

CNN을 활용한 재활용 가능 여부 분류

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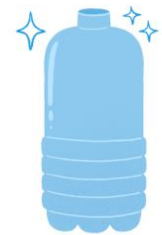
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주제 선정 및 출처



PLASTIC

1% OF PLASTIC RECYCLING = **24억**



METAL

1% OF METAL RECYCLING = **505억**



GLASS

1% OF GLASS RECYCLING = **3억**



PAPER

1% OF PAPER RECYCLING = **107억**

4대 생활폐기물 재활용이 1% 높아질 경우

639억 절약

데이터 출처: [Kaggle](https://www.kaggle.com/)

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데이터 구성

Train data: 15,045개
Validation data: 5,015개
Test data: 5,017개

25,077개

ALL DATA

Train Data

Test Data

Train Data

Validation
Data

Test Data

6

:

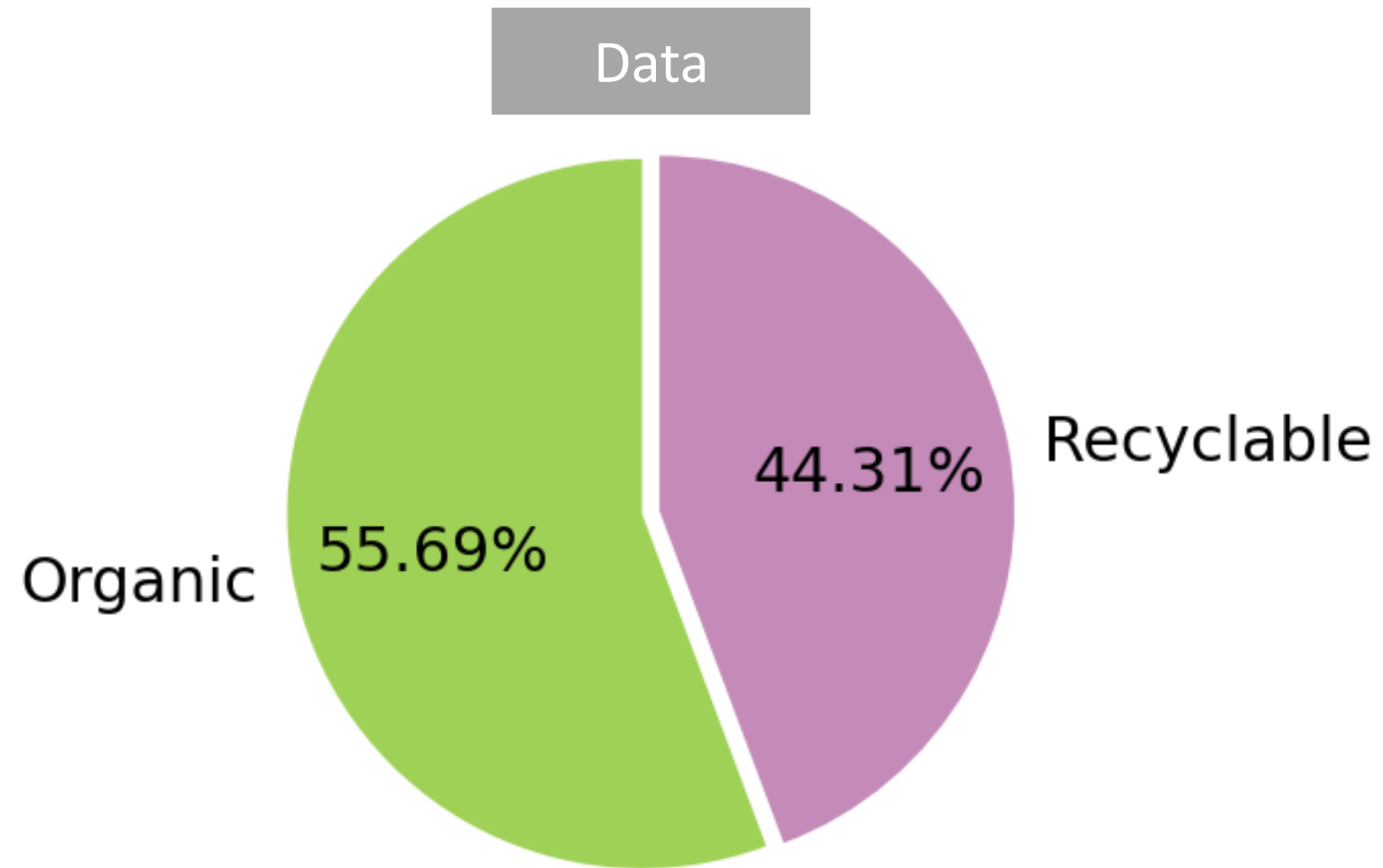
2

:

2

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데이터 구성



Organic – 유기물 -> 재활용 불가
Class – 'O'

