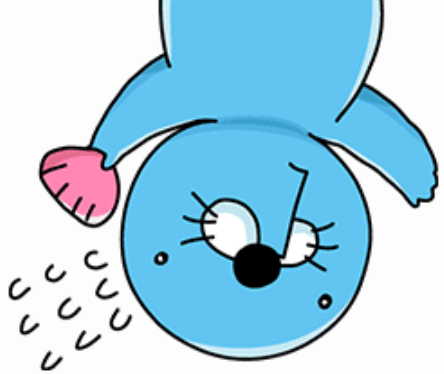
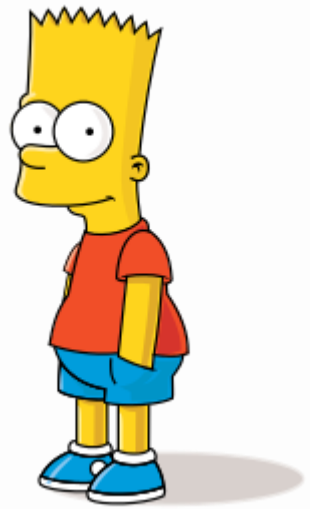


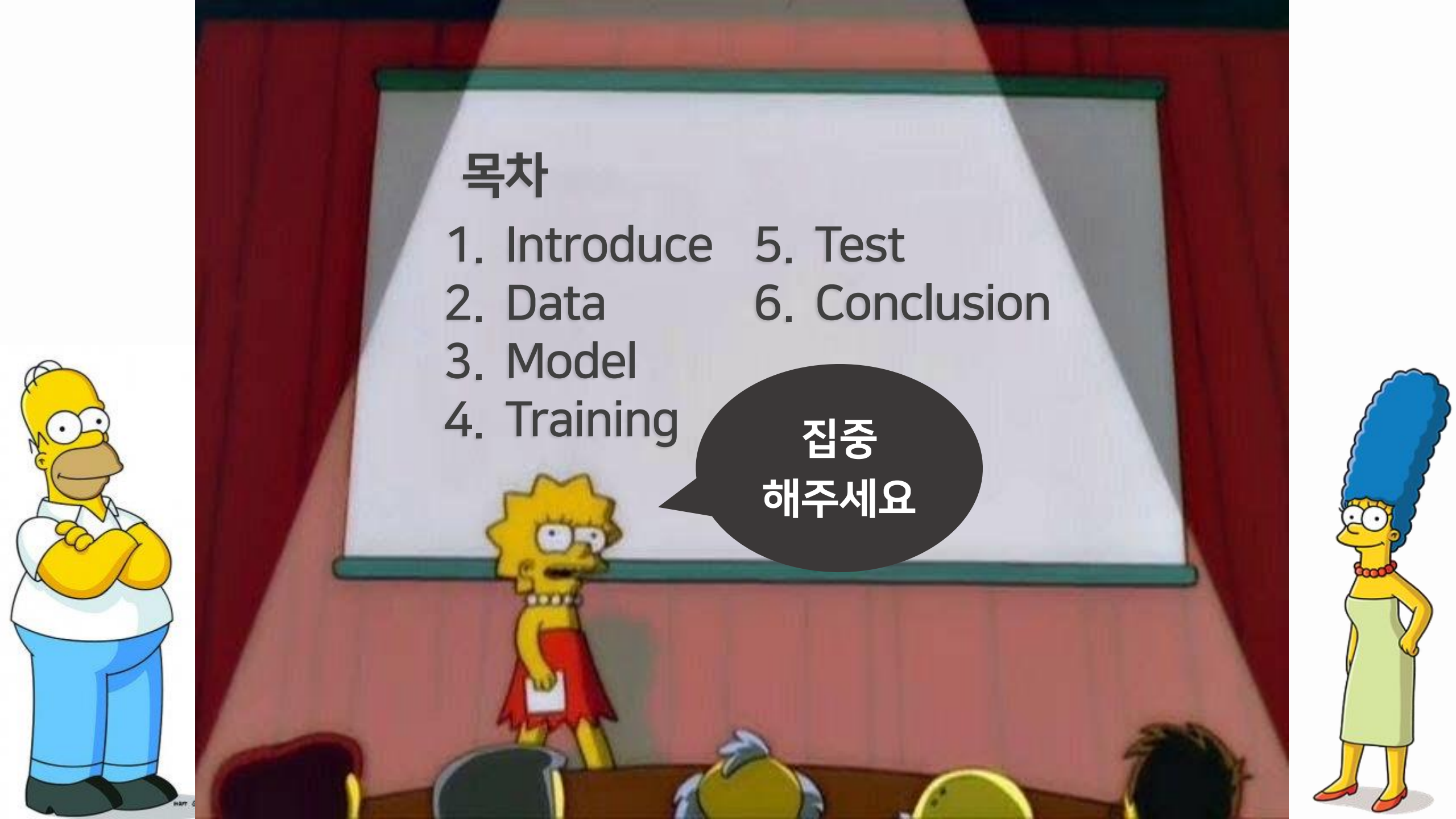
BGM : The Simpsons Opening (Greenday Theme)

