



Classification du cancer de la peau

Utilisant les techniques du transfer learning.

Plan



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Introduction



Skin cancer

croissance anormale des cellules de la peau, c'est l'un des cancers les plus courants.

lorsqu'il est pris tôt, le dermatologue peut le traiter et l'éliminer complètement.



Bénigne vs maligne

Cell maligne : peut se développer et se propager à d'autres parties du corps.

Cell bénigne : peut se développer mais ne se propagera pas.



Deep learning

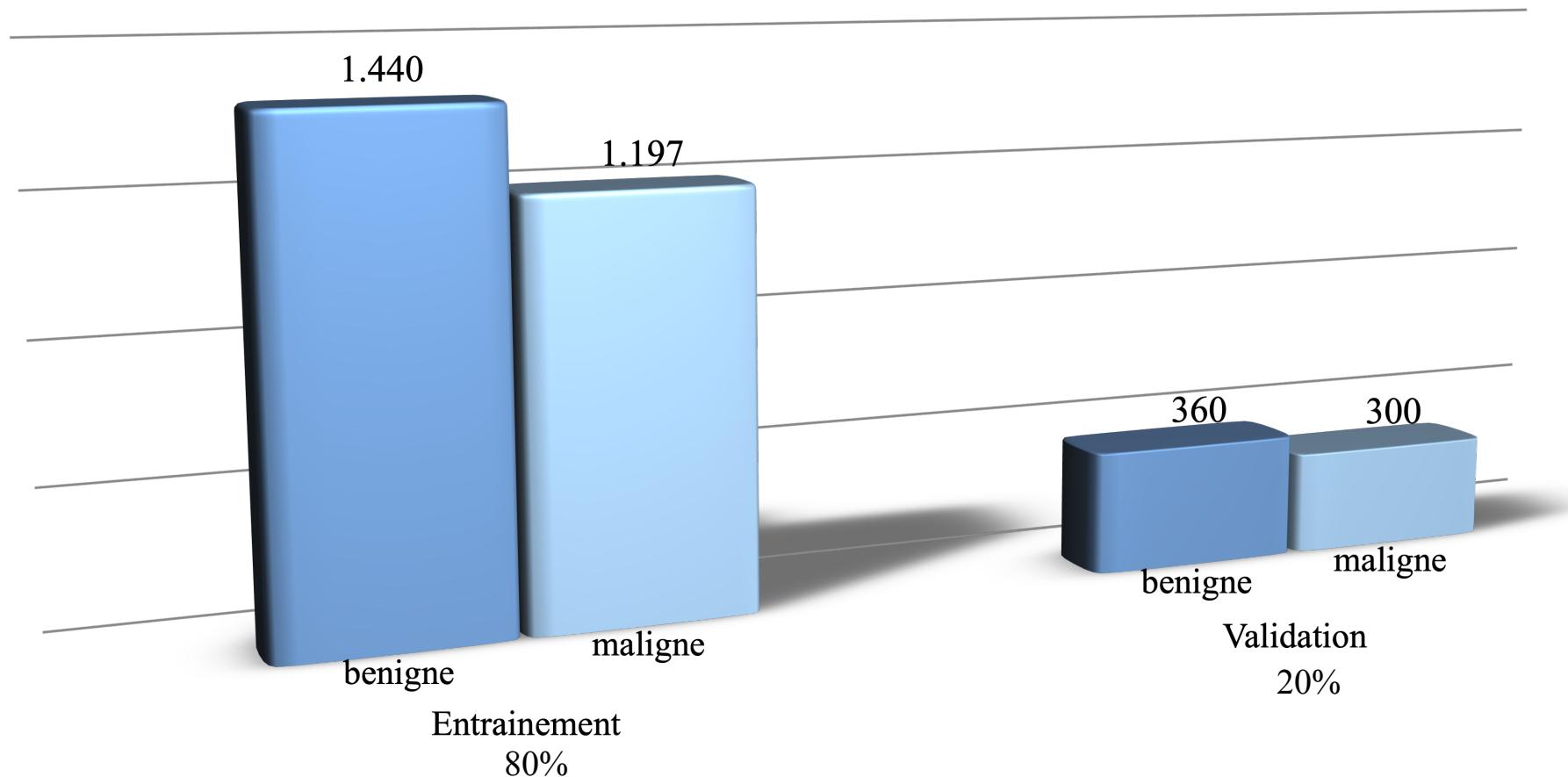
En utilisant l'apprentissage profond et les réseaux neuronaux, nous serons en mesure de classifier les maladies cutanées bénignes et malignes.