Recyclable – 재활용품
Class – 'R'

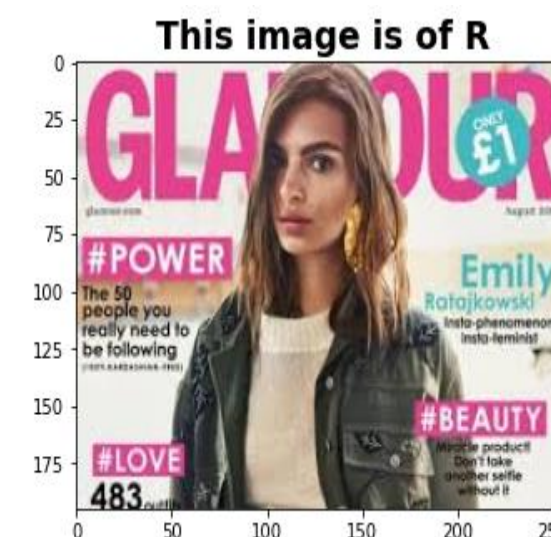
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데이터 구성 및 정제

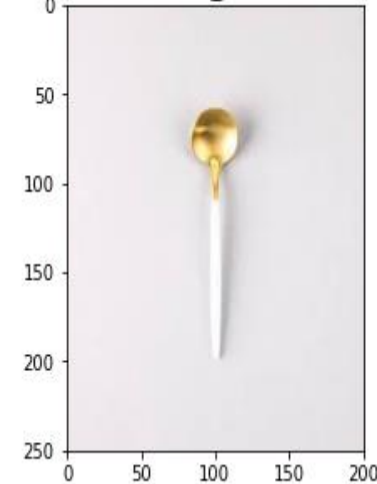
Train 데이터 15,045개 중 9개

이미지의 크기가 다르다

-> (224, 224) 변환



This image is of R



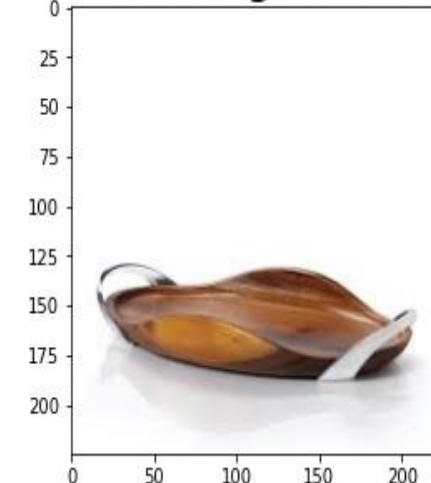