The Simpsons 이미지를 활용한 캐릭터 분류

Team 뤼이드

강도형
고정민
백지현
정한진




목차
1. Introduce
2. Data
3. Model
4. Training
5. Test
6. Conclusion
집중
해주세요

서론

우리가 좋아하는 애니메이션 캐릭터를 분류하고자 함

애니메이션 캐릭터를 분류하는 것에 그치지 않고

다른 인물 사진들을 Input 하여 어떤 애니메이션 캐릭터와 닮았는지 분류도 가능함

Data 출처

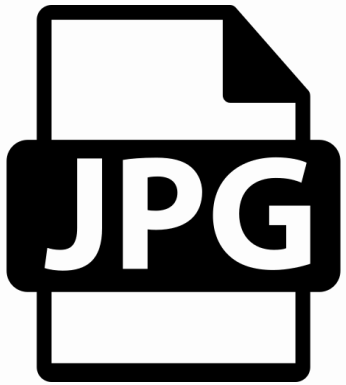
kaggle

‘The Simpson Character Data’

47개의 The Simpsons 캐릭터 , 총 20000장의 이미지

https://www.kaggle.com/alexattia/the-simpsons-characters-dataset

Data 형식

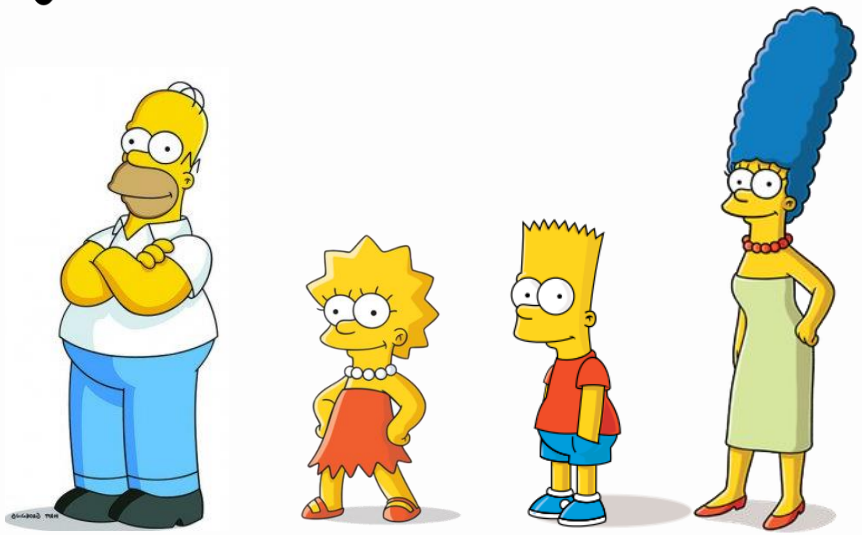


Simpson Dataset.zip

캐릭터	이미지 개수
Homer Simpson	2246
Ned Flanders	1454
Moe Szyslak	1452
Lisa Simpson	1354
Bart Simpson	1342
Marge Simpson	1291
Krusty The Clown	1206
Principal Skinner	1194
Charles Montgomery Burns	1193
Milhouse Van Houten	1079
Chief Wiggum	986
...	...

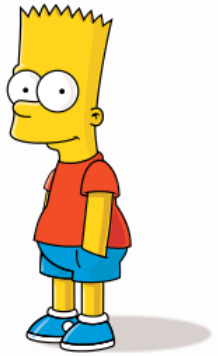
47개의 캐릭터 중
Homer, Lisa, Bart, Marge의
이미지만 분류

4개 캐릭터로만 학습



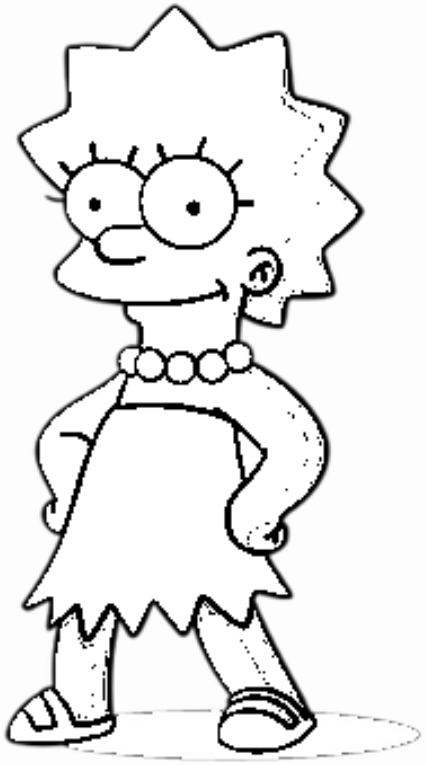
Train Data / Validation Data / Test Data






캐릭터	Homer Simpson	Lisa Simpson	Bart Simpson	Marge Simpson
총 이미지 개수	2246	1354	1342	1291
Training 이미지 개수	900	900	900	900
Validation 이미지 개수	150	150	150	150
Test 이미지 개수	200	200	200	200

흑백 이미지 학습 모델과 컬러 이미지 학습 모델



Black & White

Grey

Sepia

Full Color

Grey & Full Color Model

Grey

Full Color

Grey & Full Color Model

Grey

```
validation_generator = test_datagen.flow_from_directory(
        validation_dir,
        target_size=(150, 150),
        color_mode='grayscale',
        batch_size=20,
        class_mode='categorical')
```

```
model = models.Sequential()
model.add(layers.Conv2D(32, (3, 3), activation='relu',
                        input_shape=(150, 150, 1),padding="same"))
```

```
test_generator = test_datagen.flow_from_directory(
        test_dir,
        target_size=(150, 150),
        batch_size=20,
        color_mode='grayscale'
        class_mode='categorical')
```

```
# 이미지 불러오기 / 전처리
img_name = 'man.jfif'
img = image.load_img('test_image/%d'%img_name, target_size=(150,15
img = img.convert('L')
img_tensor = image.img_to_array(img)
img_tensor = np.expand_dims(img_tensor, axis=0)
img_tensor /= 255.
print(img_tensor.shape)
```