Transfer learning

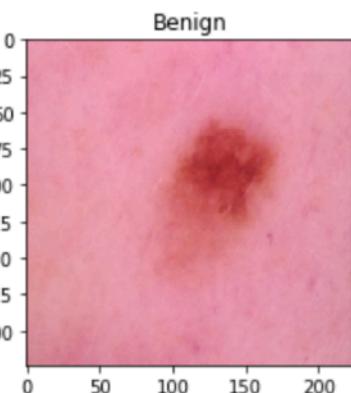
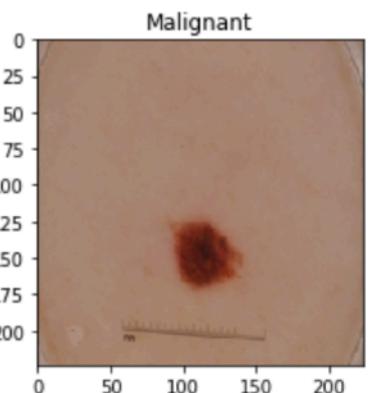
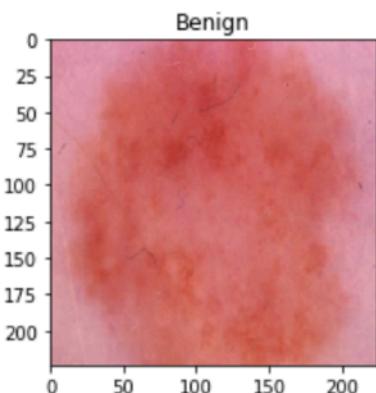
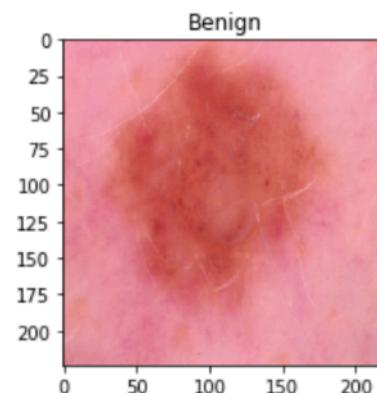
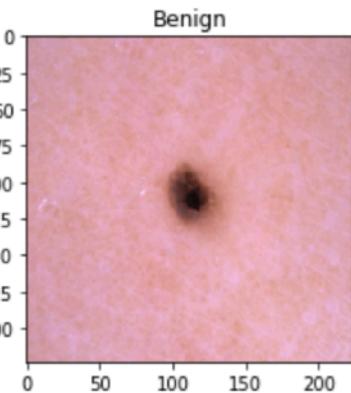
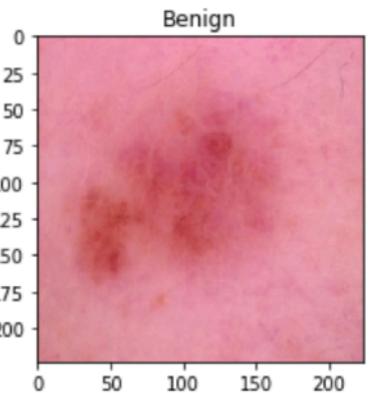
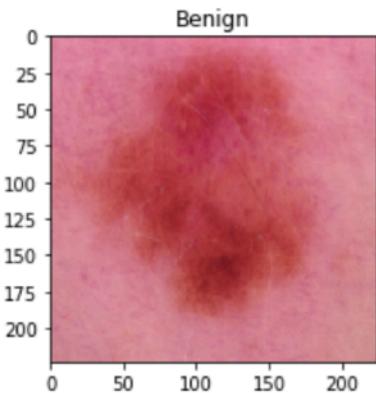
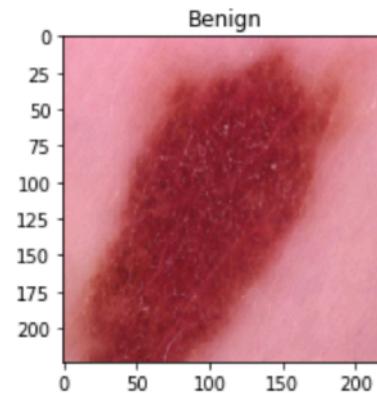
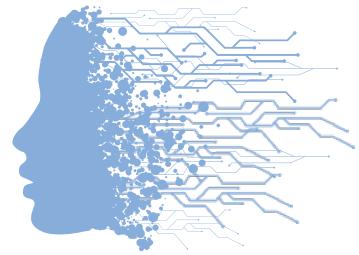
Ces techniques nous aide à développer ce genre de système de classification même avec une dataset qui n'est pas suffisante pour appliquer du DL.

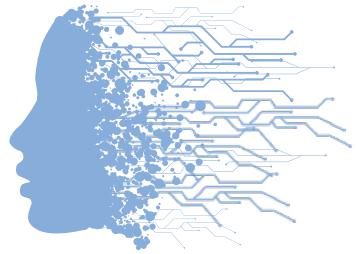
Distribution des données





Visualisation d'un échantillon





Augmentation & re-dimension du Data

```
train_datagen = ImageDataGenerator(rescale = 1./255,
                                    shear_range = 0.2,
                                    zoom_range = 0.2,
                                    horizontal_flip = True)

test_datagen = ImageDataGenerator(rescale = 1./255)
#on a fixé le batch_size à 64 pour les images d'entrenement et du test.
training_set = train_datagen.flow_from_directory(train_dir,
                                                 target_size = (224, 224),
                                                 batch_size = 64,
                                                 class_mode = 'categorical')

test_set = test_datagen.flow_from_directory(test_dir,
                                             target_size = (224, 224),
                                             batch_size = 64,
                                             class_mode = 'categorical')
```

