_repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: C:\Users\User\anaconda3

  added / updated specs:
    - dlib

The following packages will be downloaded:



| package                   | build          | size   | channel     |
|---------------------------|----------------|--------|-------------|
| ca-certificates-2020.6.20 | hecda079_0     | 184 KB | conda-forge |
| certifi-2020.6.20         | py37hc8dfbb8_0 | 151 KB | conda-forge |
| dlib-19.20                | py37h37f07e7_1 | 3.3 MB | conda-forge |
| jpeg-9d                   | he774522_0     | 344 KB | conda-forge |
| Total:                    |                | 4.0 MB |             |



The following NEW packages will be INSTALLED:

  dlib                  conda-forge/win-64::dlib-19.20-py37h37f07e7_1

The following packages will be UPDATED:

  ca-certificates      2020.4.5.1-hecc5488_0 --> 2020.6.20-hecda079_0
  certifi              2020.4.5.1-py37hc8dfbb8_0 --> 2020.6.20-py37hc8dfbb8_0
  jpeg                 pkgs/main::jpeg-9b-hb83a4c4_2 --> conda-forge::jpeg-9d-he774522_0

Proceed ([y]/n)? y

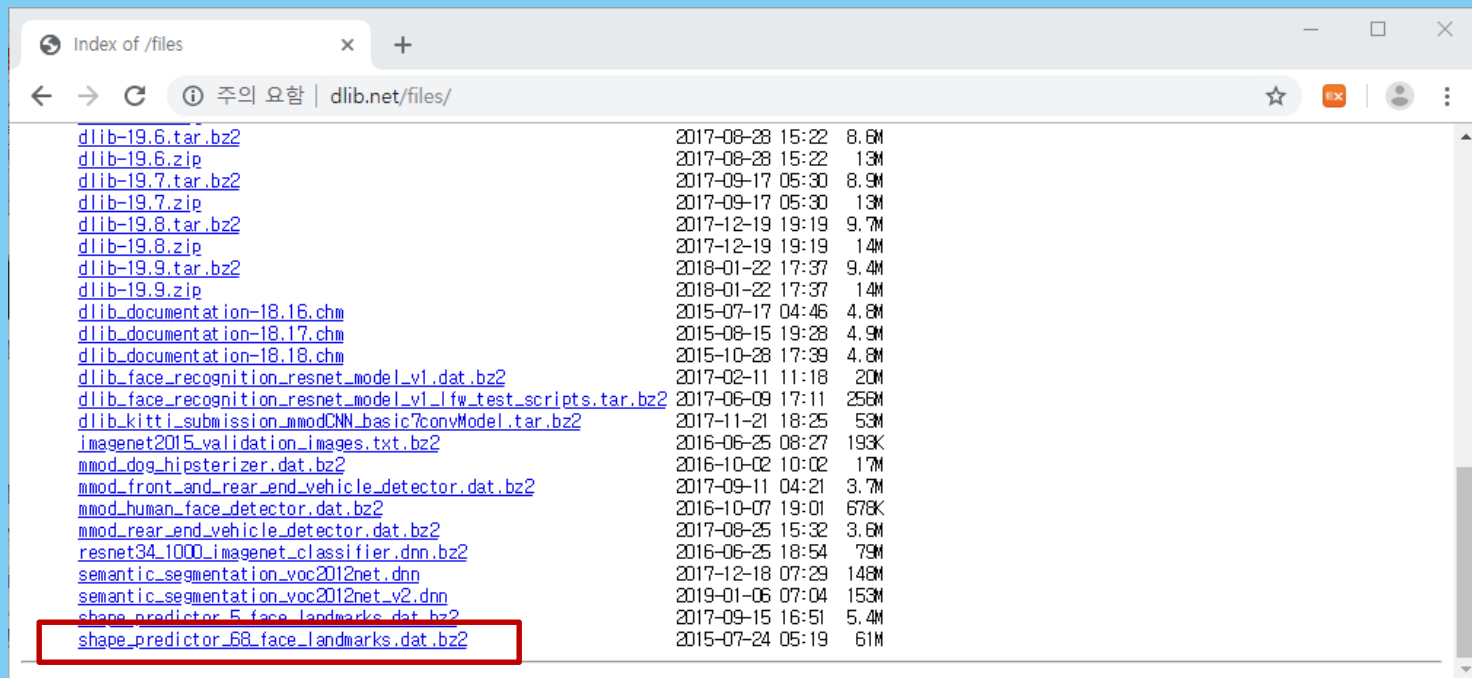
Downloading and Extracting Packages
dlib-19.20                  3.3 MB | ##### | 100%
jpeg-9d                    344 KB | ##### | 100%
ca-certificates-2020      184 KB | ##### | 100%
```

Conda-forge : git 허브 조직



# 68 landmark 다운로드/압축풀기

① <http://dlib.net/files>



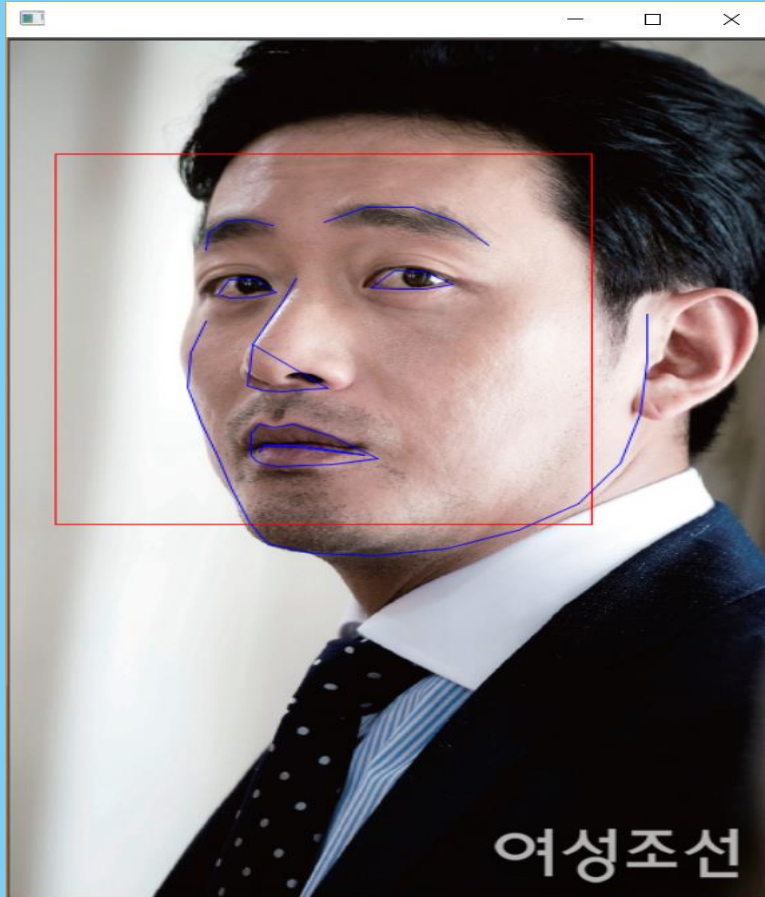
A screenshot of a web browser window displaying the 'Index of /files' page for dlib.net. The browser's address bar shows 'dlib.net/files/'. The page contains a list of files with their names, modification dates, and sizes. The file 'shape\_predictor\_68\_face\_landmarks.dat.bz2' is highlighted with a red rectangular box.