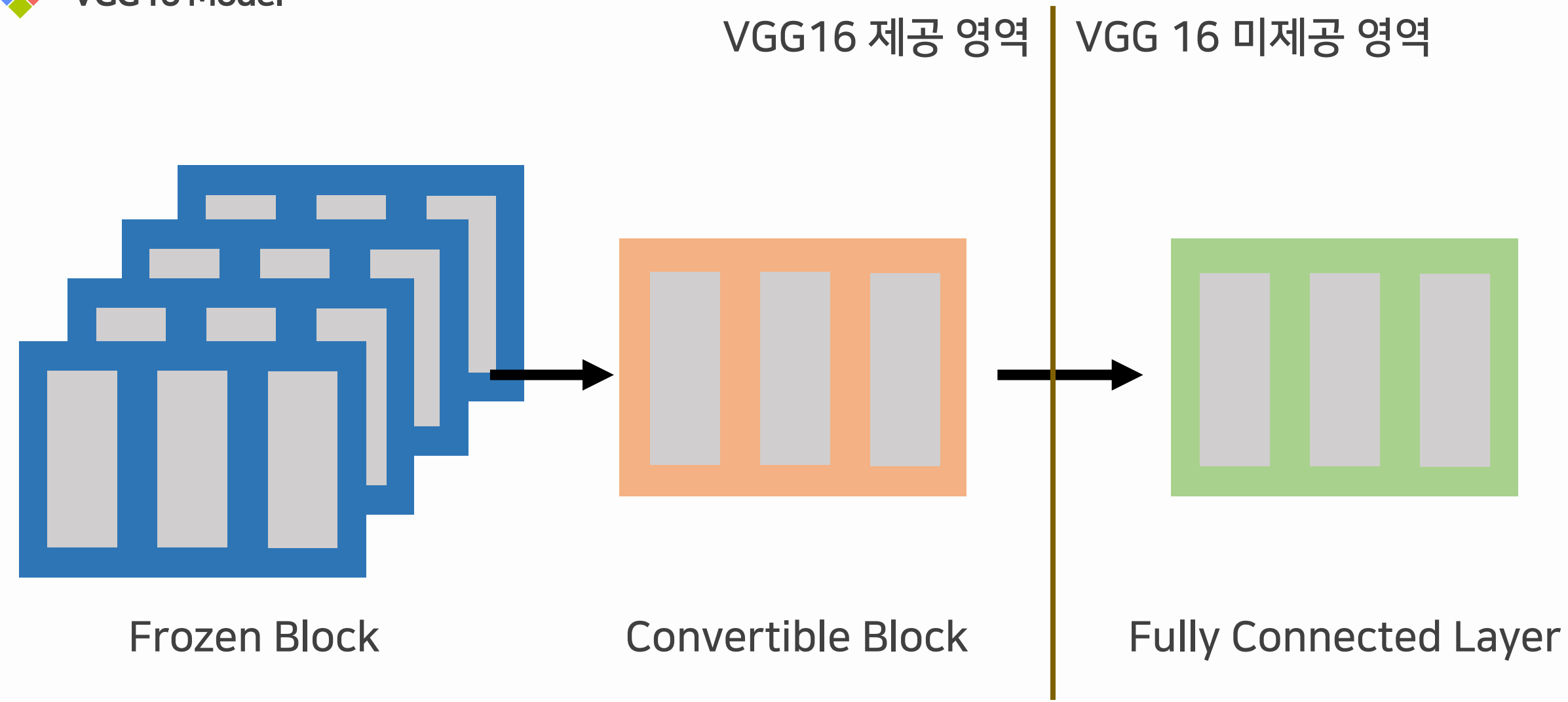
Full Color

```
validation_generator = test_datagen.flow_from_directory(
        validation_dir,
        target_size=(150, 150),
        batch_size=20,
        class_mode='categorical')
```