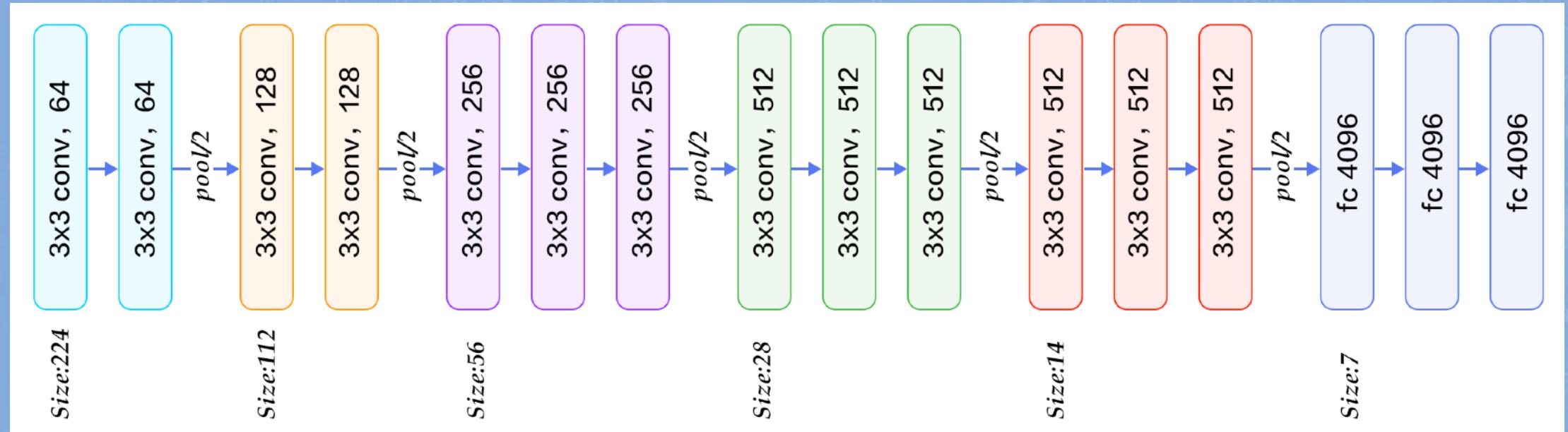
Modèles utilisés





Modèles utilisés

VGG-16

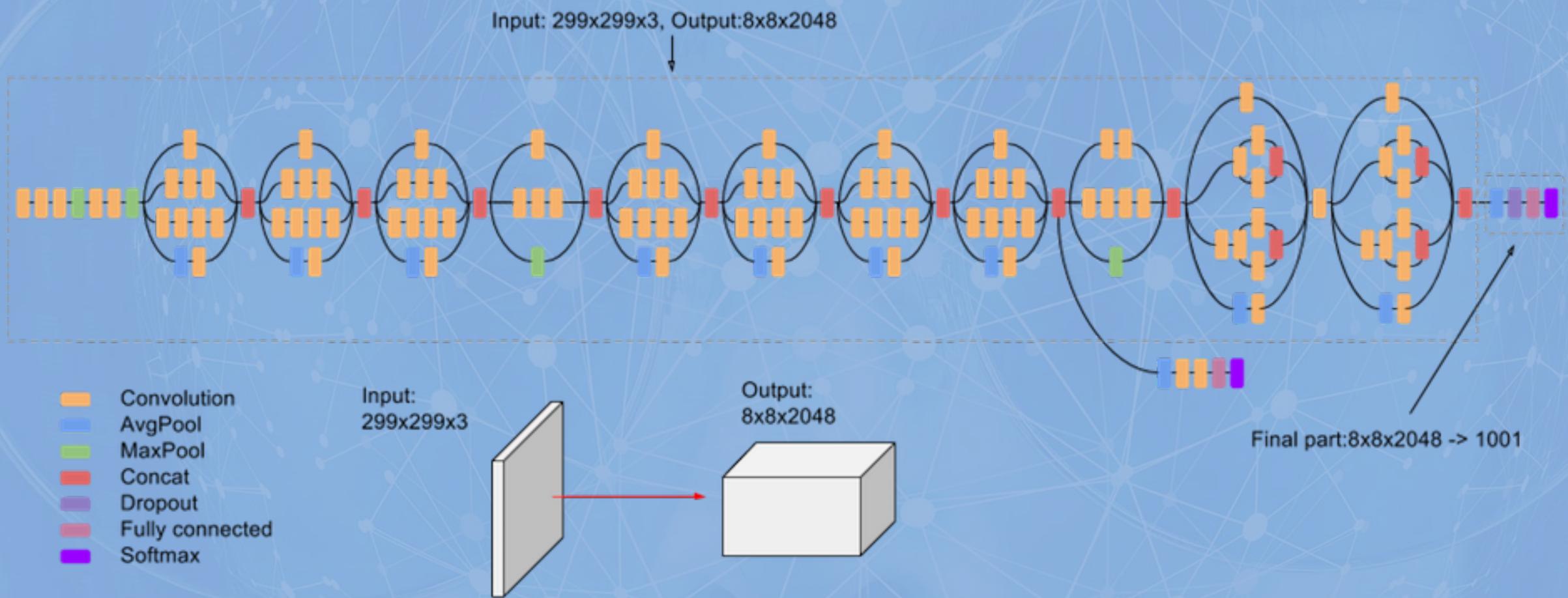




Modèles utilisés

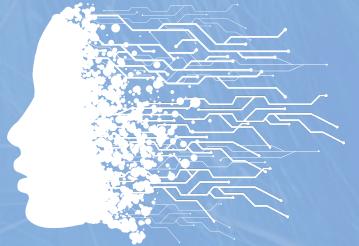


INCEPTION-V3





Modèles utilisés



EfficientNet-B0

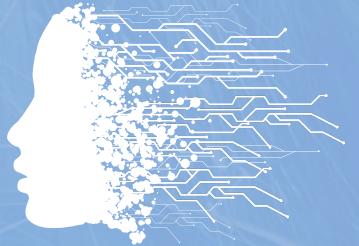
Stage i	Operator $\hat{\mathcal{F}}_i$	Resolution $\hat{H}_i \times \hat{W}_i$	#Channels \hat{C}_i	#Layers \hat{L}_i
1	Conv3x3	224×224	32	1
2	MBConv1, k3x3	112×112	16	1
3	MBConv6, k3x3	112×112	24	2
4	MBConv6, k5x5	56×56	40	2
5	MBConv6, k3x3	28×28	80	3
6	MBConv6, k5x5	14×14	112	3
7	MBConv6, k5x5	14×14	192	4
8	MBConv6, k3x3	7×7	320	1
9	Conv1x1 & Pooling & FC	7×7	1280	1

