

Fashion Image Data Classifier

Execution Environment

Local – CPU : AMD Ryzen 9 4900HS with Radeon Graphics

Anaconda – 4.12.0

python – 3.7.11

tensorflow. version: 2.2.0

numpy version : 1.18.5

pandas version : 1.3.5

keras version : 2.3.1

sklearn version :1.0.2

matplotlib version : 3.5.3

keras_preprocessing version : 1.1.2

PreProcessing

Image Augmentation

keras_preprocessing 의 ImageDataGenerator 사용

Dimension, Pointofview 를 바꿔가며 데이터 증식

Resizing

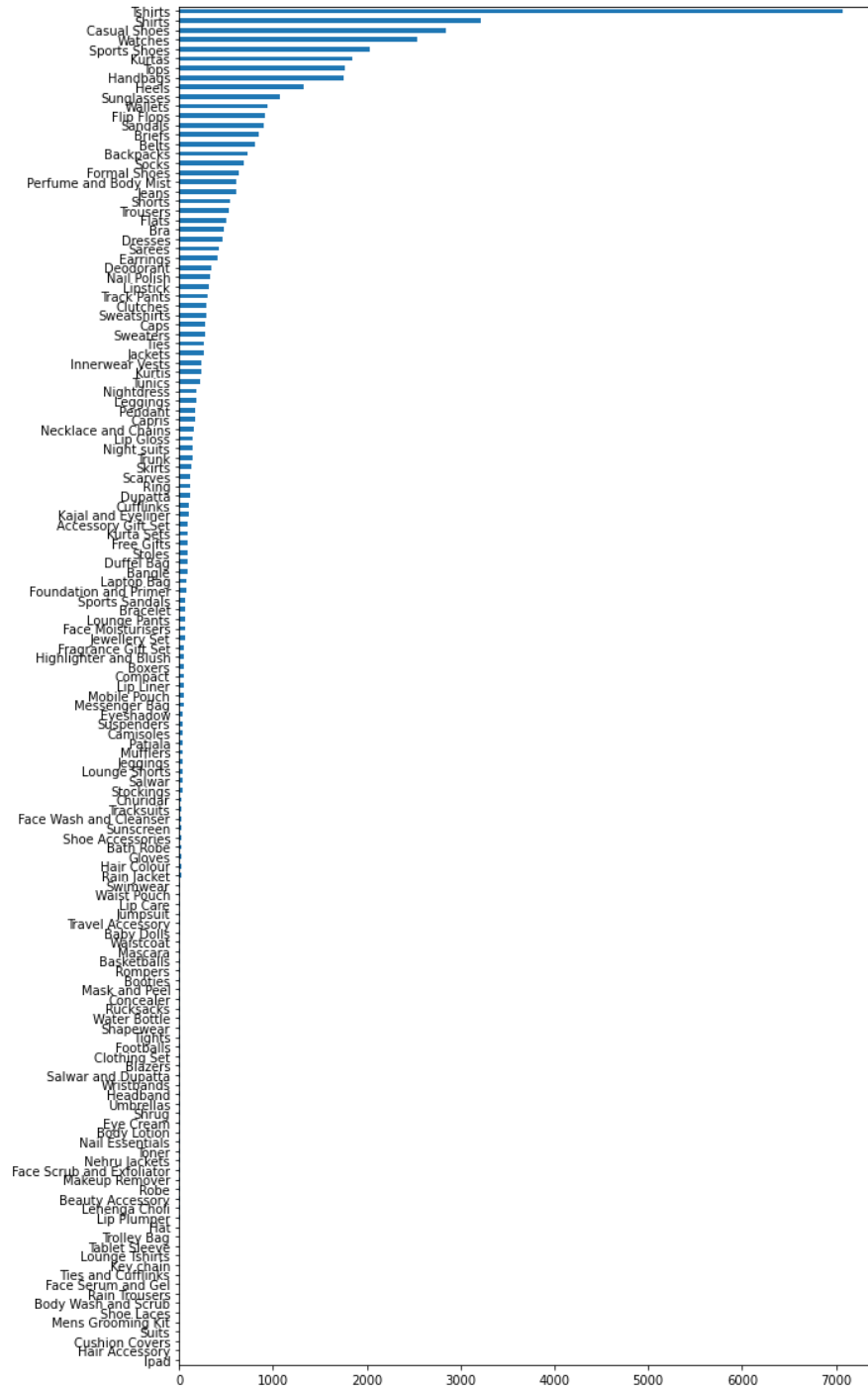
96,96,3 형태로 변환

(96, 96)짜리 정방 행렬 + RGB

Data Preview

```
class : 36 - "Accessories","Apparel Set","Bags","Bath and Body","Beauty
Accessories","Belts","Bottomwear","Dress","Eyes","Eyewear","Flip
Flops","Fragrance","Free
Gifts","Gloves","Headwear","Innerwear","Jewellery","Lips","Loungewear and
Nightwear","Makeup","Mufflers","Nails","Sandal","Saree","Scarves","Shoe
Accessories","Shoes","Skin","Skin Care","Socks","Sports
Accessories","Ties","Topwear","Wallets","Watches","Water Bottle"
```

	id	gender	masterCategory	subCategory	articleType	baseColour	season	year	usage	productDisplayName	image
0	56885	Women	Footwear	Shoes	Heels	Red	Winter	2012	Casual	HM Women Red Heels	56885.jpg
