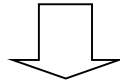


Toy project 최종 보고서

1. 저번주 보고서 마지막 부분인 12번의 error는 model 생성부분을 아래와 같이 수정하였더니 성공하였다.

```
model = Sequential()  
model.add(Conv2D(64, kernel_size=(3,3), padding='same', input_shape=(28,28,3), activation='relu'))  
model.add(MaxPooling2D(pool_size=(2,2)))  
model.add(Dropout(0.2))  
  
model.add(Conv2D(128, kernel_size=(3,3),padding='same', activation='relu'))  
model.add(MaxPooling2D(pool_size=(2,2)))  
model.add(Dropout(0.2))  
  
model.add(Conv2D(256, kernel_size=(3,3), padding='same', activation='relu'))  
model.add(MaxPooling2D(pool_size=(2,2)))  
model.add(Dropout(0.2))  
  
model.add(Flatten())  
model.add(Dense(256, activation='relu'))  
model.add(Dropout(0.2))  
model.add(Dense(10, activation='softmax'))
```



```
model = Sequential()  
model.add(Conv2D(64, kernel_size=(3,3), padding='same', input_shape=(28,28,3), activation='relu'))  
model.add(MaxPooling2D(pool_size=(2,2)))  
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model.add(Conv2D(128, kernel_size=(3,3),padding='same', activation='relu'))  
model.add(MaxPooling2D(pool_size=(2,2)))  
model.add(Dropout(0.2))  
  
model.add(Conv2D(256, kernel_size=(3,3), padding='same', activation='relu'))  
model.add(MaxPooling2D(pool_size=(2,2)))  
model.add(Dropout(0.2))  
  
model.add(Flatten())  
model.add(Dense(256, activation='relu'))  
model.add(Dropout(0.2))  
model.add(Dense(10, activation='softmax'))
```

2. error를 수정하고 코드를 돌려본 결과 data set이 너무 적어서 전체 epoch이 다 돌지 못하고 멈추었다.

Epoch 1/400

```
8/40 [====>.....] - ETA: 5s - loss: 2.3409 - accuracy: 0.1080WARNING:tensorflow:Your input ran out of data; interrupted training.
WARNING:tensorflow:Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least
8/40 [====>.....] - 2s 250ms/step - loss: 2.3409 - accuracy: 0.1080 - val_loss: 2.2913 - val_accuracy: 0.1600
[2.2917046546936035, 0.10000000149011612]
```

이 결과는 simpson 캐릭터 10가지 각각 data set을 50개, test set을 10개 사용한 결과이다. Epoch을 400, step별 epoch을 40 주었는데 전체 1/400, 그 단계에서 8/40 에서 멈추었다. 그래서 loss가 매우 높고 전체 정확도가 약 10% 정도밖에 나오지 않았다.

3. 그래서 simpson 캐릭터 10가지 각각 kaggle에서 주어진 data set, test set을 모두 이용하여 돌려보았다.

아래와 같이 돌아간다.

```
Found 13811 images belonging to 10 classes.
Found 500 images belonging to 10 classes.
Found 500 images belonging to 10 classes.
Epoch 1/400
40/40 [=====] - ETA: 0s - loss: 2.2719 - accuracy: 0.1699WARNING:tensorflow:Your input ran out of data; interrupted training.
40/40 [=====] - 11s 264ms/step - loss: 2.2719 - accuracy: 0.1699 - val_loss: 2.2537 - val_accuracy: 0.1400
Epoch 2/400
40/40 [=====] - 9s 224ms/step - loss: 2.0538 - accuracy: 0.2586
Epoch 3/400
40/40 [=====] - 9s 228ms/step - loss: 1.8065 - accuracy: 0.3742
Epoch 4/400
40/40 [=====] - 9s 223ms/step - loss: 1.6896 - accuracy: 0.4293
Epoch 5/400
40/40 [=====] - 9s 232ms/step - loss: 1.5570 - accuracy: 0.4829
Epoch 6/400
40/40 [=====] - 9s 224ms/step - loss: 1.4183 - accuracy: 0.5344
Epoch 7/400
40/40 [=====] - 9s 228ms/step - loss: 1.3484 - accuracy: 0.5607
Epoch 8/400
40/40 [=====] - 9s 226ms/step - loss: 1.2688 - accuracy: 0.5807
Epoch 9/400
40/40 [=====] - 9s 231ms/step - loss: 1.2094 - accuracy: 0.5965
Epoch 10/400
40/40 [=====] - 9s 229ms/step - loss: 1.1143 - accuracy: 0.6383
```

(중간생략)

```

Epoch 387/400
40/40 [=====] - 9s 222ms/step - loss: 0.1017 - accuracy: 0.9641
Epoch 388/400
40/40 [=====] - 9s 223ms/step - loss: 0.1000 - accuracy: 0.9691
Epoch 389/400
40/40 [=====] - 9s 228ms/step - loss: 0.0858 - accuracy: 0.9711
Epoch 390/400
40/40 [=====] - 9s 217ms/step - loss: 0.0865 - accuracy: 0.9734
Epoch 391/400
40/40 [=====] - 9s 222ms/step - loss: 0.1166 - accuracy: 0.9629
Epoch 392/400
40/40 [=====] - 9s 222ms/step - loss: 0.0912 - accuracy: 0.9668
Epoch 393/400
40/40 [=====] - 9s 231ms/step - loss: 0.0984 - accuracy: 0.9691
Epoch 394/400
40/40 [=====] - 9s 235ms/step - loss: 0.0867 - accuracy: 0.9734
Epoch 395/400
40/40 [=====] - 9s 223ms/step - loss: 0.1157 - accuracy: 0.9660
Epoch 396/400
40/40 [=====] - 9s 221ms/step - loss: 0.0779 - accuracy: 0.9750
Epoch 397/400
40/40 [=====] - 9s 224ms/step - loss: 0.0987 - accuracy: 0.9648
Epoch 398/400
40/40 [=====] - 9s 222ms/step - loss: 0.0964 - accuracy: 0.9690
Epoch 399/400
40/40 [=====] - 9s 228ms/step - loss: 0.0767 - accuracy: 0.9738
Epoch 400/400
40/40 [=====] - 9s 220ms/step - loss: 0.0919 - accuracy: 0.9719
[0.002052290365099907, 1.0]

```

위와 같이 모든 epoch이 모두 돌았고 전체 loss는 약 0.002, 정확도는 100%가 나왔다.