RÉSULTATS





Résultats du InceptionV3

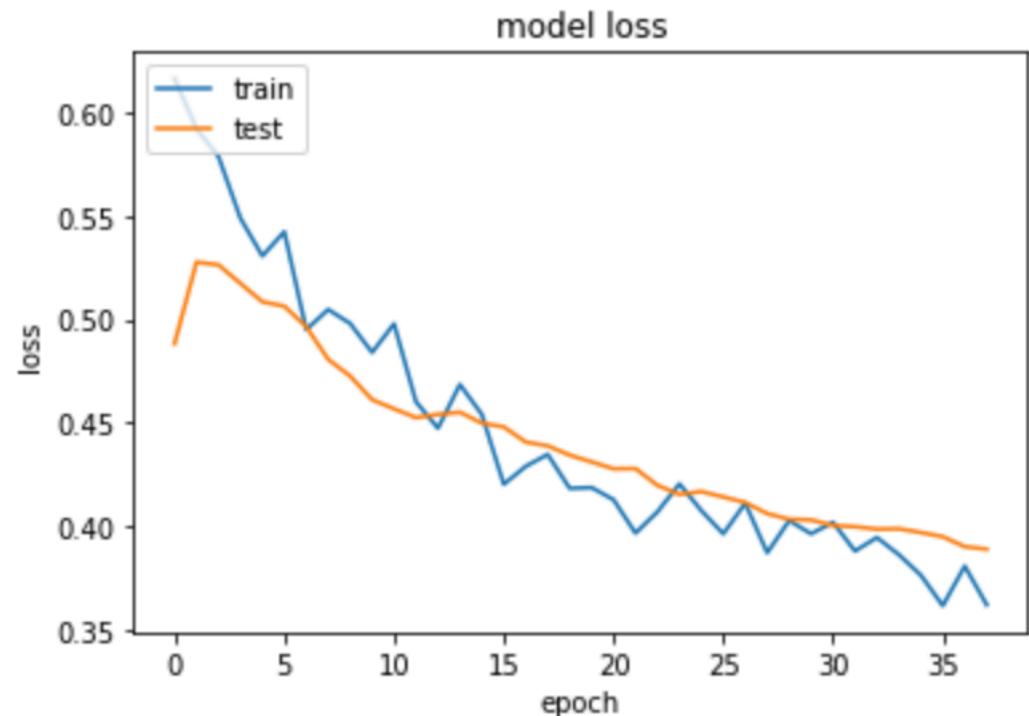
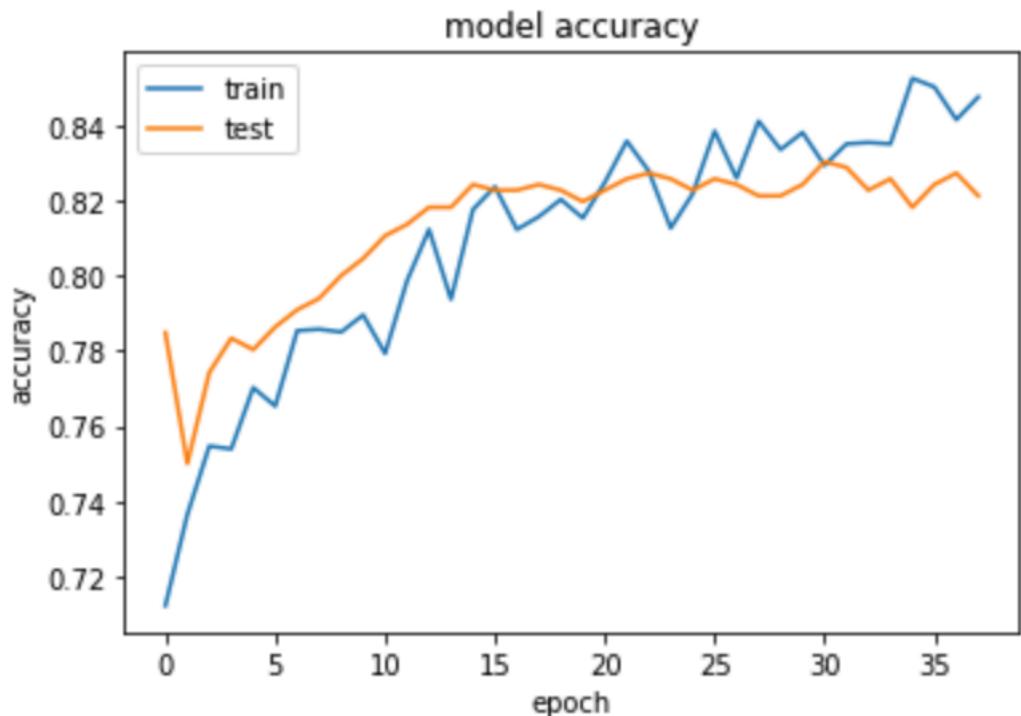
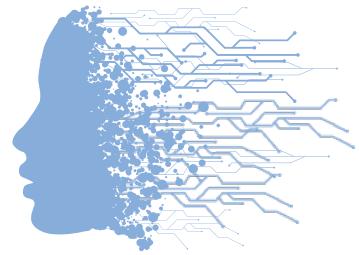


Couches ajoutées	Fonction d'activation	Optimizer après freeze	Optimizer après le defreeze
-Flatten()	—		
-Dense(128)	-Relu		
-Dropout(0.7)	—	RMSprop	
-BatchNormalization()	—		
-Dense(2)	Sigmoid		SGD

	Entrainement			Validation	
	Epochs	Loss	Accuracy	Loss	Accuracy
Apres Freeze	50	0.2570	0.8997	0.3348	0.8424
Fine-tuning	38	0.3364	0.8549	0.3889	0.8212