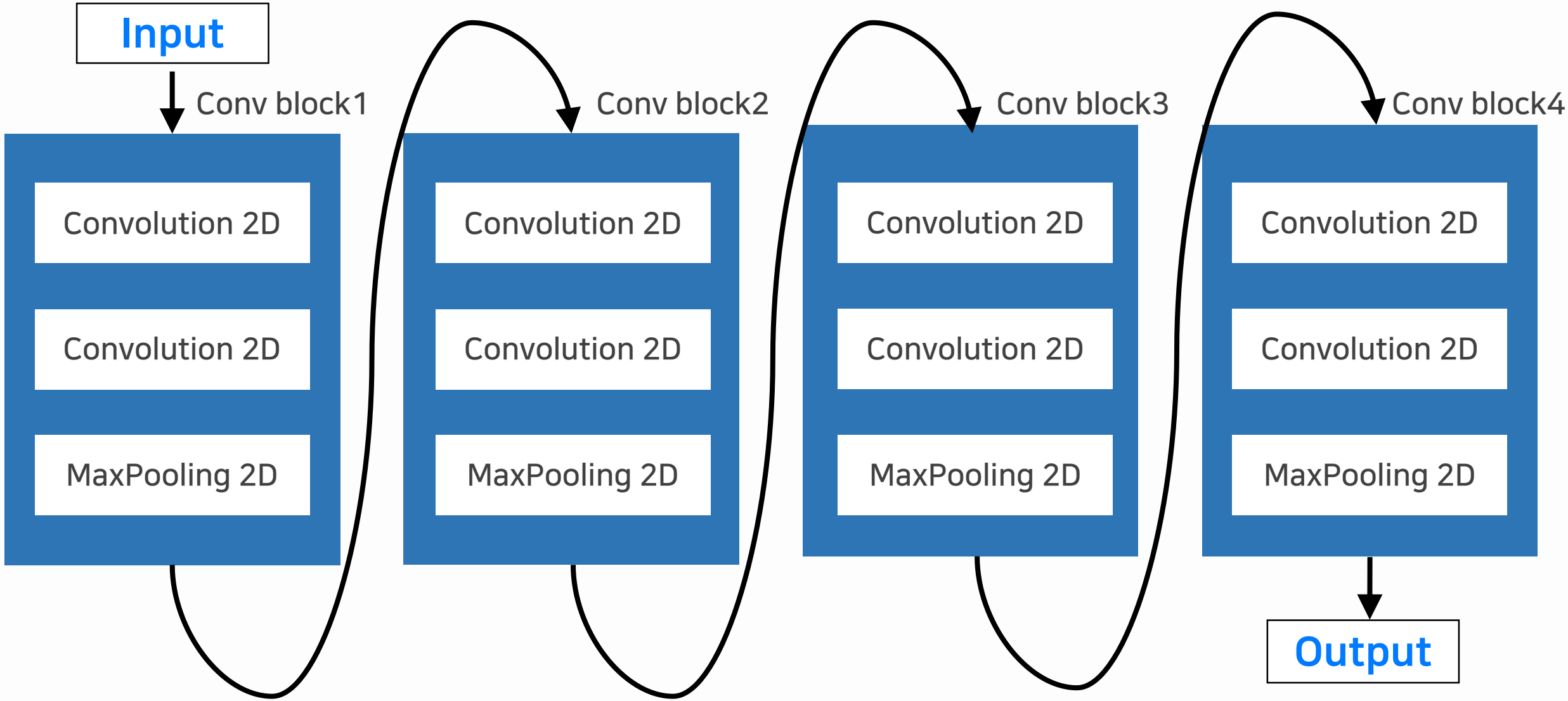
```
model = models.Sequential()
model.add(layers.Conv2D(32, (3, 3), activation='relu',
                        input_shape=(150, 150, 3),padding="same"))
```

```
test_generator = test_datagen.flow_from_directory(
        test_dir,
        target_size=(150, 150),
        batch_size=20,
        class_mode='categorical')
```