1	18830	Men	Accessories	Belts	Belts	Black	Summer	2011	Formal	Peter England Men Formal Black Belt	18830.jpg
2	51001	Women	Apparel	Innerwear	Bra	Skin	Summer	2018	Casual	Enamor Full Figure Skin Bra	51001.jpg
3	11378	Men	Apparel	Topwear	Shirts	White	Fall	2011	Formal	United Colors of Benetton Men Summer White Shirts	11378.jpg
4	23649	Men	Apparel	Topwear	Tshirts	White	Summer	2012	Casual	Disney Men White Printed T-shirt	23649.jpg
5	39522	Unisex	Accessories	Bags	Laptop Bag	Black	Summer	2012	Casual	Peter England Unisex Black Bag	39522.jpg
6	52473	Women	Apparel	Loungewear and Nightwear	Bath Robe	White	Summer	2017	Casual	Red Rose Women Pink & White Bath Robes	52473.jpg
7	44782	Men	Footwear	Shoes	Sports Shoes	White	Summer	2010	Sports	Lotto Men White Los Angeles II Sports Shoes	44782.jpg
8	16536	Women	Accessories	Headwear	Caps	Red	Fall	2011	Casual	Probase Women Checked Orange & Red Cap	16536.jpg
9	23271	Men	Accessories	Watches	Watches	White	Winter	2016	Casual	Maxima Steele Men White Watch	23271.jpg



Training

Sequential Simple CNN model

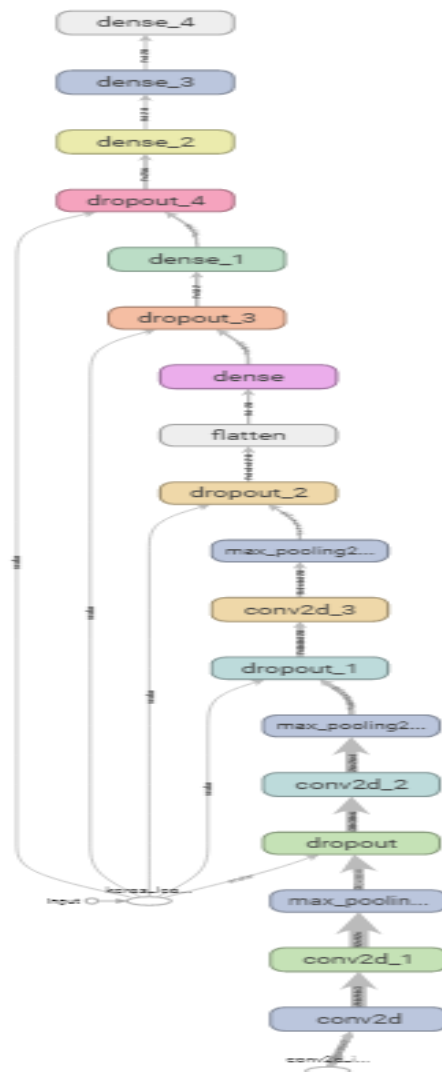
Model Summary

Model: "sequential"