File Name	Date	Time	Size
<a href="#">dlib-19.6.tar.bz2</a>	2017-08-28	15:22	8.6M
<a href="#">dlib-19.6.zip</a>	2017-08-28	15:22	13M
<a href="#">dlib-19.7.tar.bz2</a>	2017-09-17	05:30	8.9M
<a href="#">dlib-19.7.zip</a>	2017-09-17	05:30	13M
<a href="#">dlib-19.8.tar.bz2</a>	2017-12-19	19:19	9.7M
<a href="#">dlib-19.8.zip</a>	2017-12-19	19:19	14M
<a href="#">dlib-19.9.tar.bz2</a>	2018-01-22	17:37	9.4M
<a href="#">dlib-19.9.zip</a>	2018-01-22	17:37	14M
<a href="#">dlib_documentation-18.16.chm</a>	2015-07-17	04:46	4.8M
<a href="#">dlib_documentation-18.17.chm</a>	2015-08-15	19:28	4.9M
<a href="#">dlib_documentation-18.18.chm</a>	2015-10-28	17:39	4.8M
<a href="#">dlib_face_recognition_resnet_model_v1.dat.bz2</a>	2017-02-11	11:18	20M
<a href="#">dlib_face_recognition_resnet_model_v1_lfw_test_scripts.tar.bz2</a>	2017-06-09	17:11	256M
<a href="#">dlib_kitti_submission_mmodCNN_basic7convModel.tar.bz2</a>	2017-11-21	18:25	53M
<a href="#">imagenet2015_validation_images.txt.bz2</a>	2016-06-25	08:27	193K
<a href="#">mmod_dog_histogramizer.dat.bz2</a>	2016-10-02	10:02	17M
<a href="#">mmod_front_and_rear_end_vehicle_detector.dat.bz2</a>	2017-09-11	04:21	3.7M
<a href="#">mmod_human_face_detector.dat.bz2</a>	2016-10-07	19:01	678K
<a href="#">mmod_rear_end_vehicle_detector.dat.bz2</a>	2017-08-25	15:32	3.6M
<a href="#">resnet34_1000_imagenet_classifier.dnn.bz2</a>	2016-06-25	18:54	79M
<a href="#">semantic_segmentation_voc2012net.dnn</a>	2017-12-18	07:29	148M
<a href="#">semantic_segmentation_voc2012net_v2.dnn</a>	2019-01-06	07:04	153M
