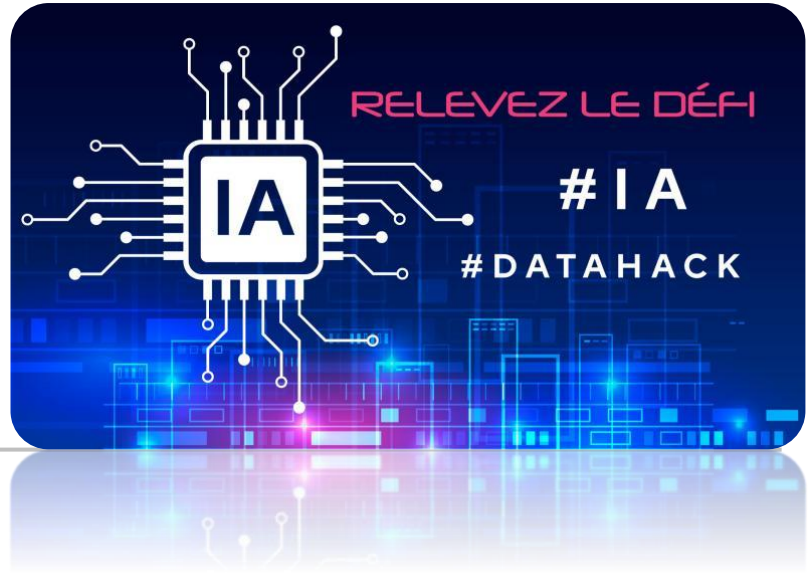
Projet 6milarite

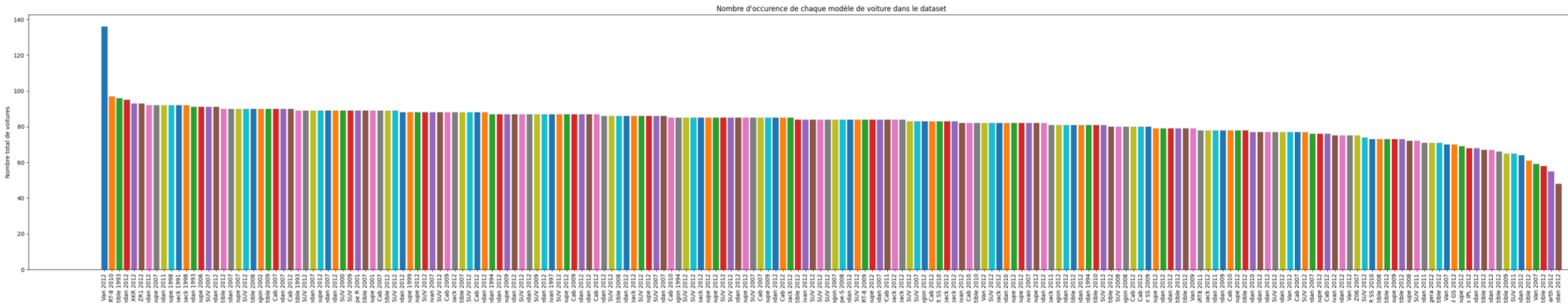


Samy Hadj-said
Virgile Hermant
Angelo Eap
Pierre-Louis Favreau
Gautier Gally

25 avril 2024

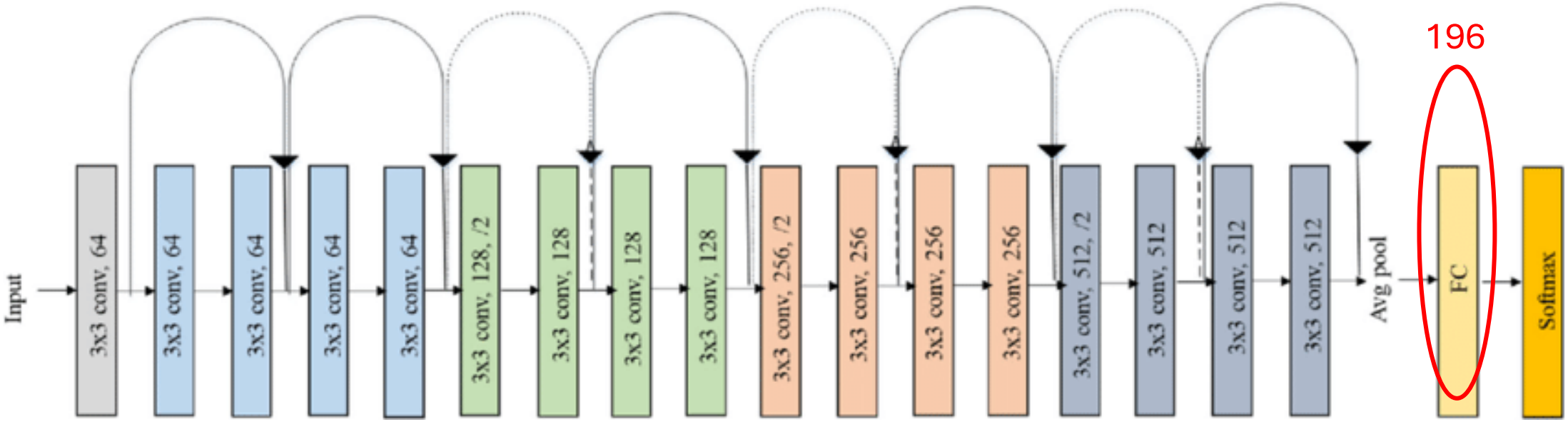
Introduction

Dataset



16k voitures
196 modèles différents

Model: Resnet18



Pré-traitement

HorizontalFlip

Original

Horizontal flip