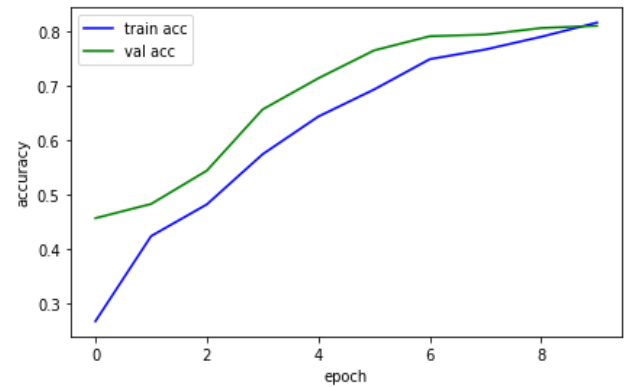
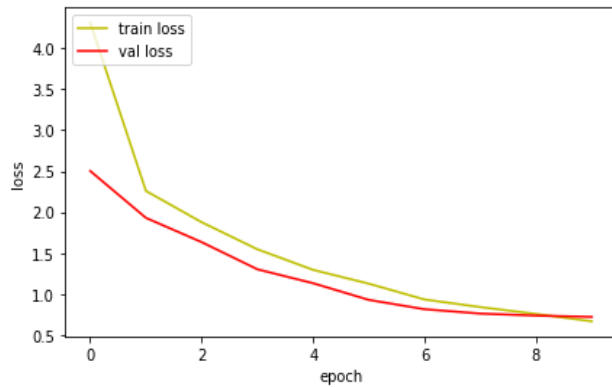
Layer (type)	Output Shape	Param #
=====		
conv2d (Conv2D)	(None, 94, 94, 32)	896
conv2d_1 (Conv2D)	(None, 92, 92, 64)	18496
max_pooling2d (MaxPooling2D)	(None, 30, 30, 64)	0
dropout (Dropout)	(None, 30, 30, 64)	0
conv2d_2 (Conv2D)	(None, 26, 26, 128)	204928
max_pooling2d_1 (MaxPooling2D)	(None, 8, 8, 128)	0
dropout_1 (Dropout)	(None, 8, 8, 128)	0
conv2d_3 (Conv2D)	(None, 4, 4, 128)	409728
max_pooling2d_2 (MaxPooling2D)	(None, 1, 1, 128)	0
dropout_2 (Dropout)	(None, 1, 1, 128)	0
flatten (Flatten)	(None, 128)	0
dense (Dense)	(None, 512)	66048
dropout_3 (Dropout)	(None, 512)	0
dense_1 (Dense)	(None, 256)	131328
dropout_4 (Dropout)	(None, 256)	0
dense_2 (Dense)	(None, 128)	32896
dense_3 (Dense)	(None, 128)	16512
dense_4 (Dense)	(None, 36)	4644
=====		

Total params: 885,476
Trainable params: 885,476
Non-trainable params: 0

Visualizing Model Structure by tensorboard



In Epoch 10



epoch 가 지날 수록, train loss, validation loss 가 감소, train accuracy 와 validation accuracy 가 증가함으로 효율의 증대가 추후 epoch 에서 이루어 질 것으로 보고, 실 사용 모델은 epoch 를 40 번 한 모델을 사용

Cautions

학습시 keras,tensorflow 버전에 주의

ran out of data 로 멈출 수 있음.

tf.keras 로 모델 구성 할 것

'Sequential' object has no attribute '_get_save_spec' error 발생 가능

Prediction

최종 모델의 Validation Accuracy : 89.62%

Sample 어플 제작 후 테스트



결과:
Topwear



결과:
Topwear

사진 촬영

주변 환경 요소의 색상이 균일 하면, 상당한 정확도를 보임.



결과:
Innerwear

사진 촬영

갤러리



결과:
Belts

환경 요소의 색상이 균일 하지 않거나, 애매하면 잘못된 결과를 도출하기도 함.

TensorflowLite

```
converter = tf.lite.TFLiteConverter.from_keras_model(classifier)
```

```
tflite_model = converter.convert()
```

```
with open("Clothing_ClassifierTFLite_model.tflite",'wb') as f:
```

```
    f.write(tflite_model)
```

해당 코드를 통해 학습된 모델을 TensorflowLite 를 통해 앱에 내장 할 수 있었음.

서버 자원의 절약 및 속도 측면에서 사용 + 인터넷이 없어도 인식 가능

References List

KRIZHEVSKY, Alex; SUTSKEVER, Ilya; HINTON, Geoffrey E. Imagenet classification with deep convolutional neural networks. *Communications of the ACM*, 2017, 60.6: 84-90.

TensorflowLite - [Image Classification App](#) | [Teachable Machine + TensorFlow Lite](#)



+ <https://github.com/IJ-Apps/Image-Classification-App-with-Custom-TensorFlow-Model>