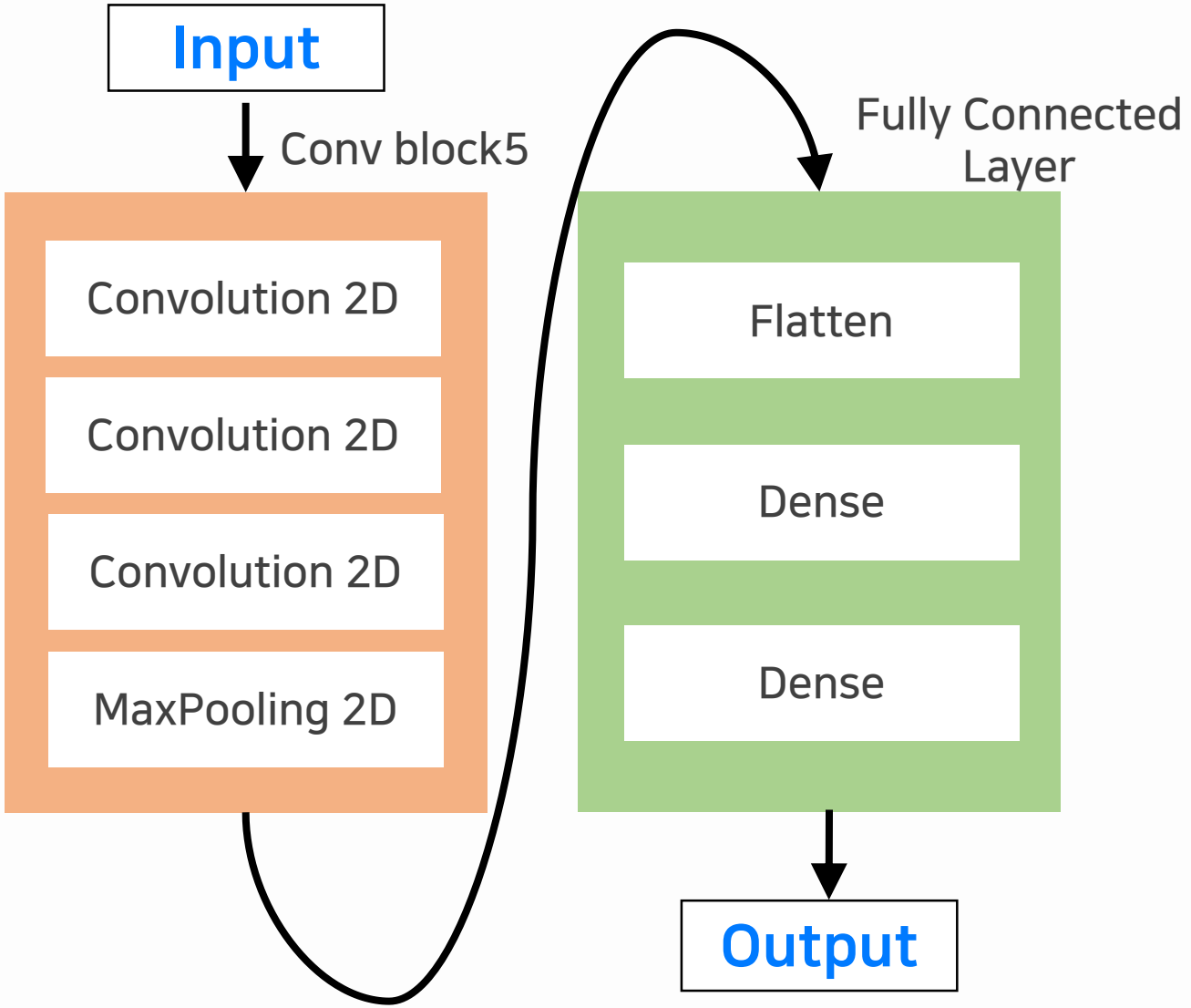
VGG16 Model


VGG16 제공 영역
VGG 16 미제공 영역
Frozen Block
Convertible Block
Fully Connected Layer

VGG16 모델


Input
Conv block1
Convolution 2D
Convolution 2D
MaxPooling 2D
Conv block2
Convolution 2D
Convolution 2D
MaxPooling 2D
Conv block3
Convolution 2D
Convolution 2D
MaxPooling 2D
Conv block4
Convolution 2D
Convolution 2D
MaxPooling 2D
Output

VGG16 모델



Homer Simpson 0.00

Lisa Simpson 1.00

Bart Simpson 0.00

Marge Simpson 0.00

model.fit

```
train_generator = train_datagen.flow_from_directory(
        # 타깃 디렉터리
        train_dir,
        # 모든 이미지를 150 × 150 크기로 바꿉니다
        target_size=(150, 150),
        color_mode = 'grayscale',
        batch_size=60,
        class_mode='categorical')

validation_generator = test_datagen.flow_from_directory(
        validation_dir,
        target_size=(150, 150),
        color_mode = 'grayscale',
        batch_size=50,
        class_mode='categorical')

history = model.fit_generator(
      train_generator,
      steps_per_epoch=60,
      epochs=50,
      validation_data=validation_generator,
      validation_steps=16,
      callbacks = callbacks_list)
```

Bath size = 60

Steps_per_epoch = 60

Epoch = 50

Validation_steps=16

result

```
Found 600 images belonging to 4 classes.
test acc: 0.8616666694482168
```

Grey Scale Model Accuracy : 0.8616

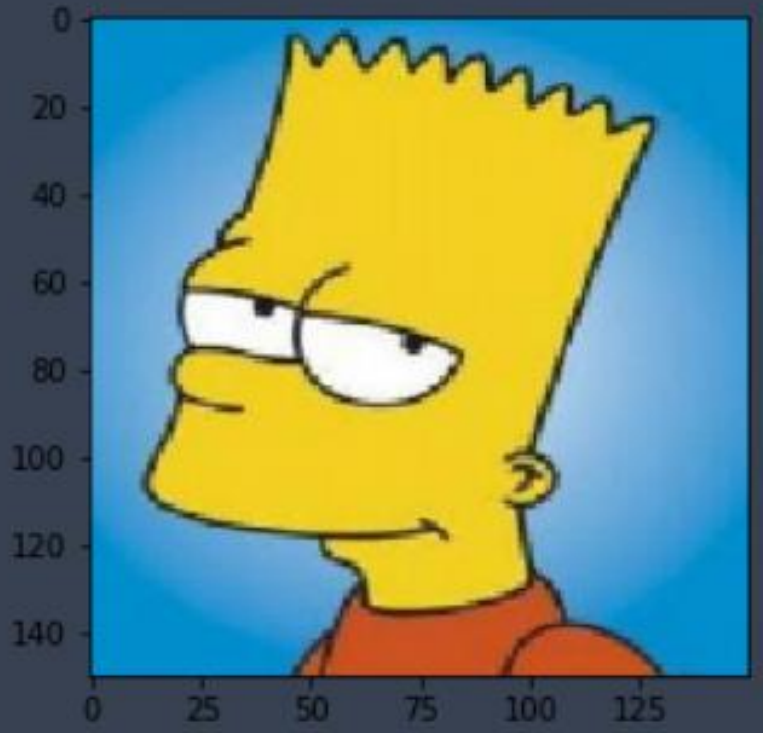
```
Found 600 images belonging to 4 classes.
test acc: 0.9079999959468842
```