AdjustSharpness

0

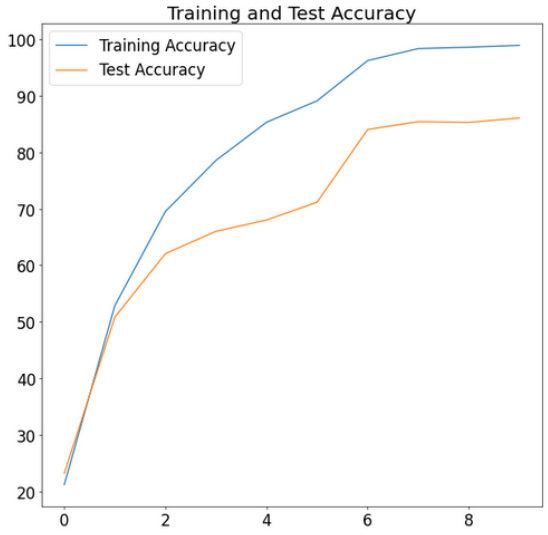
1

10

20

AdjustSharpness

Without



RandomAdjustSharpness(2)

RandomAdjustSharpness(10)

RandomAdjustSharpness(20)

GaussianBlur

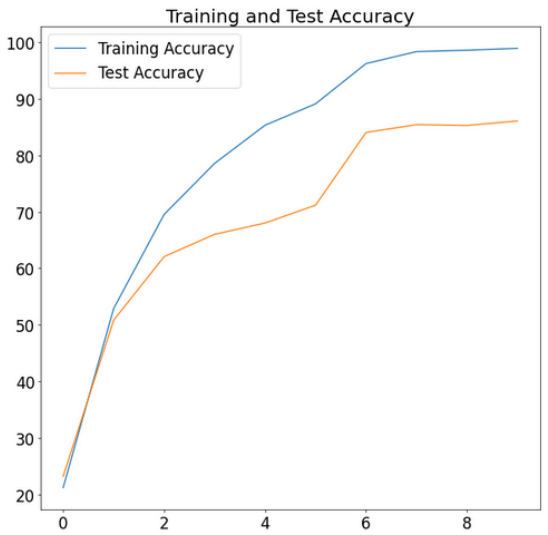
kernel_size = (9,9)

σ(0.3) σ(2)

σ(5) σ(8)

GaussianBlur

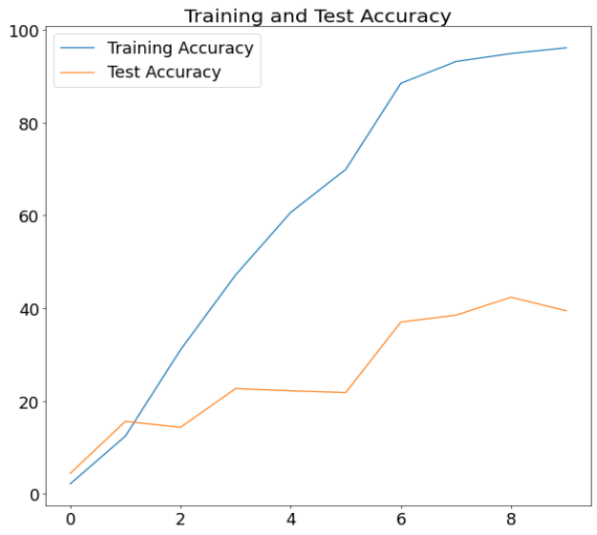
Without



GaussianBlur(0.3,0.3)