<a href="#">shape_predictor_5_face_landmarks.dat.bz2</a>	2017-09-15	16:51	5.4M
<a href="#">shape_predictor_68_face_landmarks.dat.bz2</a>	2015-07-24	05:19	61M

## ② 작업 위치에 압축파일 풀기

Name	Size	Type	Date Modified
> cropped_images		File Folder	2019-12-12 오전 11:24
__init__.py	1 bytes	py File	2019-06-20 오전 10:15
person.jpg	88 KB	jpg File	2019-06-20 오후 5:40
shape_predictor_68_face_landmarks.dat	95.1 MB	dat File	2019-06-20 오전 10:34
step01_facedetect_landmark.py	2 KB	py File	2019-12-13 오후 6:22
step02_cropped_image_reshape.py	1 KB	py File	2019-12-12 오후 1:35

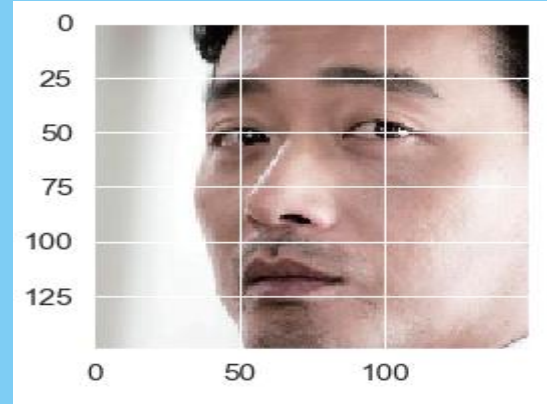
## 4) Image crop



# Image reshape



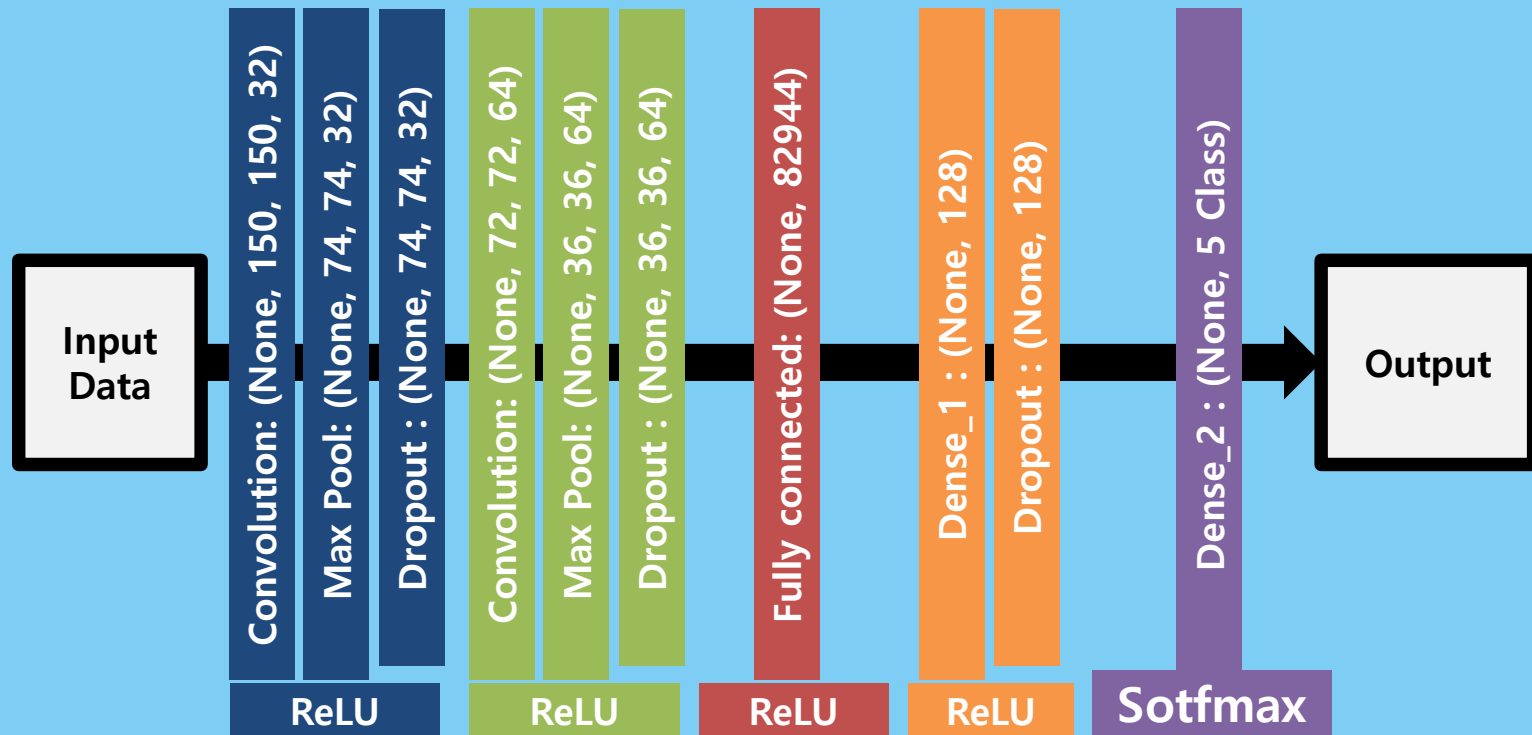
321x321



150x150

## STEP 03 : CNN model

- CNN 모델 구조