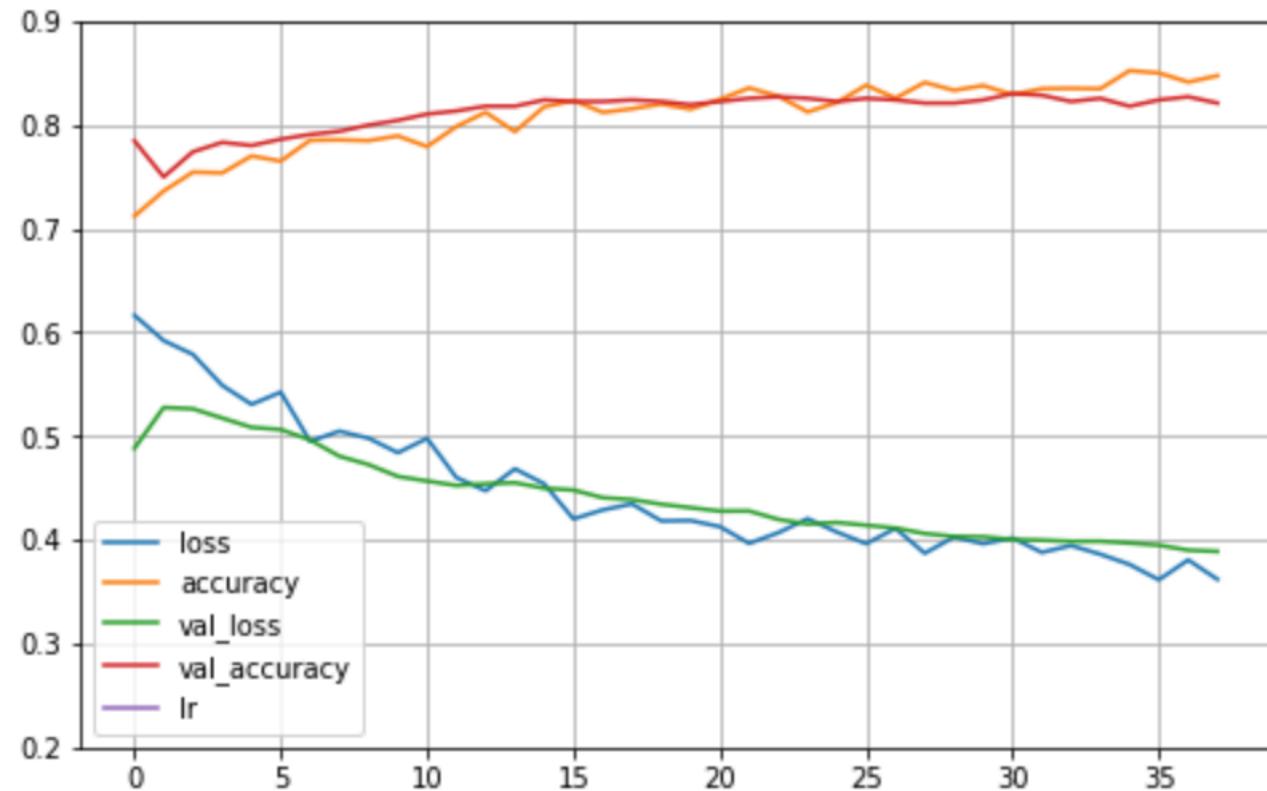


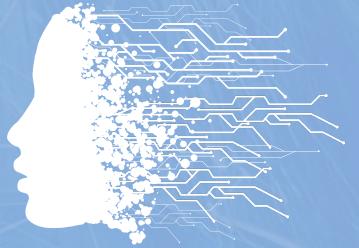
Résultats du InceptionV3





Résultats du InceptionV3





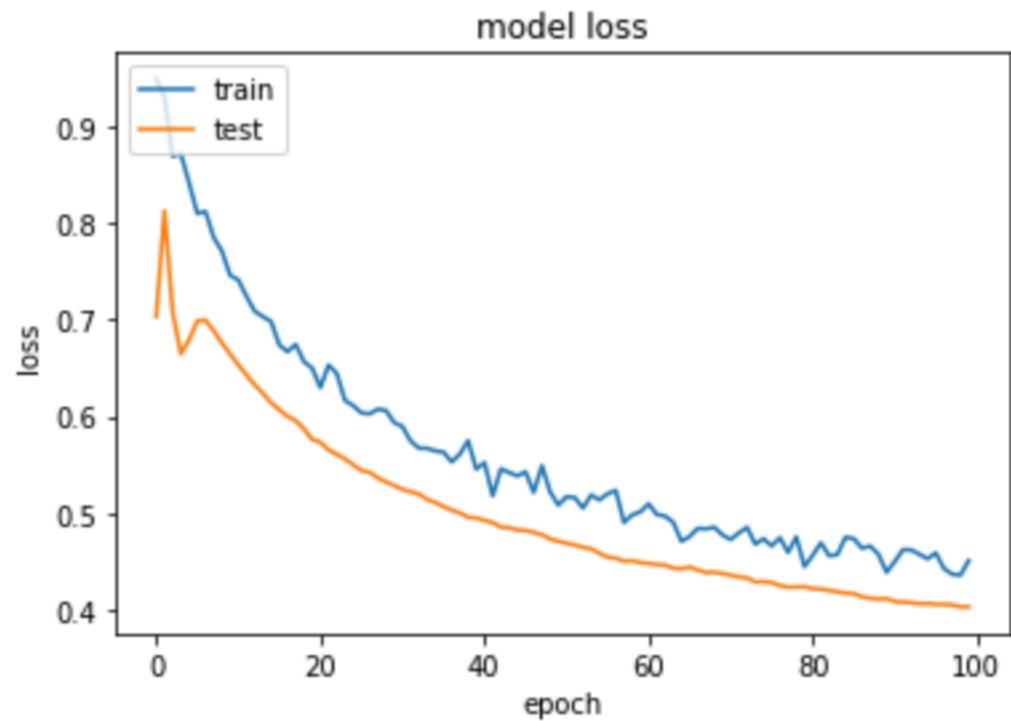
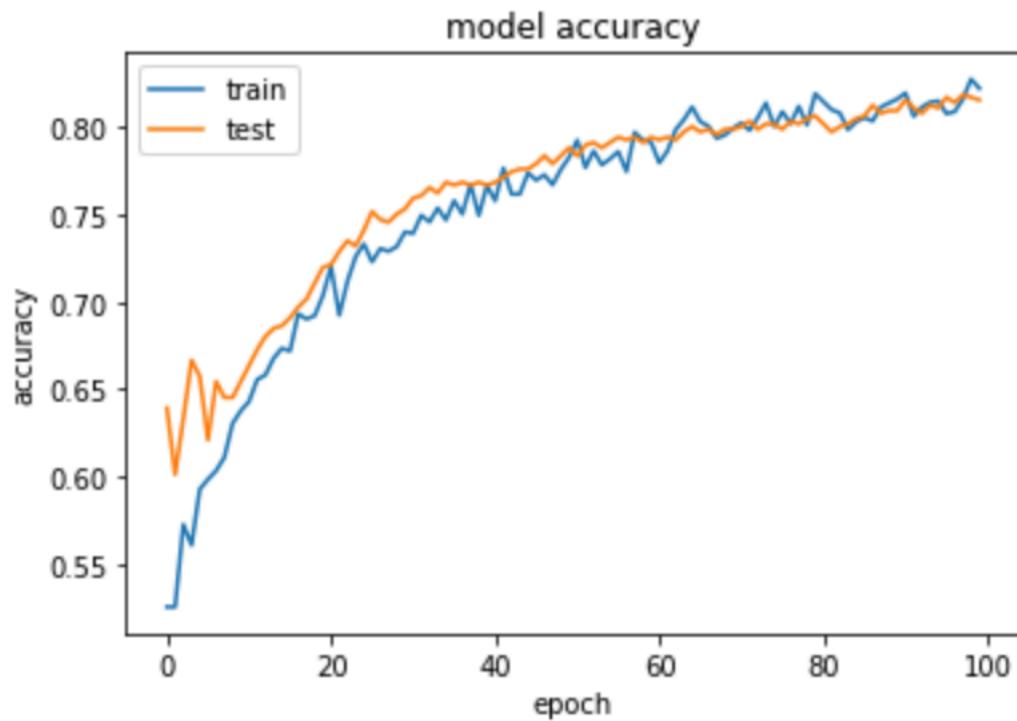
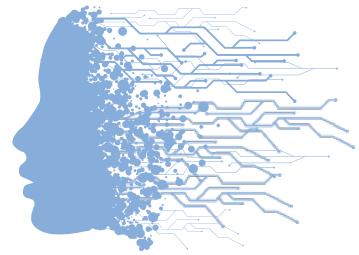
Résultats du EfficientNetB0

Couches ajoutées	Fonction d'activation	Optimizer après freeze	Optimizer après le defreeze
-GlobalAveragePooling2D()	—		
-Dense(128)	-Relu		
-Dropout(0.5)	—		
-BatchNormalization		RMSprop	
-Dense(2)	-Softmax		SGD

	Entrainement			Validation	
	Epochs	Loss	Accuracy	Loss	Accuracy
Apres Freeze	50	0.3469	0.8475	0.3325	0.8545
Fine-tuning	100	0.4462	0.8230	0.4032	0.8152