GaussianBlur(2,2)

GaussianBlur(8,8)



ElasticTransformation

α =10 σ = 2

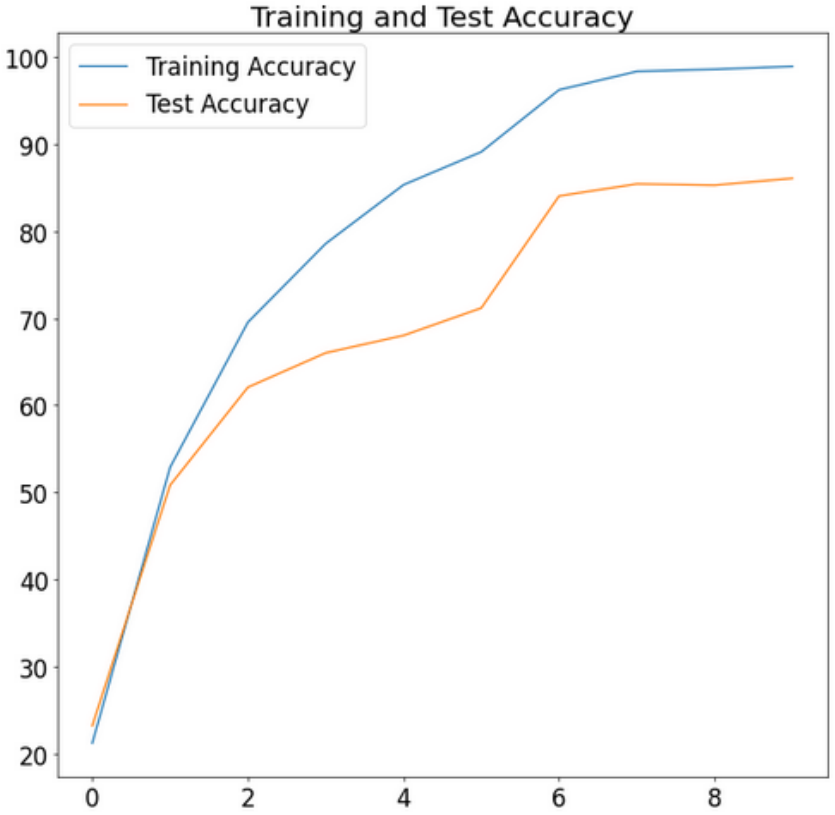
α =100 σ = 2

α =10 σ = 10

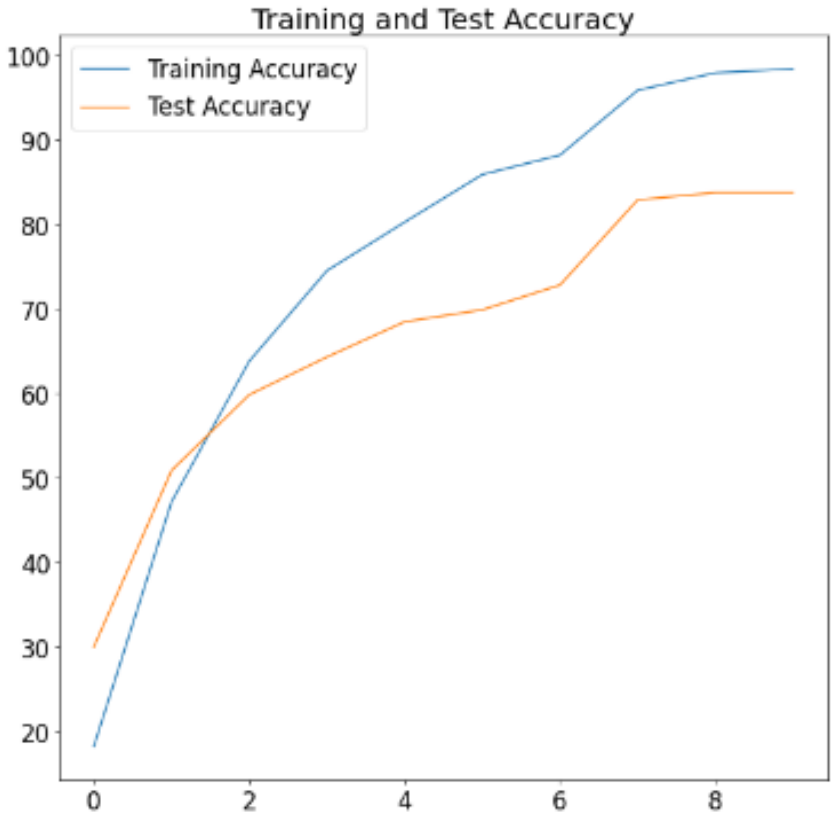
α =50 σ = 5

ElasticTransformation

Without



ElasticTransform(50, 5)



ColorJitter

brightness=0.2, contrast=0.2, saturation=0.2, hue=0.1

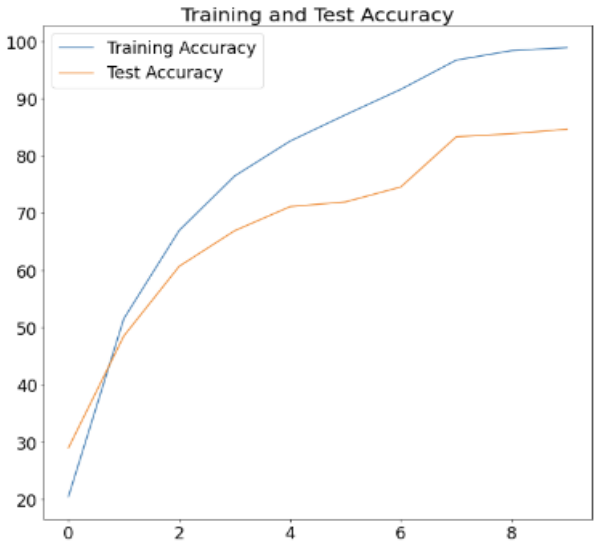