This image is of O



This image is of O



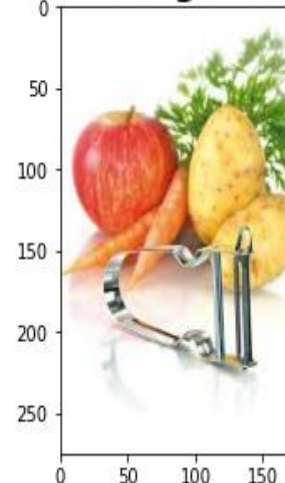
This image is of R



This image is of R

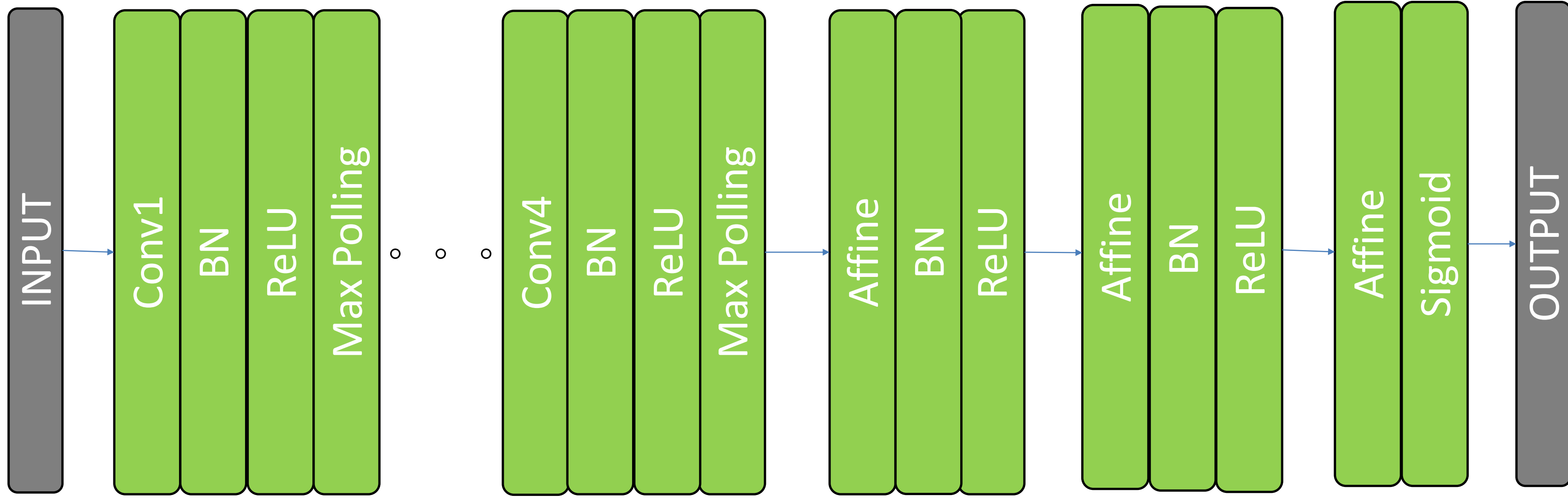


This image is of O



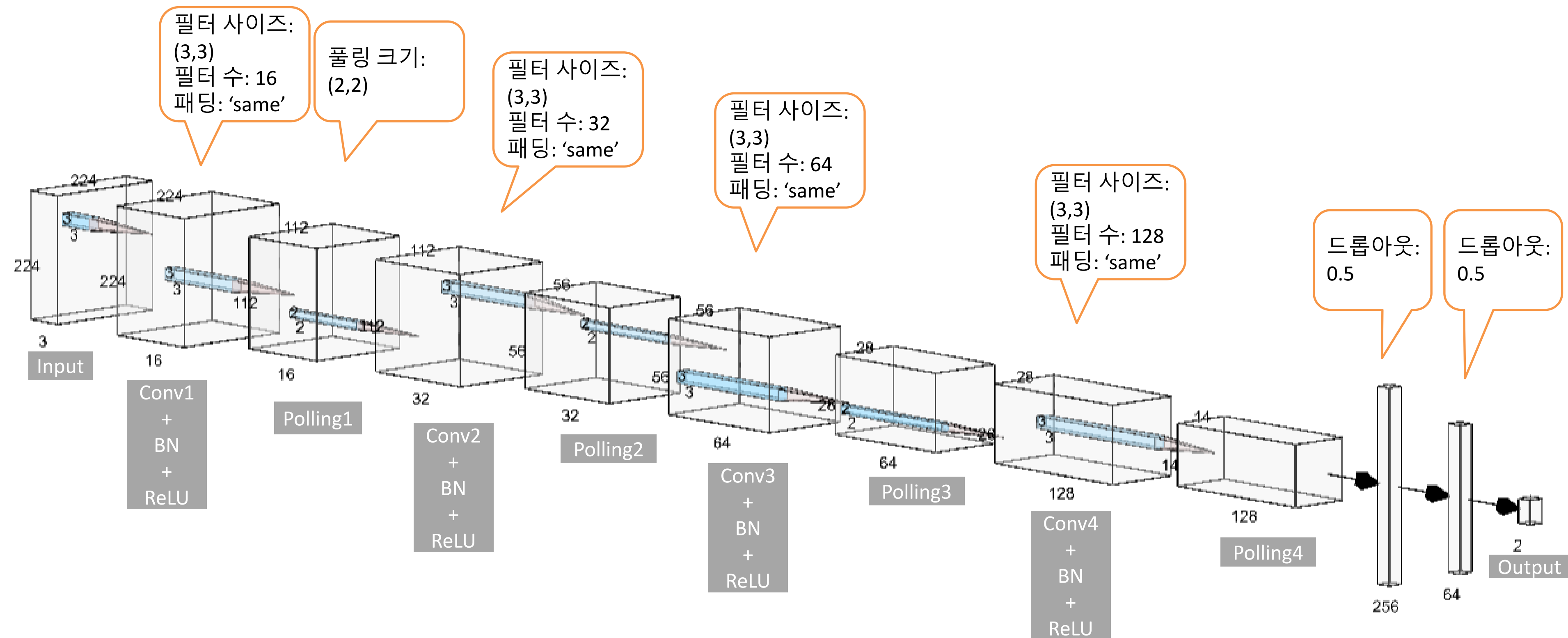
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데이터 모델 구조