Full Color Model Accuracy : 0.9080

Correct

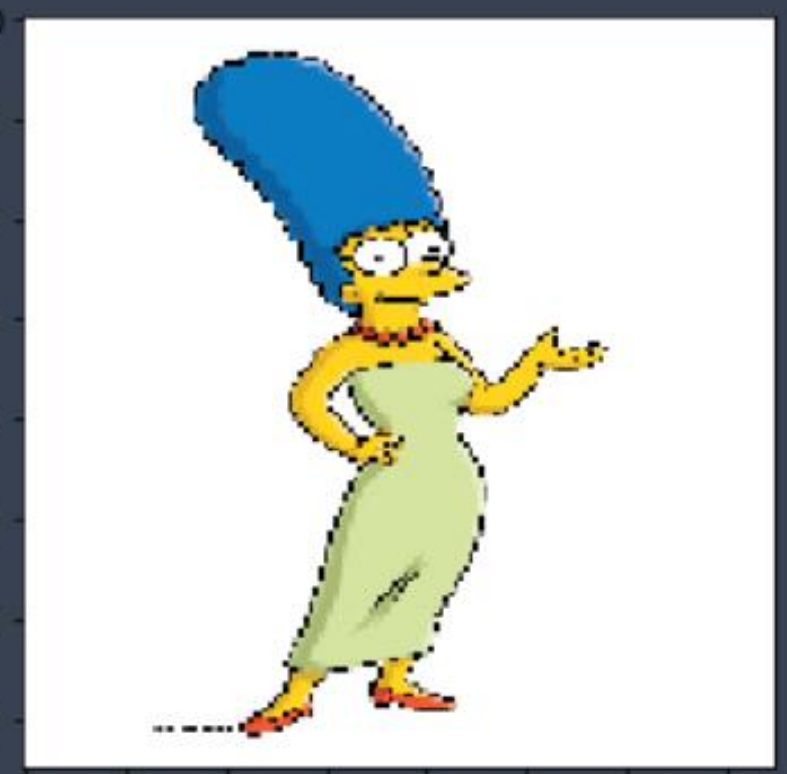
```
(1, 150, 150, 3)
bart_simpson      0.0000
homer_simpson     0.0000
lisa_simpson      1.0000
marge_simpson     0.0000

result :  lisa_simpson
```


```
(1, 150, 150, 3)
bart_simpson      1.0000
homer_simpson     0.0000
lisa_simpson      0.0000
marge_simpson     0.0000

result :  bart_simpson
```



Correct

```
bart_simpson      0.0204
homer_simpson     0.0193
lisa_simpson      0.0213
marge_simpson     0.9390

result :  marge_simpson
```

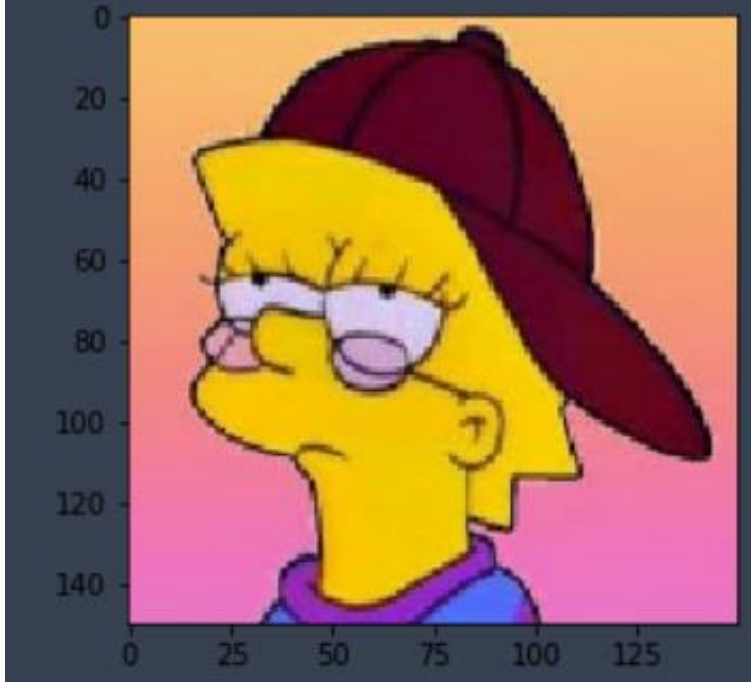



```
bart_simpson      0.0009
homer_simpson     0.9984
lisa_simpson      0.0006
marge_simpson     0.0001

result :  homer_simpson
```

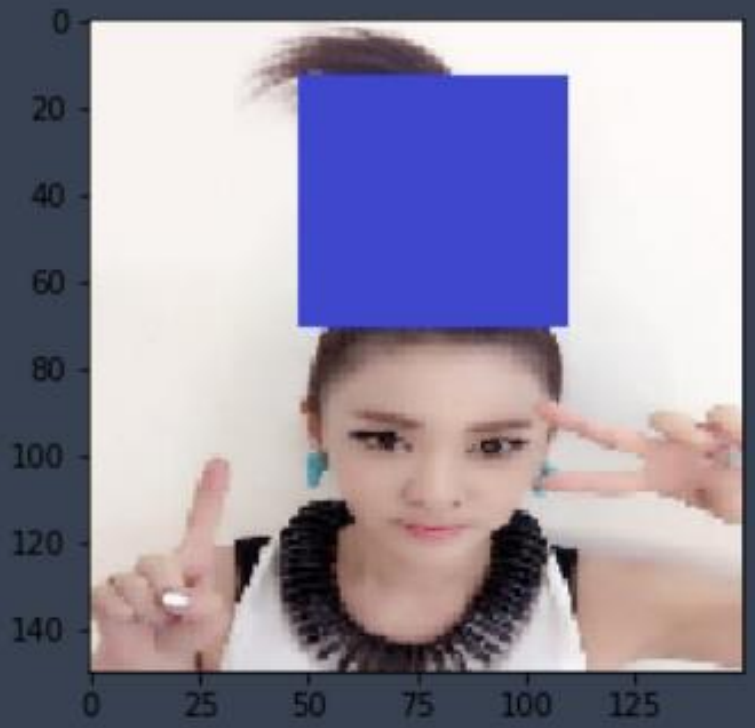
```
(1, 150, 150, 3)
bart_simpson      0.7649
homer_simpson     0.1541
lisa_simpson      0.0386
marge_simpson     0.0423

result :  bart_simpson
```

```
(1, 150, 150, 3)
bart_simpson      0.0445
homer_simpson     0.0014
lisa_simpson      0.9533
marge_simpson     0.0007

result :  lisa_simpson
```

```
(1, 150, 150, 3)
bart_simpson      0.0000
homer_simpson     1.0000
lisa_simpson      0.0000
marge_simpson     0.0000

result :  homer_simpson
```