brightness=0.2, contrast=0.7, saturation=0.4, hue=0.2

brightness=0.6, contrast=0.6, saturation=0.6, hue=0.3

brightness=0.8, contrast=0.8, saturation=0.8, hue=0.4

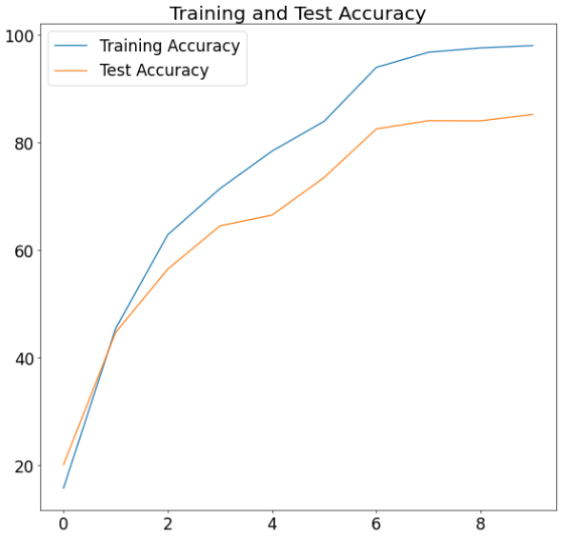
ColorJitter

ColorJitter(0.2, 0.2, 0.2, 0.2)

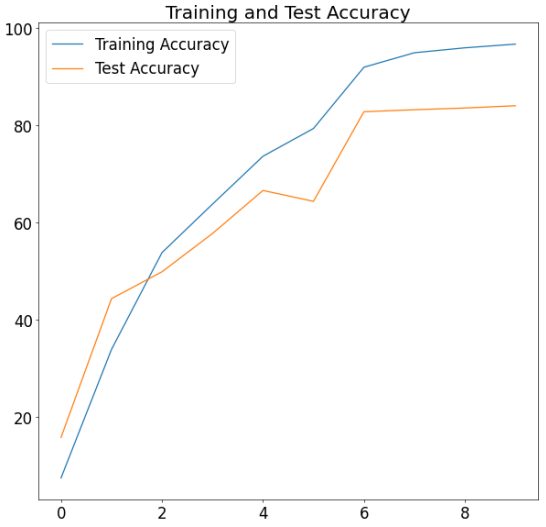


ColorJitter(0.4, 0.7, 0.4, 0.2)

ColorJitter(0.6, 0.6, 0.6, 0.3)