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모델 아키텍처



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모델 아키텍처

Total params: 6,539,042
Trainable params: 6,537,922
Non-trainable params: 1,120

Conv1

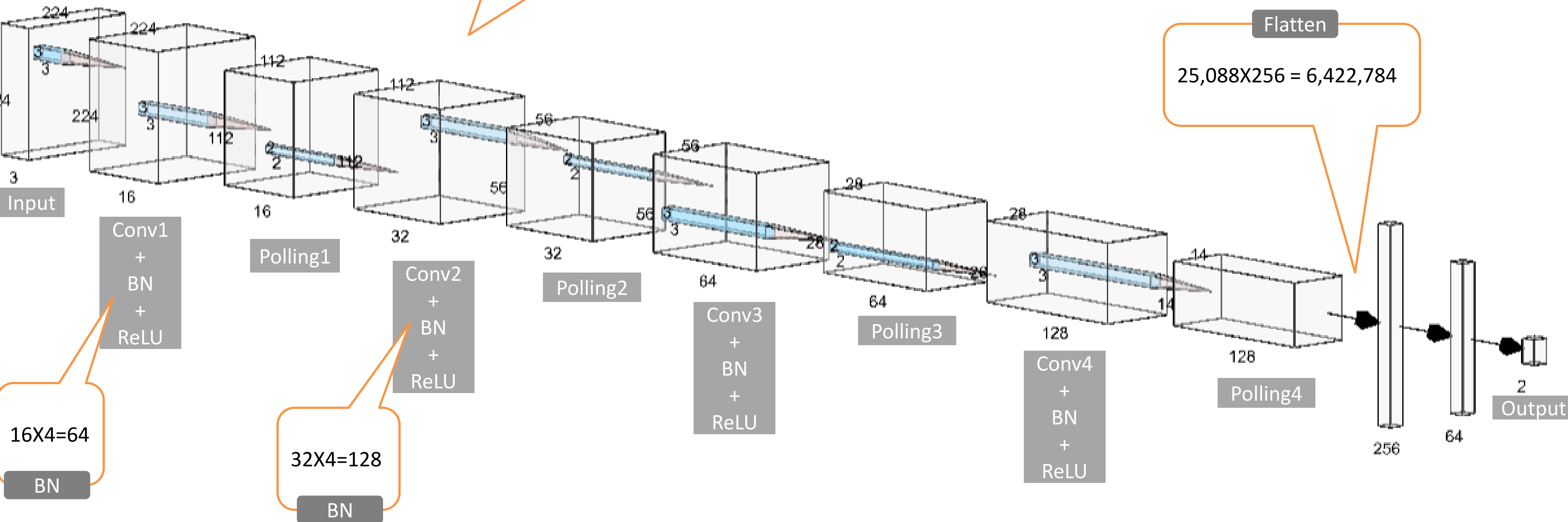
필터 1개 = $3 \times 3 = 9$, 채널=3
 $9 \times 3 \times 16$ (필터수)+16 = 448