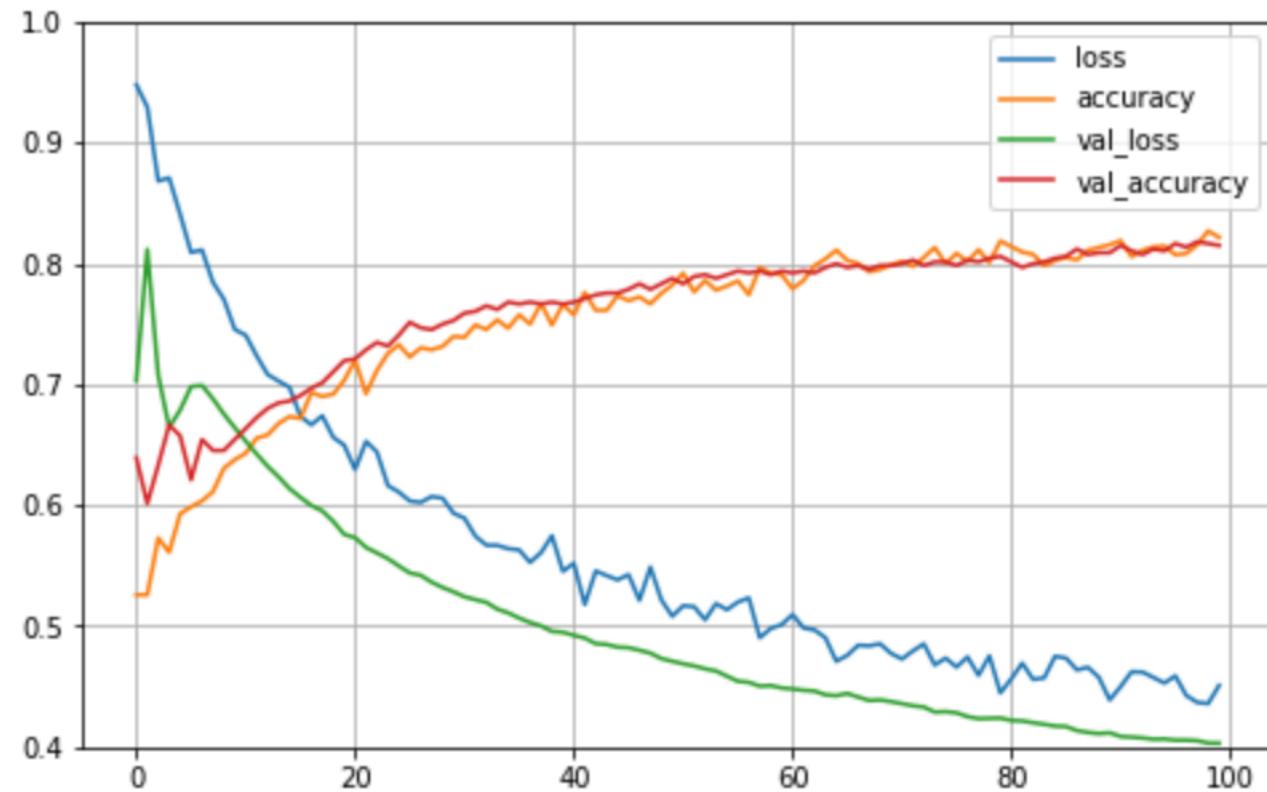


Résultats du EfficientNetB0



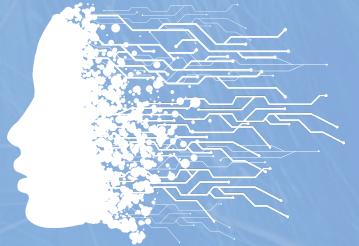


Résultats du EfficientNetB0





Résultats du VGG16

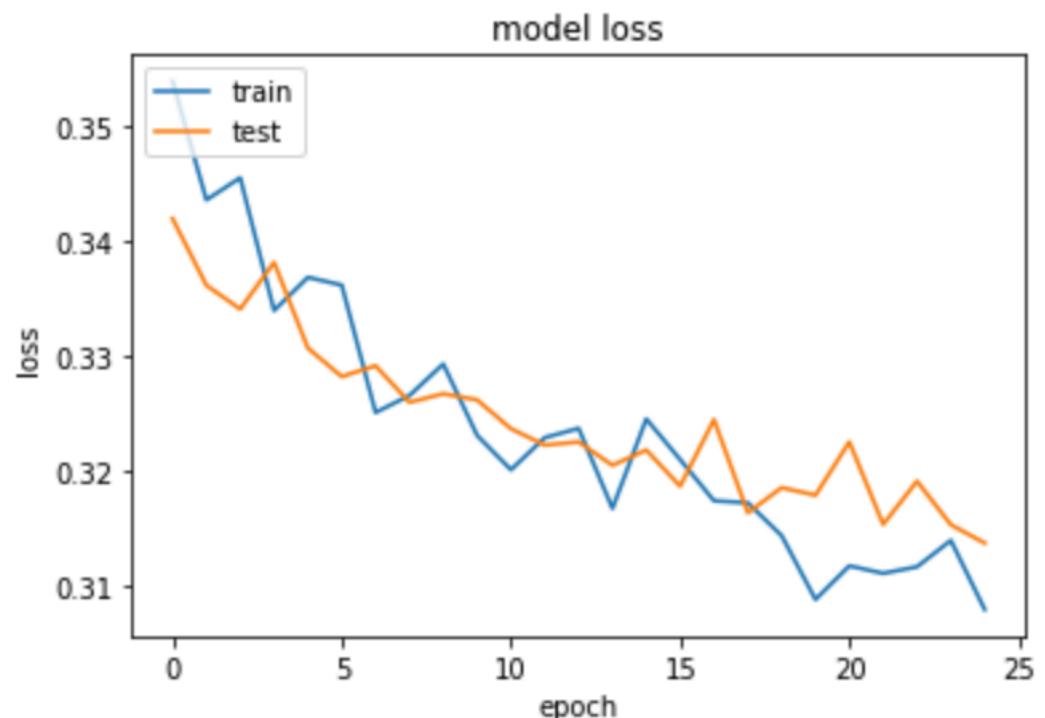
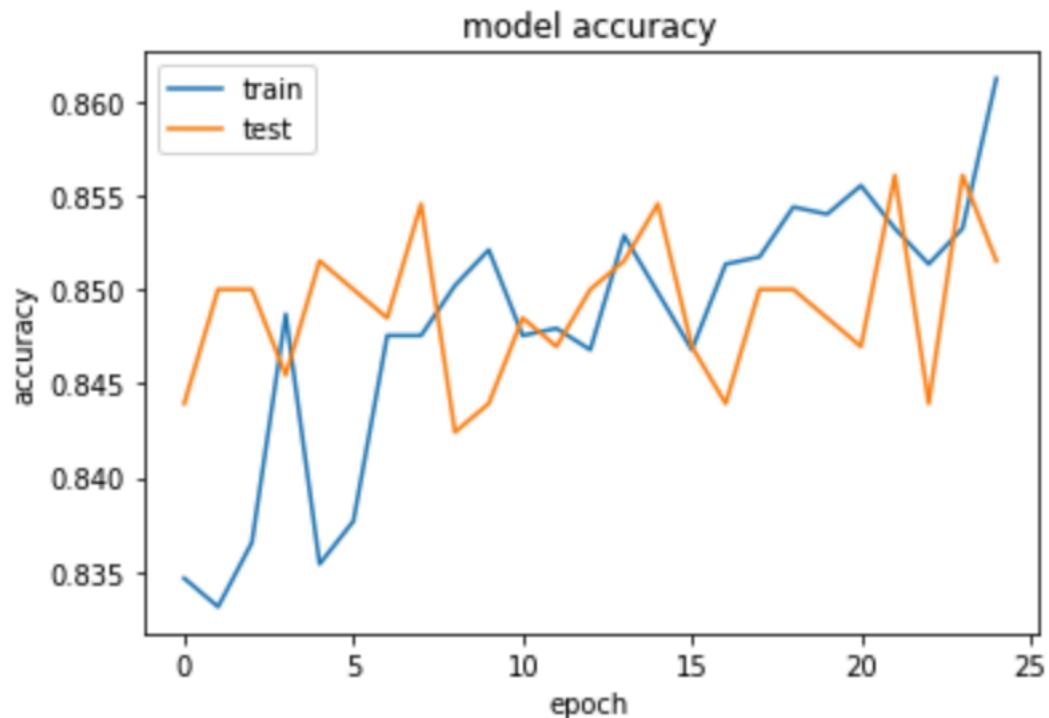
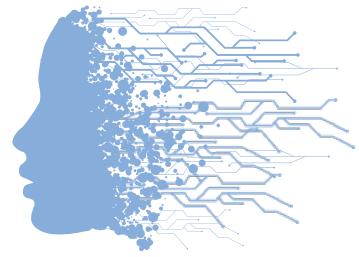


