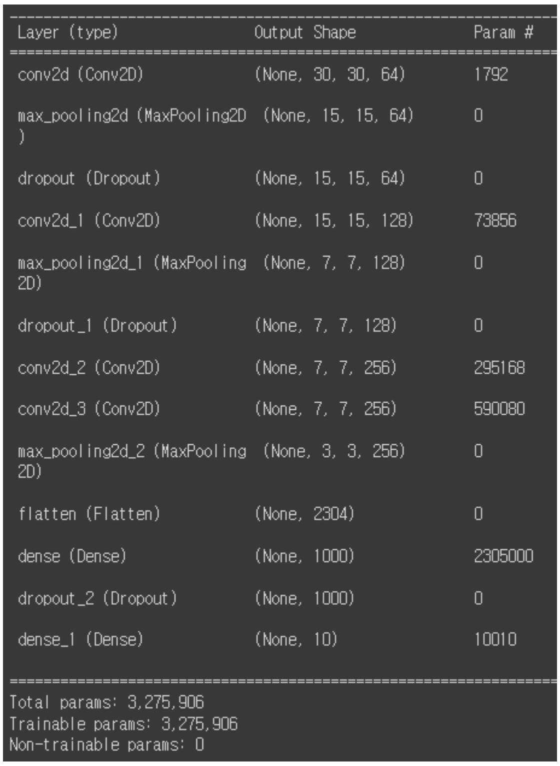
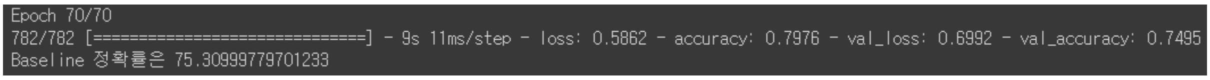
컴퓨터학부 글로벌SW융합전공 2021113878 제유진

2) result

Baseline: 75.3

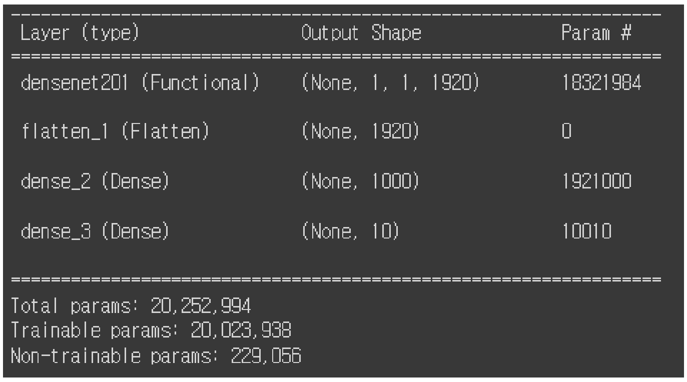


```
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 30, 30, 64)        1792

 max_pooling2d (MaxPooling2D  (None, 15, 15, 64)       0
 )

 dropout (Dropout)           (None, 15, 15, 64)        0

 conv2d_1 (Conv2D)           (None, 15, 15, 128)       73856

 max_pooling2d_1 (MaxPooling  (None, 7, 7, 128)        0
 2D)

 dropout_1 (Dropout)         (None, 7, 7, 128)         0

 conv2d_2 (Conv2D)           (None, 7, 7, 256)         295168

 conv2d_3 (Conv2D)           (None, 7, 7, 256)         590080

 max_pooling2d_2 (MaxPooling  (None, 3, 3, 256)        0
 2D)

 flatten (Flatten)           (None, 2304)              0

 dense (Dense)               (None, 1000)              2305000

 dropout_2 (Dropout)         (None, 1000)              0

 dense_1 (Dense)             (None, 10)                10010

=================================================================
Total params: 3,275,906
Trainable params: 3,275,906
Non-trainable params: 0
```