Conv2

9×16 (입력채널) $\times 32$ (출력채널)+32
=4640

Flatten

$25,088 \times 256 = 6,422,784$

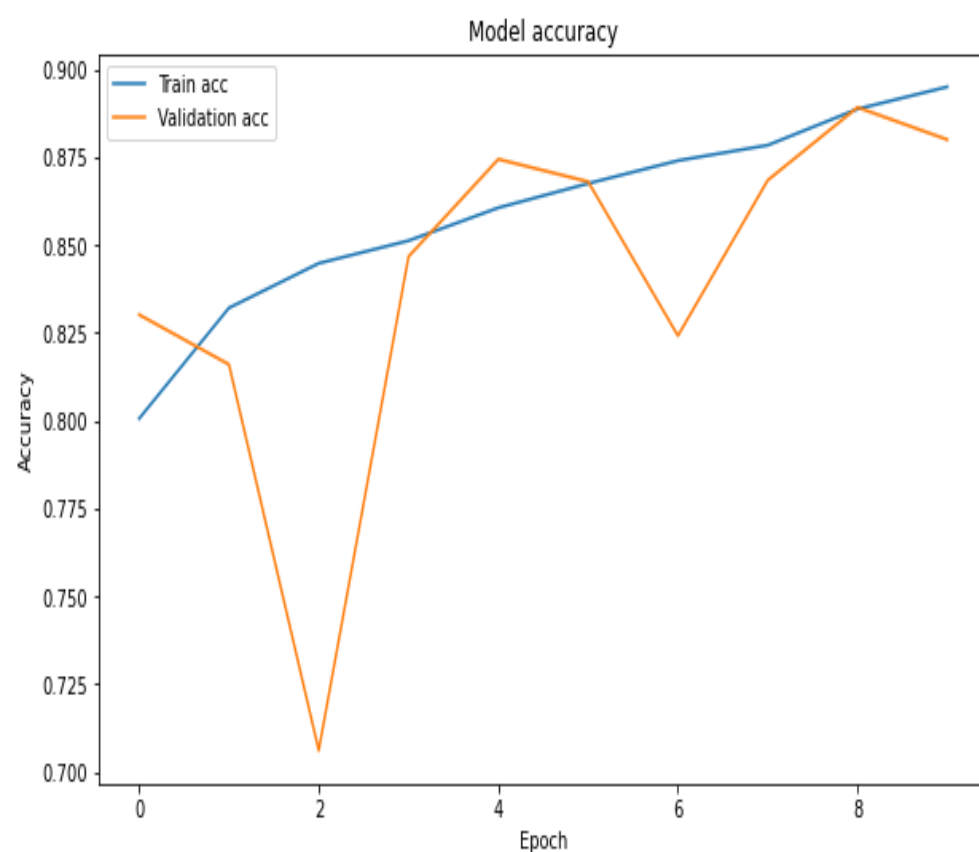


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모델 비교_Batch size

loss = 'binary_crossentropy', optimizer = "adam", epoch=10

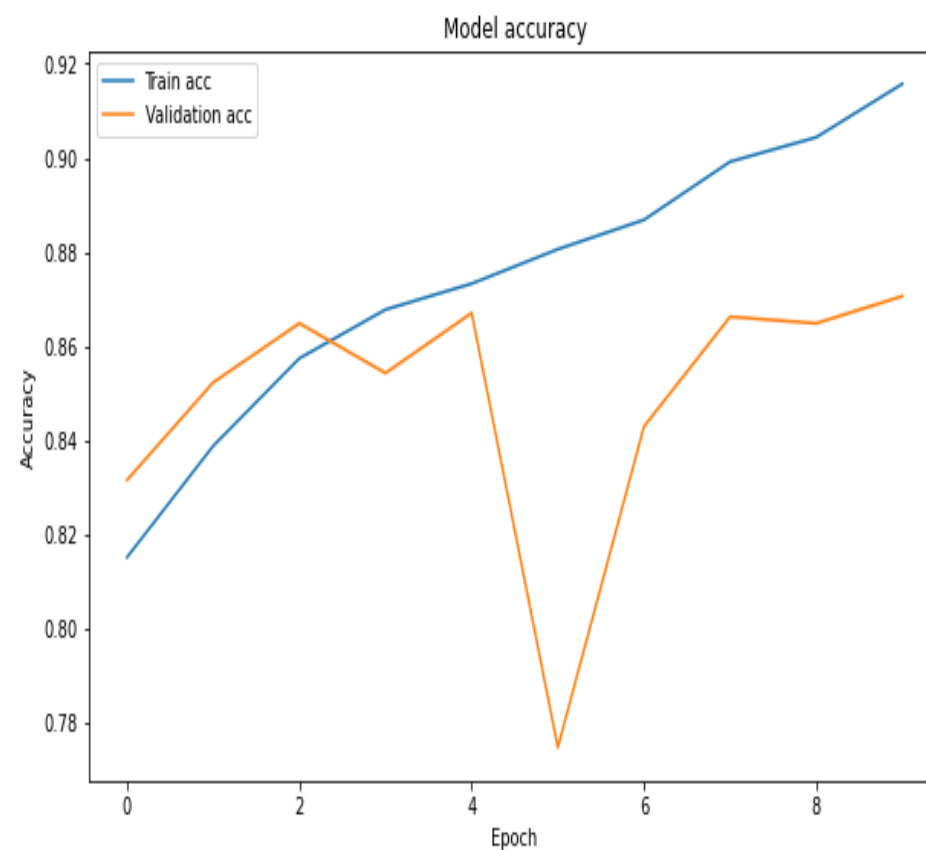
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Training Accuracy: 93.12%

Testing Accuracy: 88.70%

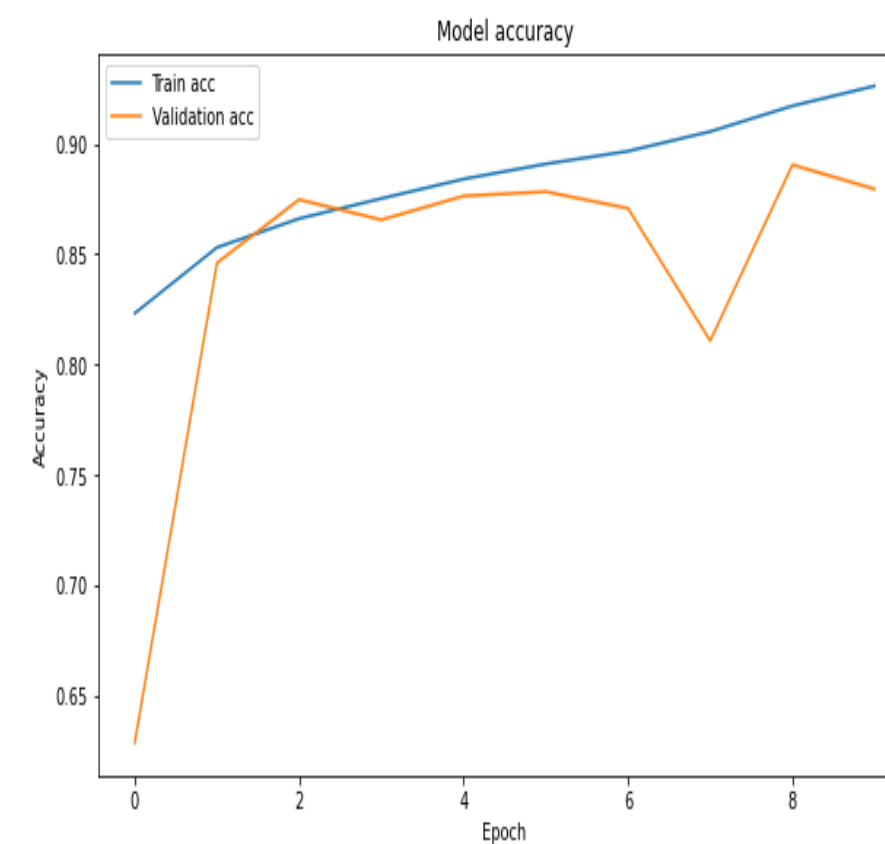
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Training Accuracy: 93.25%

