

```

from google.colab import drive
!ls
drive.mount('/content/drive')

sample_data
Mounted at /content/drive

from keras.applications.vgg16 import VGG16
import numpy as np
import matplotlib.pyplot as plt

train_dict_path = '/content/drive/Shareddrives/Projet-ML-M2-PLS/data/train'
valid_dict_path = '/content/drive/Shareddrives/Projet-ML-M2-PLS/data/validation'

# On a utilisé les layer preprocessing VGG16 de Keras
# avec demension de 640*480 de l'image et 3 pour RGB
vgg = VGG16(input_shape=[640, 480] + [3], weights='imagenet', include_top=False)

for layer in vgg.layers:
    layer.trainable = False

x = keras.layers.Flatten()(vgg.output)

# on definit 3 classe du dernier layer
prediction = keras.layers.Dense(3, activation='softmax')(x)

# creation du model
model = keras.Model(inputs=vgg.input, outputs=prediction)

# On compile avec l'optimizer Adam
model.compile(
    optimizer=keras.optimizers.Adam(learning_rate=0.0001, amsgrad=True),
    loss=[keras.losses.CategoricalCrossentropy(from_logits=True)],
    metrics=['accuracy']
)

# afficher la structure du modele
model.summary()

# On utilise la classe ImageDataGenerator pour traiter les image
from keras.preprocessing.image import ImageDataGenerator

train_img_datagen = ImageDataGenerator(rescale = 1./255)

test_img_datagen = ImageDataGenerator(rescale = 1./255)

# on utilise la fonction (flow_from_directory) pour definir le training set avec ces
training_set = train_img_datagen.flow_from_directory(train_dict_path,
                                                    target_size = (640, 480),

```

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        batch_size = 32,
        class_mode = 'categorical')

test_set = test_img_datagen.flow_from_directory(valid_dict_path,
                                                target_size = (640, 480),
                                                batch_size = 32,
                                                class_mode = 'categorical')

# fit le model avec epochs=5 comme un debut
history = model.fit(
    training_set,
    validation_data=test_set,
    epochs=5,
    steps_per_epoch=len(training_set),
    validation_steps=len(test_set)
)

```

Downloading data from <https://storage.googleapis.com/tensorflow/keras-applications/58892288/58889256> [=====] - 0s 0us/step

3

Model: "model"

Layer (type)	Output Shape	Param #
=====		
input_1 (InputLayer)	[(None, 640, 480, 3)]	0
block1_conv1 (Conv2D)	(None, 640, 480, 64)	1792
block1_conv2 (Conv2D)	(None, 640, 480, 64)	36928
block1_pool (MaxPooling2D)	(None, 320, 240, 64)	0
block2_conv1 (Conv2D)	(None, 320, 240, 128)	73856
block2_conv2 (Conv2D)	(None, 320, 240, 128)	147584
block2_pool (MaxPooling2D)	(None, 160, 120, 128)	0
block3_conv1 (Conv2D)	(None, 160, 120, 256)	295168
block3_conv2 (Conv2D)	(None, 160, 120, 256)	590080
block3_conv3 (Conv2D)	(None, 160, 120, 256)	590080
block3_pool (MaxPooling2D)	(None, 80, 60, 256)	0
block4_conv1 (Conv2D)	(None, 80, 60, 512)	1180160
block4_conv2 (Conv2D)	(None, 80, 60, 512)	2359808
block4_conv3 (Conv2D)	(None, 80, 60, 512)	2359808
block4_pool (MaxPooling2D)	(None, 40, 30, 512)	0
block5_conv1 (Conv2D)	(None, 40, 30, 512)	2359808

block5_conv2 (Conv2D)	(None, 40, 30, 512)	2359808
block5_conv3 (Conv2D)	(None, 40, 30, 512)	2359808
block5_pool (MaxPooling2D)	(None, 20, 15, 512)	0
flatten (Flatten)	(None, 153600)	0
dense (Dense)	(None, 3)	460803

=====  
Total params: 15,175,491

Trainable params: 460,803

Non-trainable params: 14,714,688

Found 114 images belonging to 3 classes.

Found 13 images belonging to 3 classes.

/usr/local/lib/python3.6/dist-packages/tensorflow/python/keras/engine/training.py  
warnings.warn("`Model.fit\_generator` is deprecated and "

Epoch 1/5

4/4 [=====] - 414s 100s/step - loss: 8.0910 - accuracy:

# afficher les different valeur du loss

```
plt.plot(history.history['loss'], label='train loss')
```

```
plt.plot(history.history['val_loss'], label='val loss')
```

```
plt.legend()
```

```
plt.show()
```

```
plt.savefig('LossVal_loss')
```

# afficher les different valeur du l'accuracy

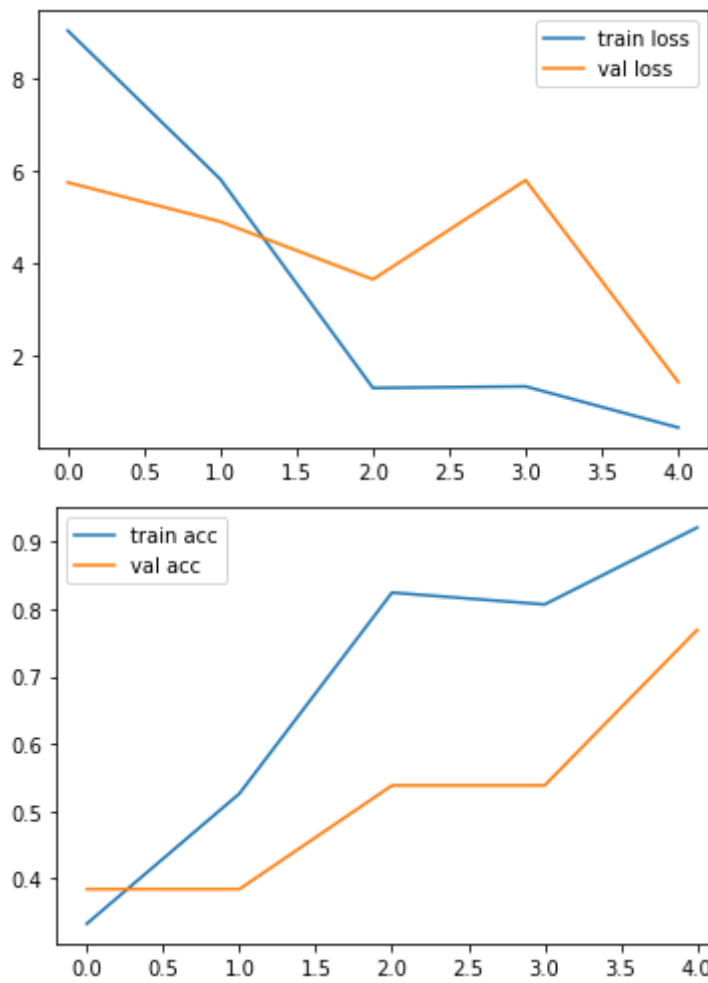
```
plt.plot(history.history['accuracy'], label='train acc')
```

```
plt.plot(history.history['val_accuracy'], label='val acc')
```

```
plt.legend()
```

```
plt.show()
```

```
plt.savefig('AccVal_acc')
```



<Figure size 432x288 with 0 Axes>