ColorJitter(0.8, 0.8, 0.8, 0.4)



Hyperparamètres et entraînement

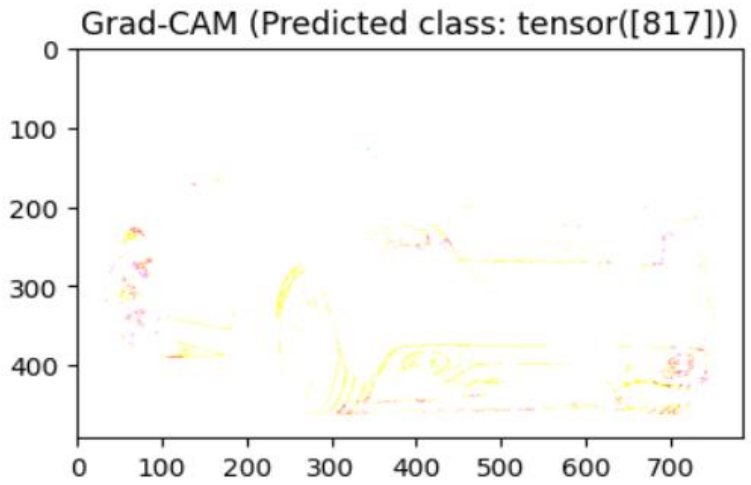
Batch_size 32 →16 = gain de temps

num_worker 2 → 4 = gain de temps

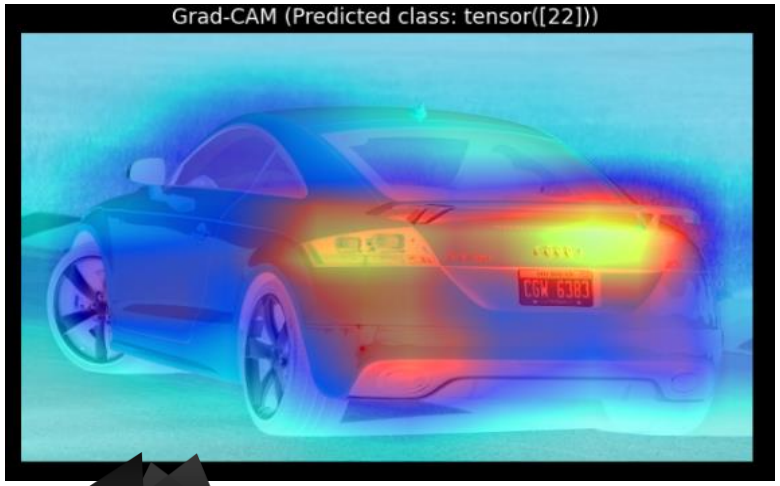
Epochs 10 → 15 = meilleures performances