Testing Accuracy: 88.94%

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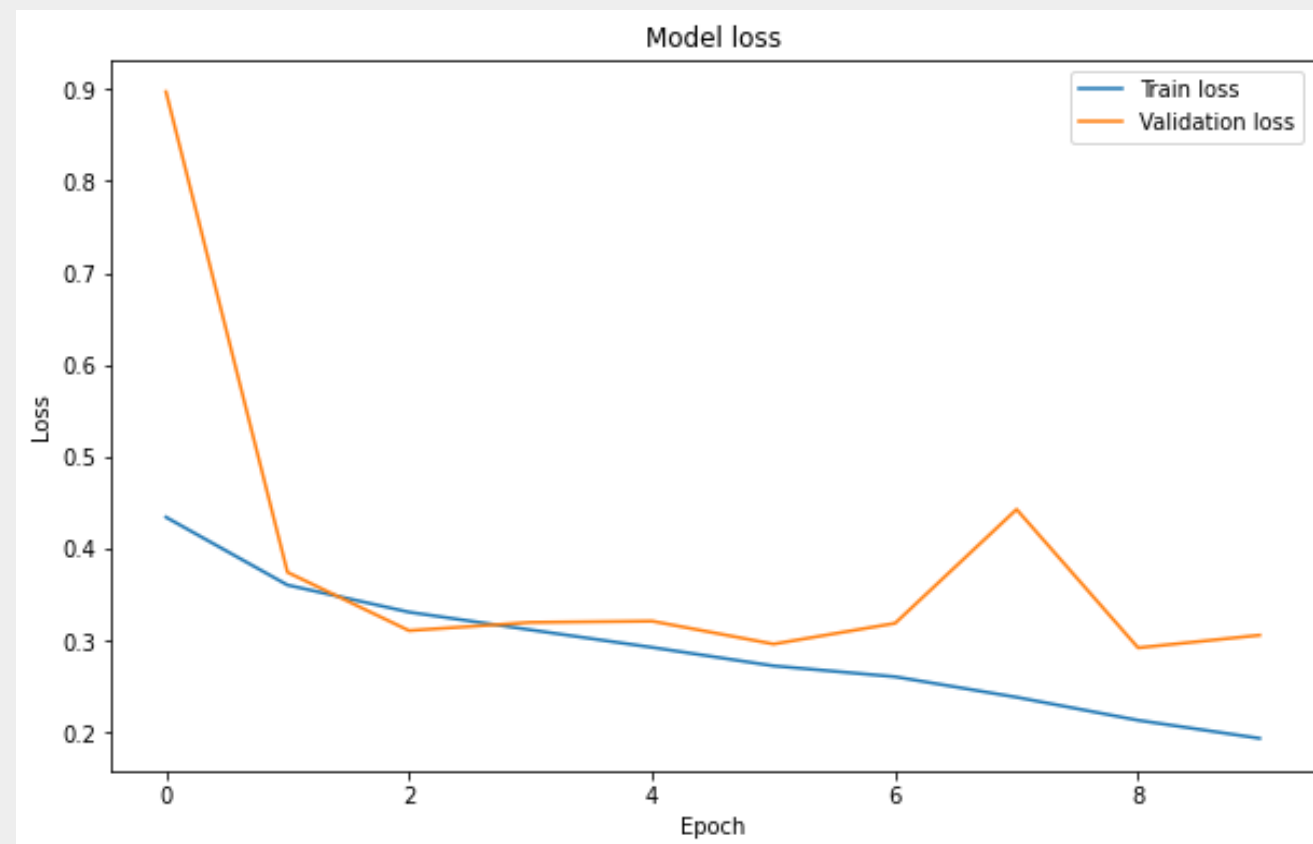
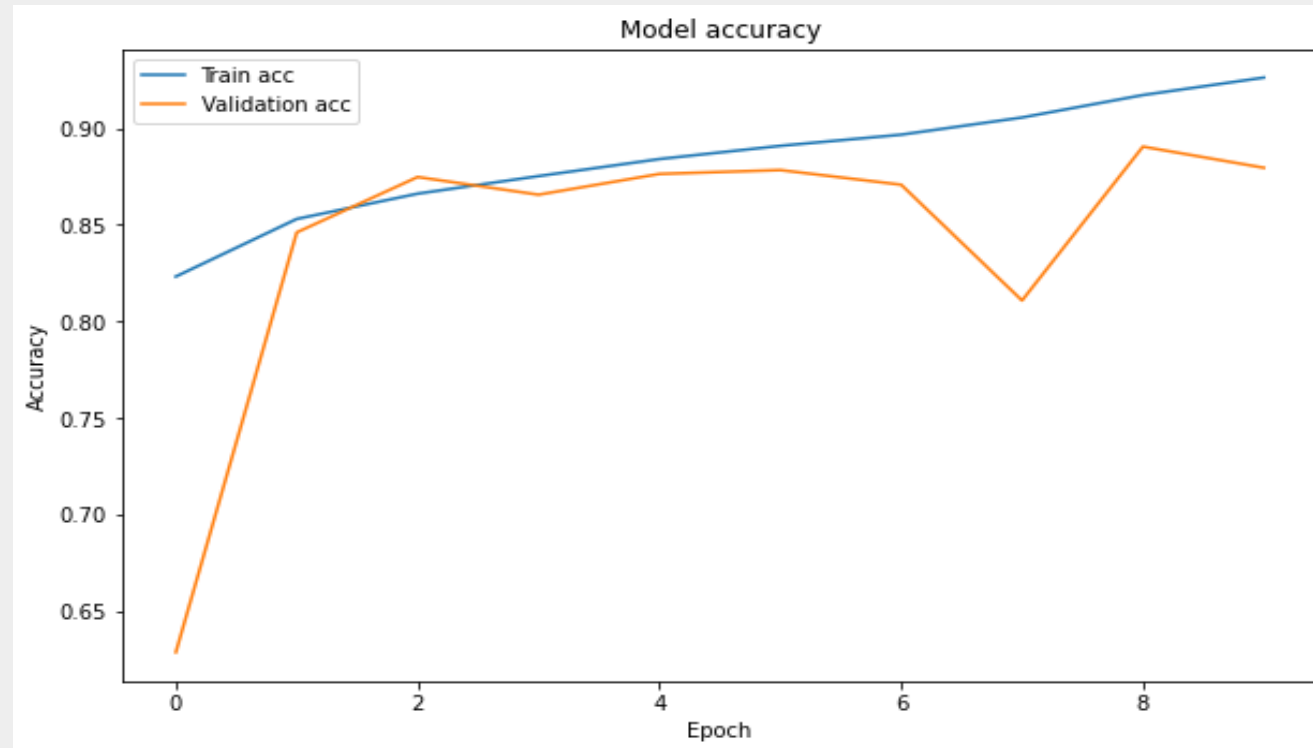