Couches ajoutées	Fonction d'activation	Optimizer après freeze	Optimizer après le defreeze
-GlobalAveragePooling2D()	—		
-Dense(128)	-Relu		
-Dropout(0.4)	—	Adam	
-Dense(2)	Softmax		SGD

	Entrainement			Validation	
	Epochs	Loss	Accuracy	Loss	Accuracy
Apres Freeze	50	0.3433	0.8451	0.3471	0.8485
Fine-tuning	25	0.3078	0.8614	0.3138	0.8515

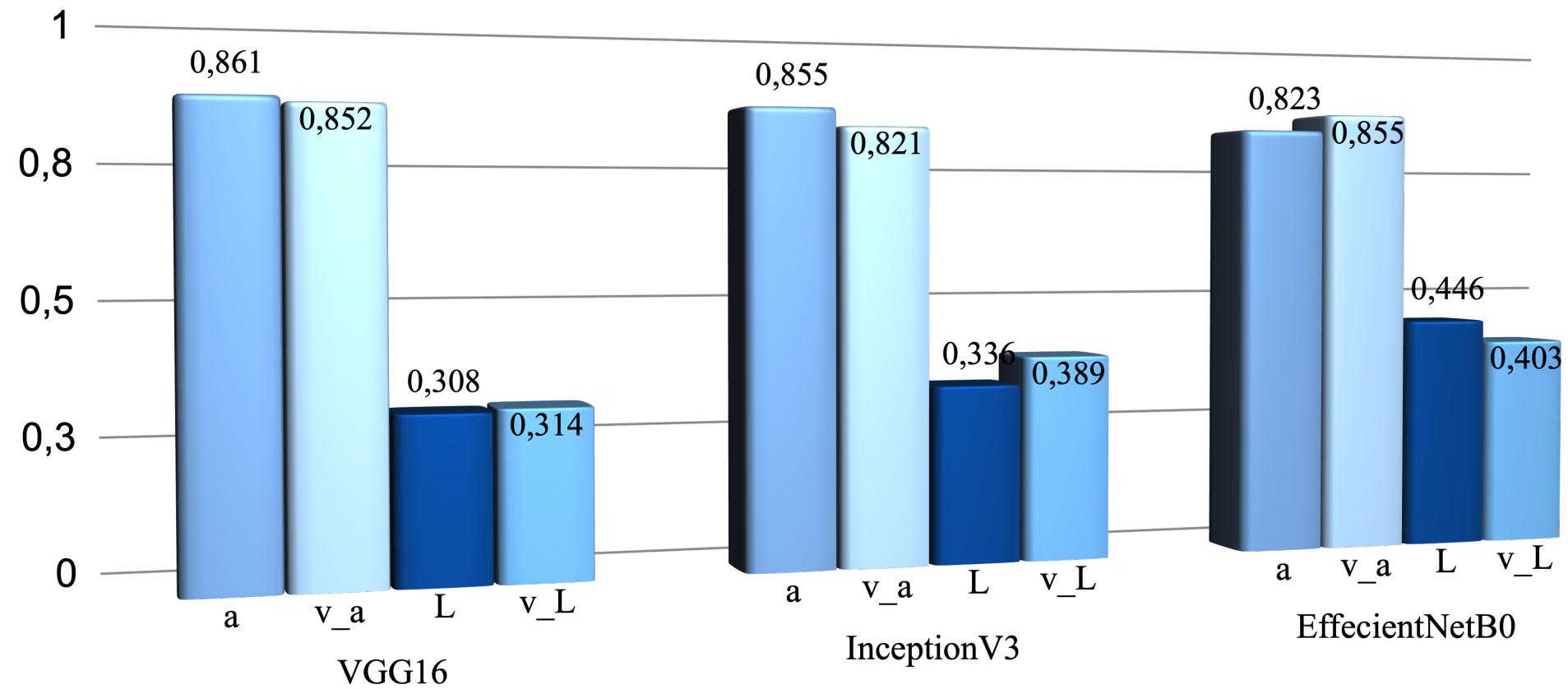
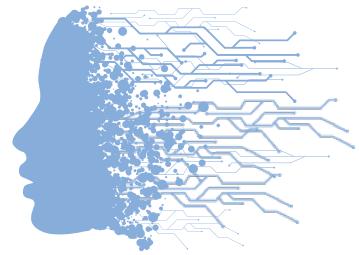


Résultats du VGG16





Comparaison & Conclusion



Merci pour votre attention