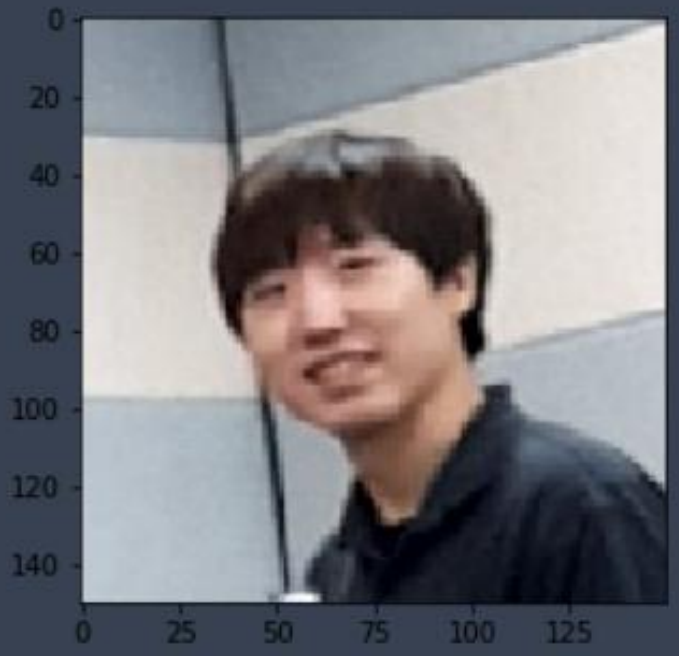
```
(1, 150, 150, 3)
bart_simpson     0.0149
homer_simpson    0.0310
lisa_simpson     0.0313
marge_simpson    0.9228

result :  marge_simpson
```



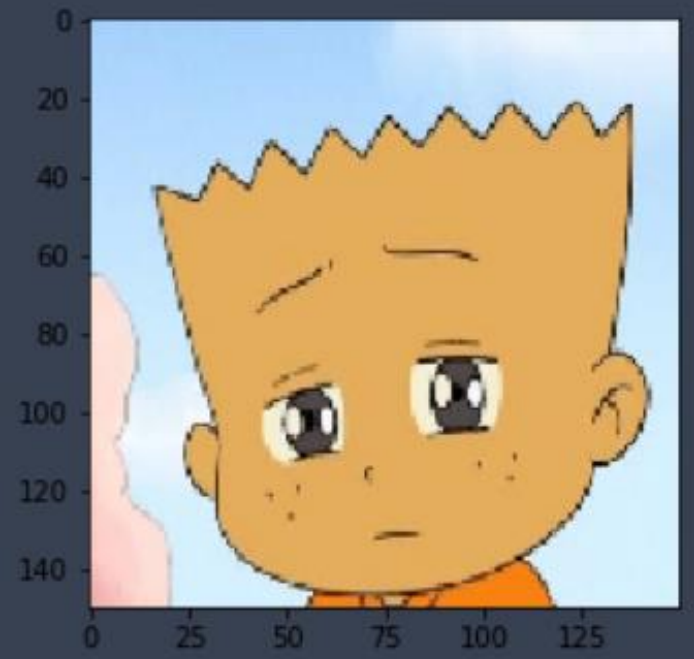

```
(1, 150, 150, 3)
bart_simpson     0.2205
homer_simpson    0.2078
lisa_simpson     0.4088
marge_simpson    0.1630

result :  lisa_simpson
```

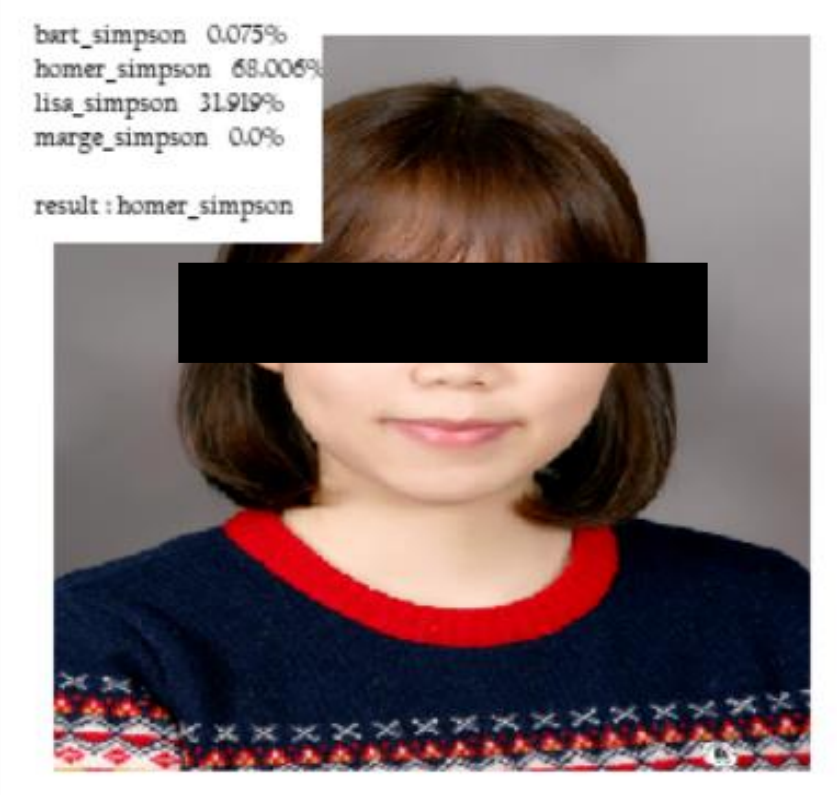
```
(1, 150, 150, 3)
bart_simpson      0.0001
homer_simpson     0.9992
lisa_simpson      0.0006
marge_simpson     0.0000

result :  homer_simpson
```

```
(1, 150, 150, 3)
bart_simpson      0.1135
homer_simpson     0.6569
lisa_simpson      0.1786
marge_simpson     0.0510

result :  homer_simpson
```



```
(1, 150, 150, 3)
bart_simpson      0.0000
homer_simpson     0.0000
lisa_simpson      1.0000
marge_simpson     0.0000

result :  lisa_simpson
```