Training Accuracy: 95.15%

Testing Accuracy: 87.86%

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분석 정확도



✓ 정확도

Train_set 정확도: 95.15%

Test_set 정확도: 87.86%

Training Accuracy: 95.15%

Testing Accuracy: 87.86%

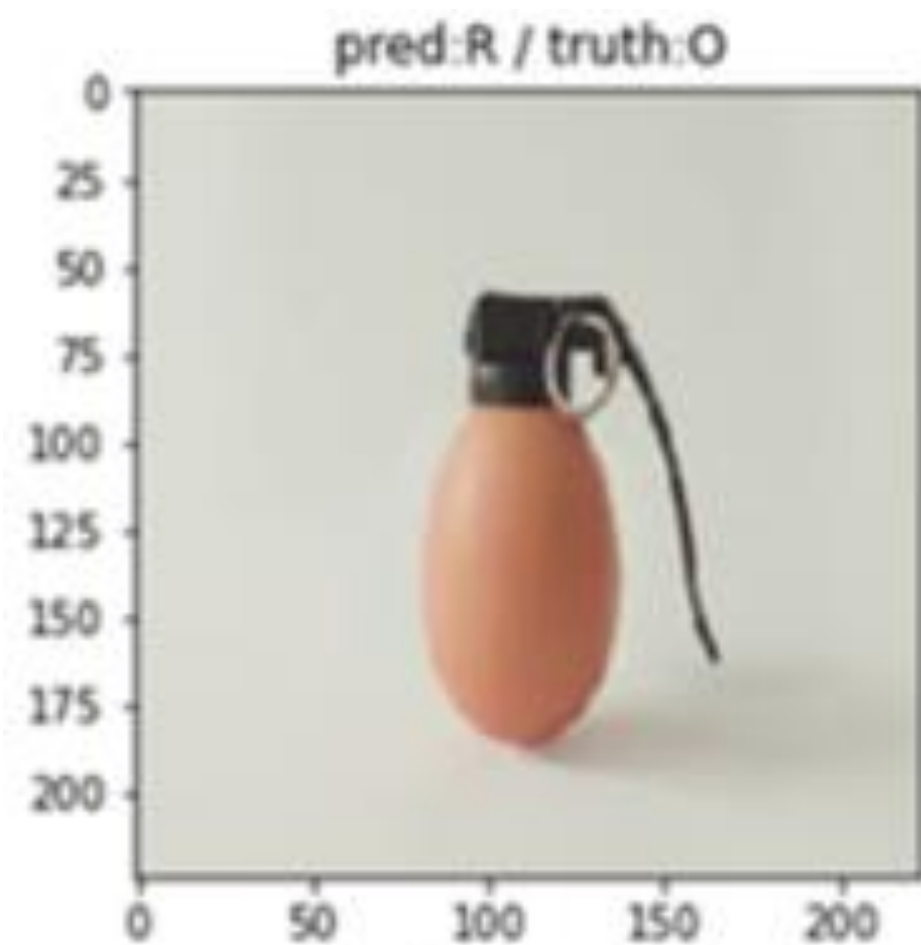
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결과 확인