## 훈련 데이터 셋(Training Dataset)

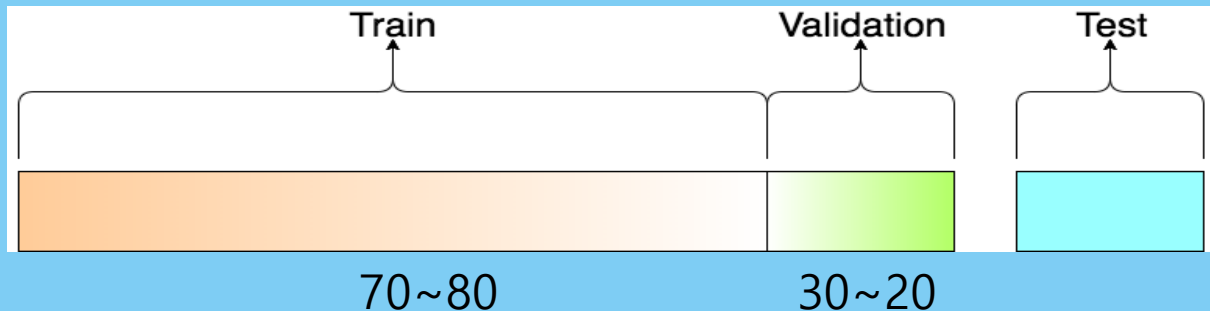
모델을 훈련하는 데 사용되는 데이터 셋(신경망 : 가중치, 바이어스)

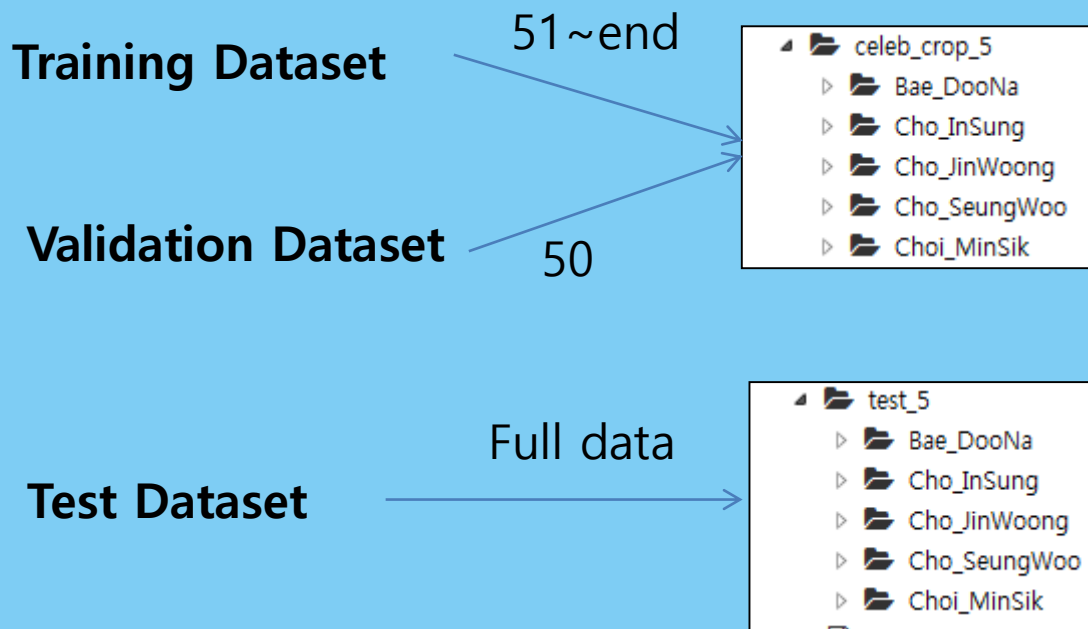
## 유효성 데이터 셋(Validation Dataset)

모델의 Hyper Parameter를 튜닝 하는데 사용되는 데이터 셋(모델 최적화)

## 검정 데이터 셋(Test Dataset)

모델이 완전히 훈련 된 후에 만 사용되는 데이터 셋(실제 업무 데이터)





# CNN 모델링 처리 가정

Input Image



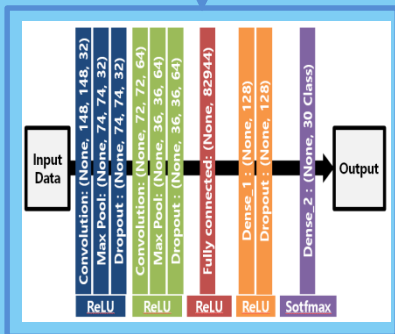
Face Detection



Crop & 전처리(150x150)

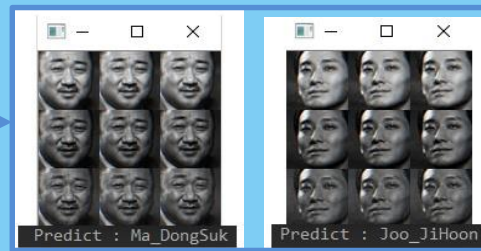


CNN



Classification

Predict



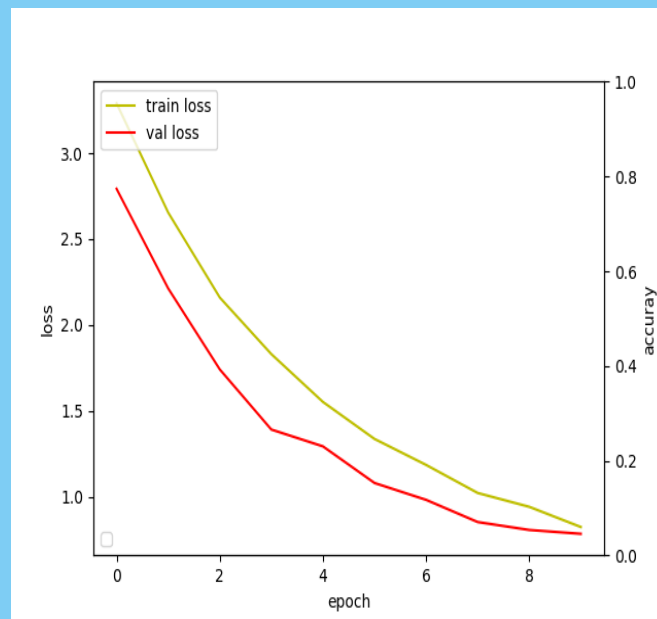
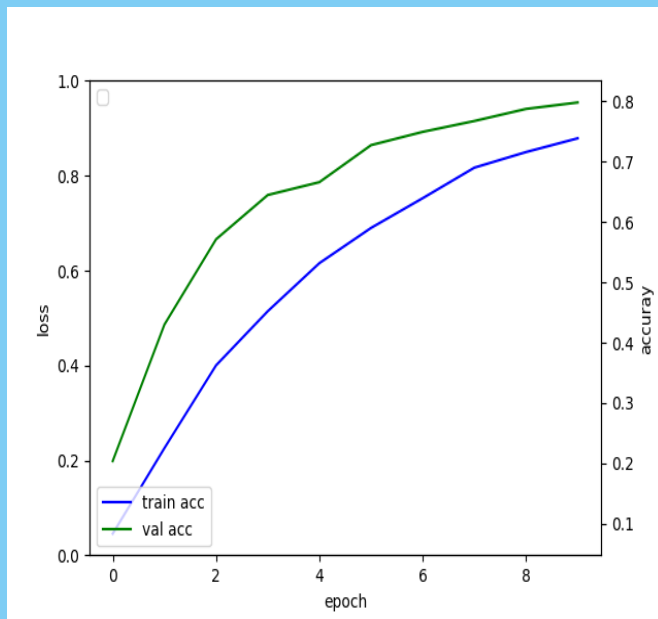


# Accuracy, Loss 결과(10 epoch)

- 학습 시간 : 15분

Train\_Data :  $150 * 5 = 750$

Test\_Data :  $50 * 5 = 250$



# Accuracy, Loss 결과(20 epoch)

- 학습 시간 : 20분

Train\_Data :  $150 * 5 = 750$

Test\_Data :  $50 * 5 = 250$