고 모씨 (24, 목동)

Bart Simpson 0.075

Homer Simpson 0.680

Lisa Simpson 0.319

Marge Simpson 0.000

고 모씨 (24, 목동)

Bart Simpson 0.003

Homer Simpson 0.907

Lisa Simpson 0.898

Marge Simpson 0.001

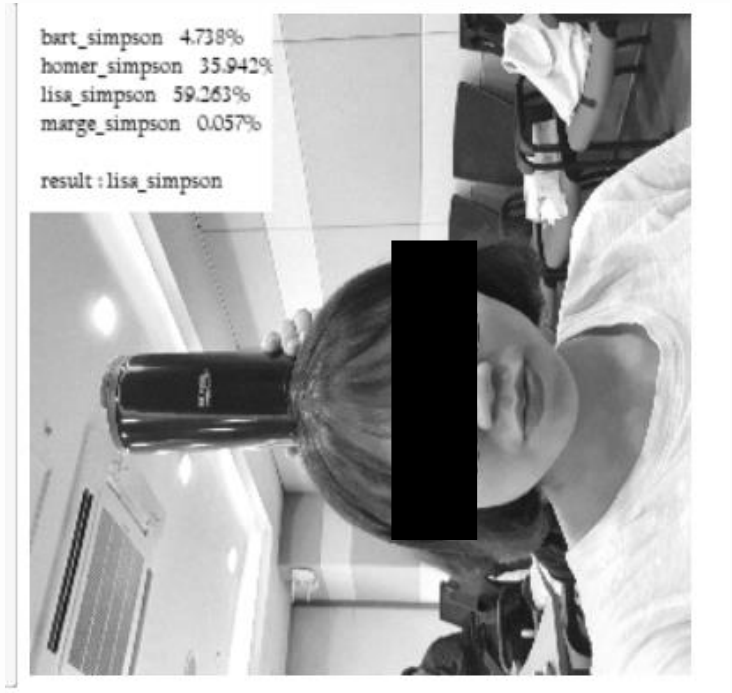
Bart Simpson 0.047

Homer Simpson 0.359

Lisa Simpson 0.592

Marge Simpson 0.005

고 모씨 (24, 목동)



흑백 컬러 차이

흑백이 Full Color 학습시간의 80% 정도로 학습이 약간 빠르다.

하지만 Acurray가 떨어진다는 단점이 있다.

Temp

```
Epoch 1/25
60/60 [==============================] - 8s 136ms/step - loss: 1.1978 - a
cc: 0.4800
Epoch 2/25
60/60 [==============================] - 8s 138ms/step - loss: 1.0449 - a
cc: 0.6100
Epoch 3/25
60/60 [==============================] - 8s 140ms/step - loss: 0.9088 - a
cc: 0.6875
Epoch 4/25
60/60 [==============================] - 9s 142ms/step - loss: 0.8115 - a
cc: 0.7050
Epoch 5/25
60/60 [==============================] - 9s 150ms/step - loss: 0.6008 - a
cc: 0.7525
Epoch 6/25
60/60 [==============================] - 9s 154ms/step - loss: 0.4989 - a
cc: 0.7975
Epoch 7/25
60/60 [==============================] - 10s 159ms/step - loss: 0.4002 -
acc: 0.8225
Epoch 8/25
60/60 [==============================] - 10s 173ms/step - loss: 0.3046 -
acc: 0.7912
Epoch 9/25
60/60 [==============================] - 10s 171ms/step - loss: 0.2774 -
acc: 0.8275
Epoch 10/25
60/60 [==============================] - 11s 187ms/step - loss: 0.1803 -
acc: 0.8212
Epoch 11/25
60/60 [==============================] - 11s 191ms/step - loss: 0.1559 -
acc: 0.8312
```

```
==========] - 13s 221ms/step - loss: 1.1191 - acc: 0
==========] - 9s 142ms/step - loss: 0.8401 - acc: 0.6
==========] - 9s 144ms/step - loss: 0.6890 - acc: 0.7
==========] - 9s 146ms/step - loss: 0.5902 - acc: 0.7
==========] - 9s 149ms/step - loss: 0.4667 - acc: 0.8
==========] - 9s 156ms/step - loss: 0.3550 - acc: 0.8
==========] - 10s 159ms/step - loss: 0.2804 - acc: 0
==========] - 10s 163ms/step - loss: 0.2013 - acc: 0
==========] - 10s 173ms/step - loss: 0.1520 - acc: 0
```