Grad-CAM et analyse des résultats

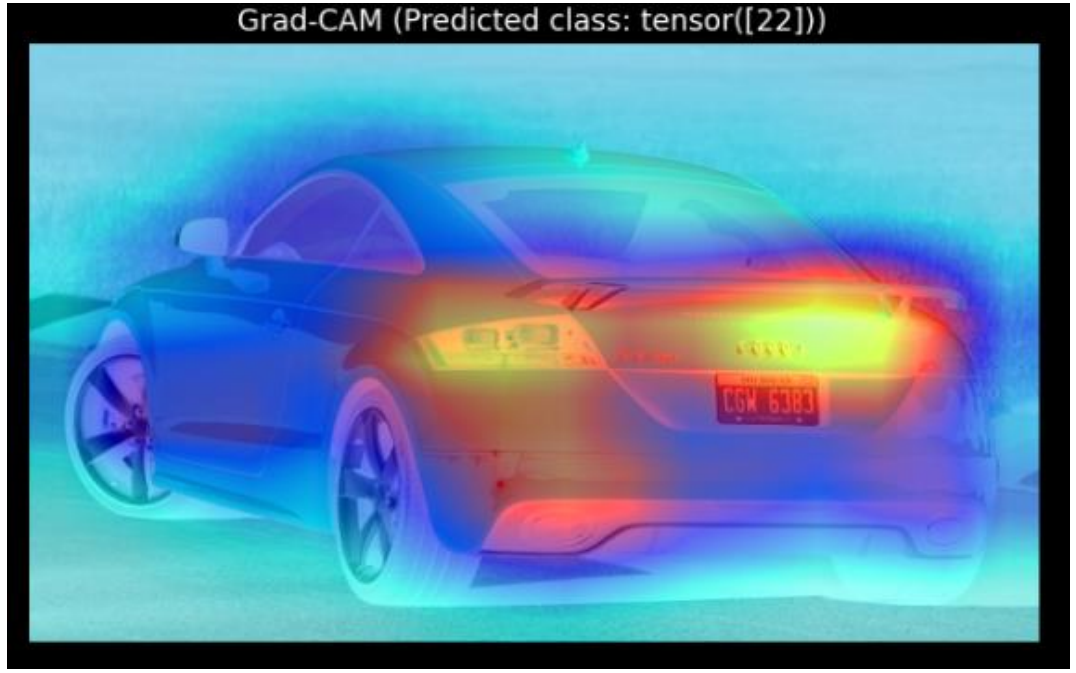
Original Image



Grad-CAM (Predicted class: tensor([22]))



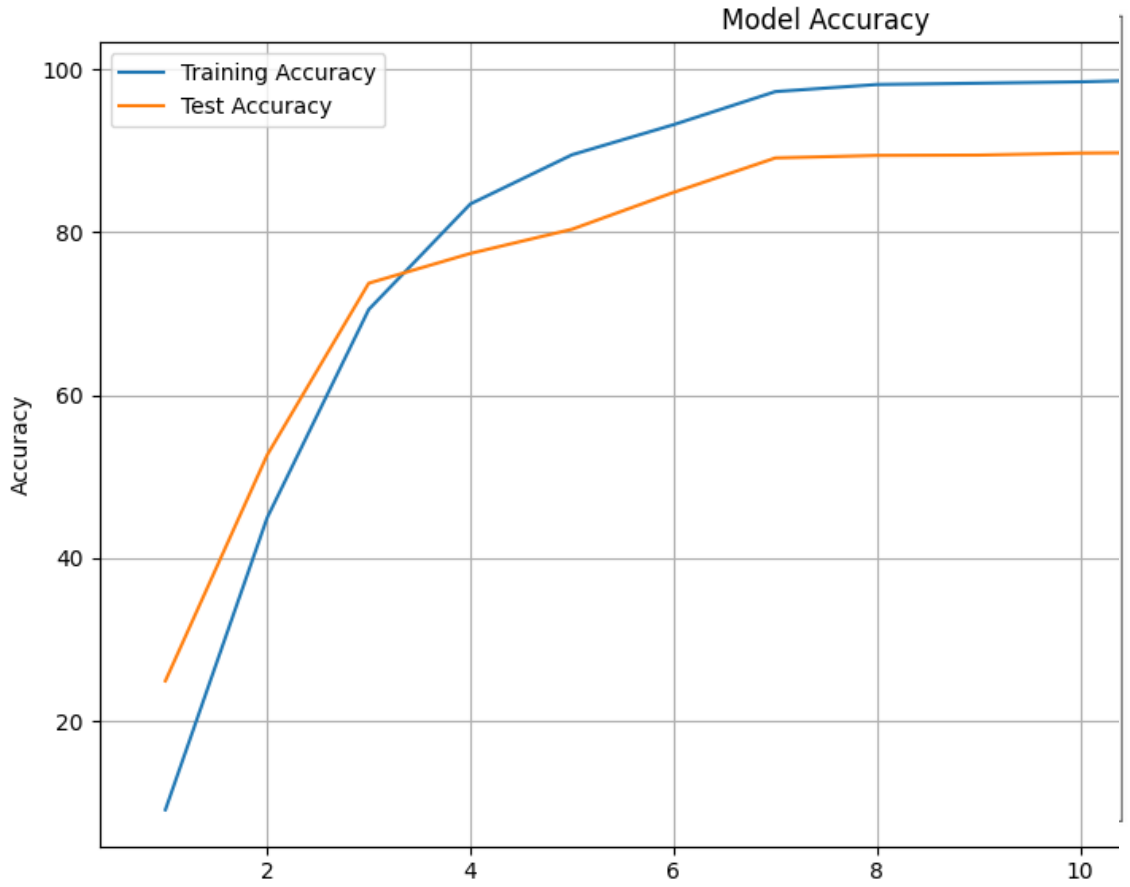
Influence de la répartition des train/test datasets