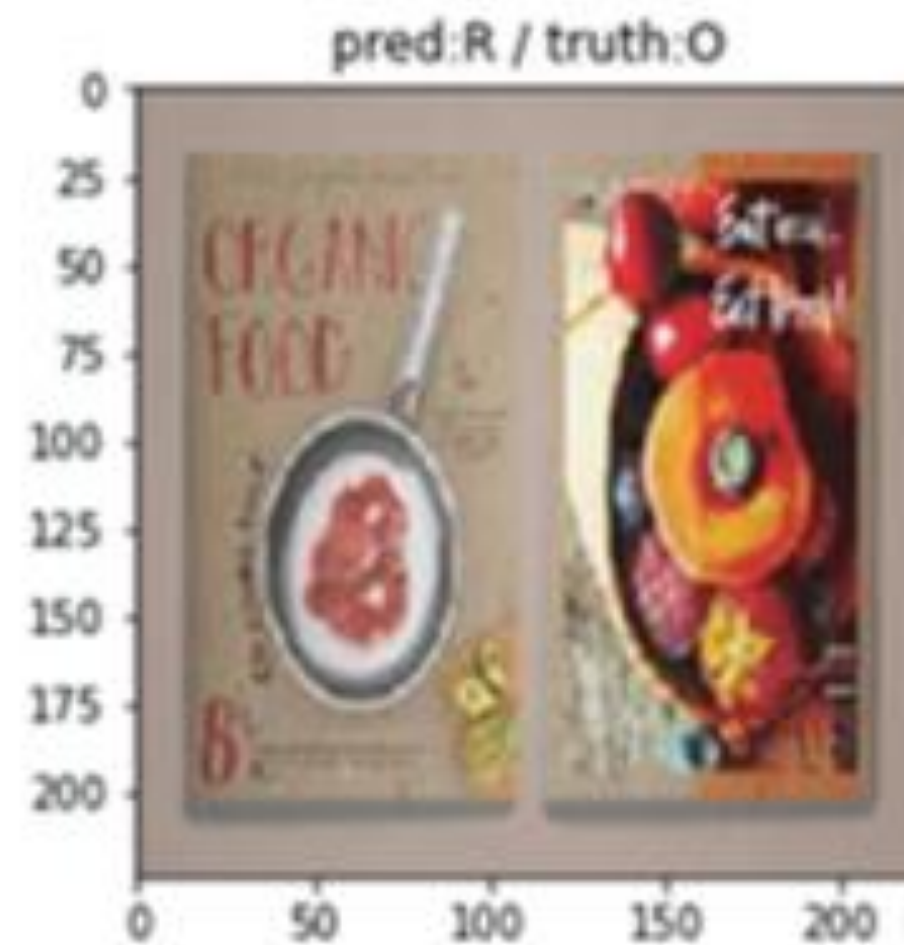


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결과 확인



수류탄?
달걀?



잡지?

13 최종 결과

값 변경

Seed: 1337

Training Accuracy: 95.15%
Testing Accuracy: 87.86%

Seed: 1336

Training Accuracy: 92.09%
Testing Accuracy: 90.28%

Seed: 1335

Training Accuracy: 92.59%
Testing Accuracy: 86.98%

Seed: 1334

Training Accuracy: 95.09%
Testing Accuracy: 88.44%

Seed: 1333

Training Accuracy: 95.21%
Testing Accuracy: 88.58%

평균 정확도

88.42%

THANK YOU