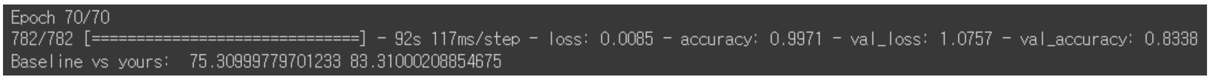


```
Epoch 70/70
782/782 [==============================] - 9s 11ms/step - loss: 0.5862 - accuracy: 0.7976 - val_loss: 0.6992 - val_accuracy: 0.7495
Baseline 정확률은 75.30999779701233
```

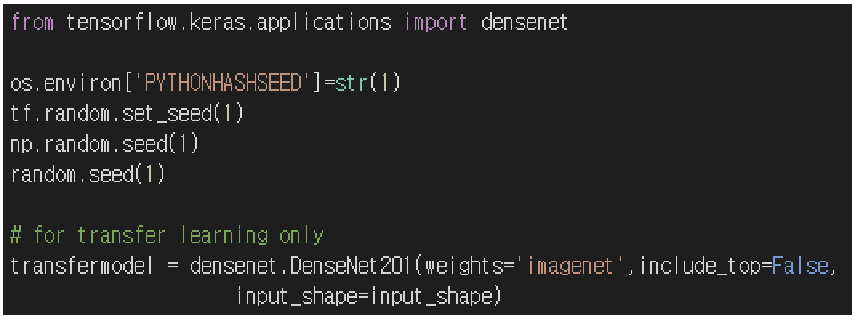
New model (DenseNet201): 83.3



```
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 densenet201 (Functional)    (None, 1, 1, 1920)        18321984

 flatten_1 (Flatten)         (None, 1920)              0

 dense_2 (Dense)             (None, 1000)              1921000

 dense_3 (Dense)             (None, 10)                10010

=================================================================
Total params: 20,252,994
Trainable params: 20,023,938
Non-trainable params: 229,056
```



```
Epoch 70/70
782/782 [==============================] - 92s 117ms/step - loss: 0.0085 - accuracy: 0.9971 - val_loss: 1.0757 - val_accuracy: 0.8338
Baseline vs yours:  75.30999779701233 83.31000208854675
```

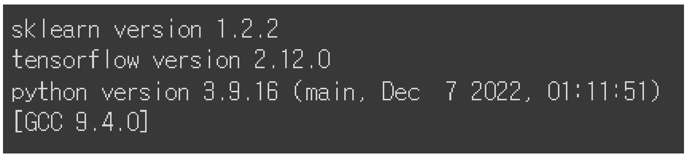


```python
from tensorflow.keras.applications import densenet

os.environ['PYTHONHASHSEED']=str(1)
tf.random.set_seed(1)
np.random.seed(1)
random.seed(1)

# for transfer learning only
transfermodel = densenet.DenseNet201(weights='imagenet',include_top=False,
                         input_shape=input_shape)
```

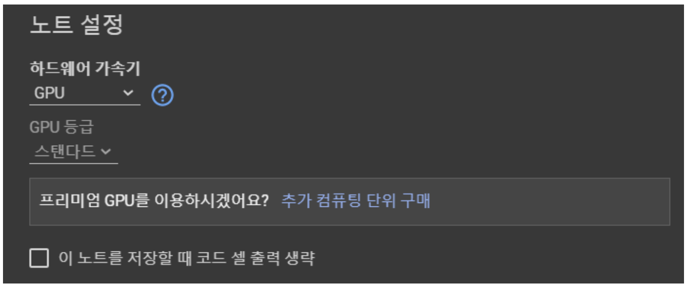
Vanilla CNN에서 denseNet으로 변경하였으며, 기존 코드 대비 정확도가 8% 상승했습니다.

3) Runtime environment

Cloud (Colab), GPU



```
sklearn version 1.2.2
tensorflow version 2.12.0
python version 3.9.16 (main, Dec  7 2022, 01:11:51)
[GCC 9.4.0]
```



노트 설정

하드웨어 가속기: GPU

GPU 등급: 스탠다드

프리미엄 GPU를 이용하시겠어요? 추가 컴퓨팅 단위 구매

□ 이 노트를 저장할 때 코드 셀 출력 생략