50% train
50% test

70% train
30% test

Analyse des résultats



	precision	recall	f1-score	support
AM General Hummer SUV 2000	0.75	0.94	0.83	16
Acura RL Sedan 2012	0.80	0.73	0.76	11
Acura TL Sedan 2012	0.81	1.00	0.89	17
Acura TL Type-S 2008	0.81	0.87	0.84	15
Acura TSX Sedan 2012	0.96	0.76	0.85	29
Acura Integra Type R 2001	0.87	0.91	0.89	22
Acura ZDX Hatchback 2012	0.93	0.93	0.93	14
Aston Martin V8 Vantage Convertible 2012	0.67	0.67	0.67	18
Aston Martin V8 Vantage Coupe 2012	0.70	0.93	0.80	15
Aston Martin Virage Convertible 2012	0.60	0.69	0.64	13
Aston Martin Virage Coupe 2012	0.92	0.69	0.79	16
Audi RS 4 Convertible 2008	0.79	0.79	0.79	19

Accuracy: **86%**
Loss: **0.03**

Matrice de confusion

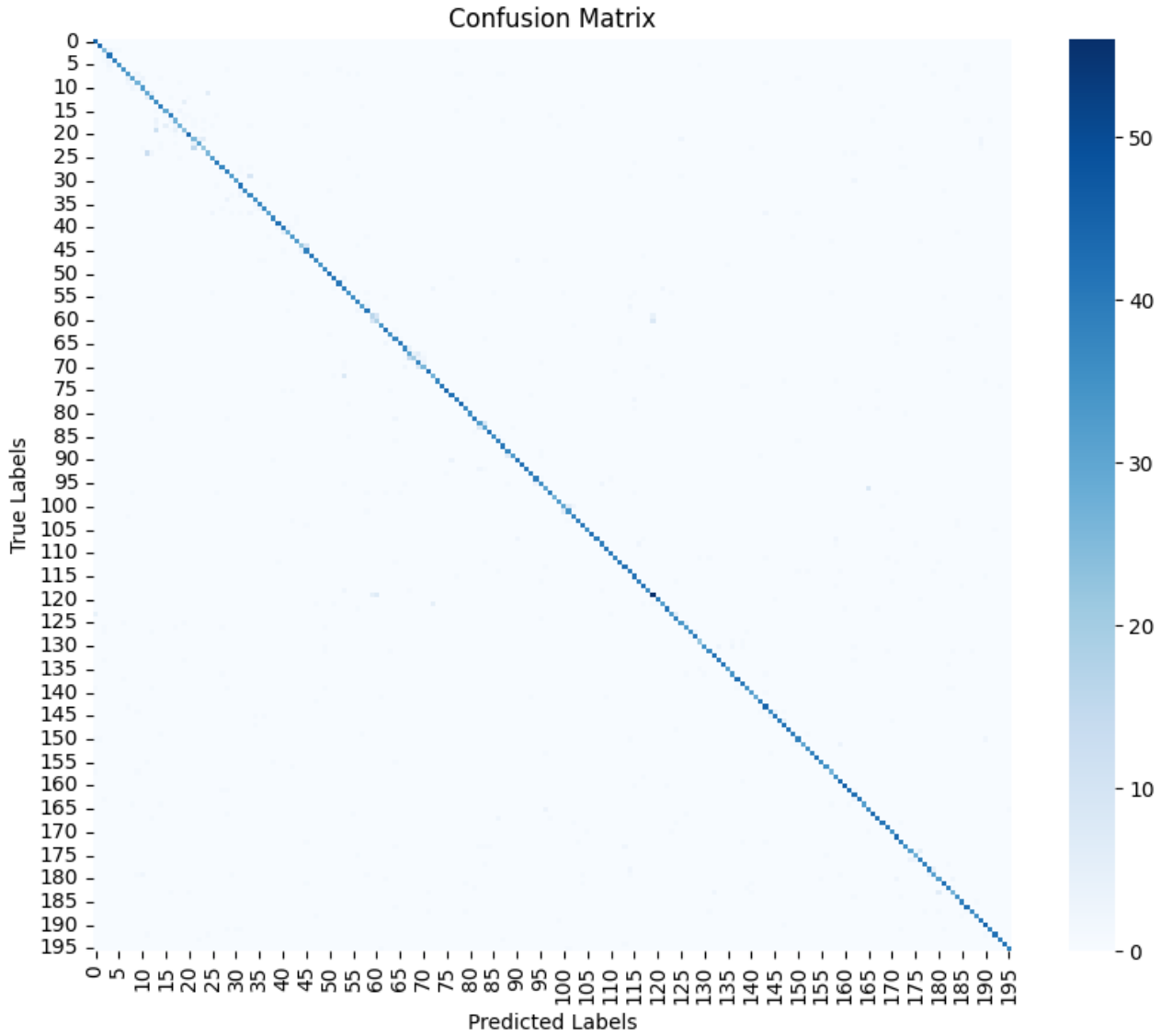


Image avec fausse prediction

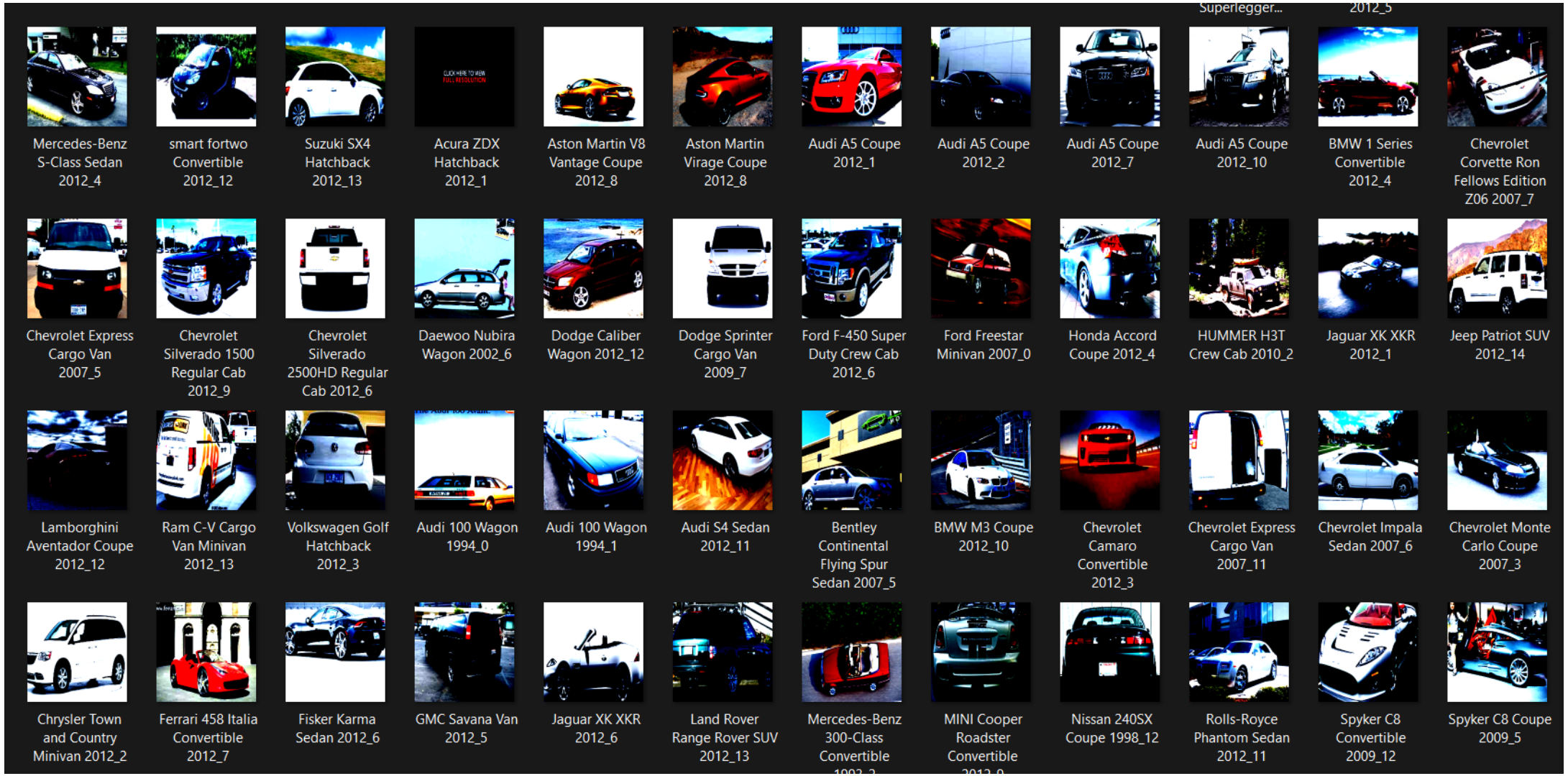


Image avec fausse prediction

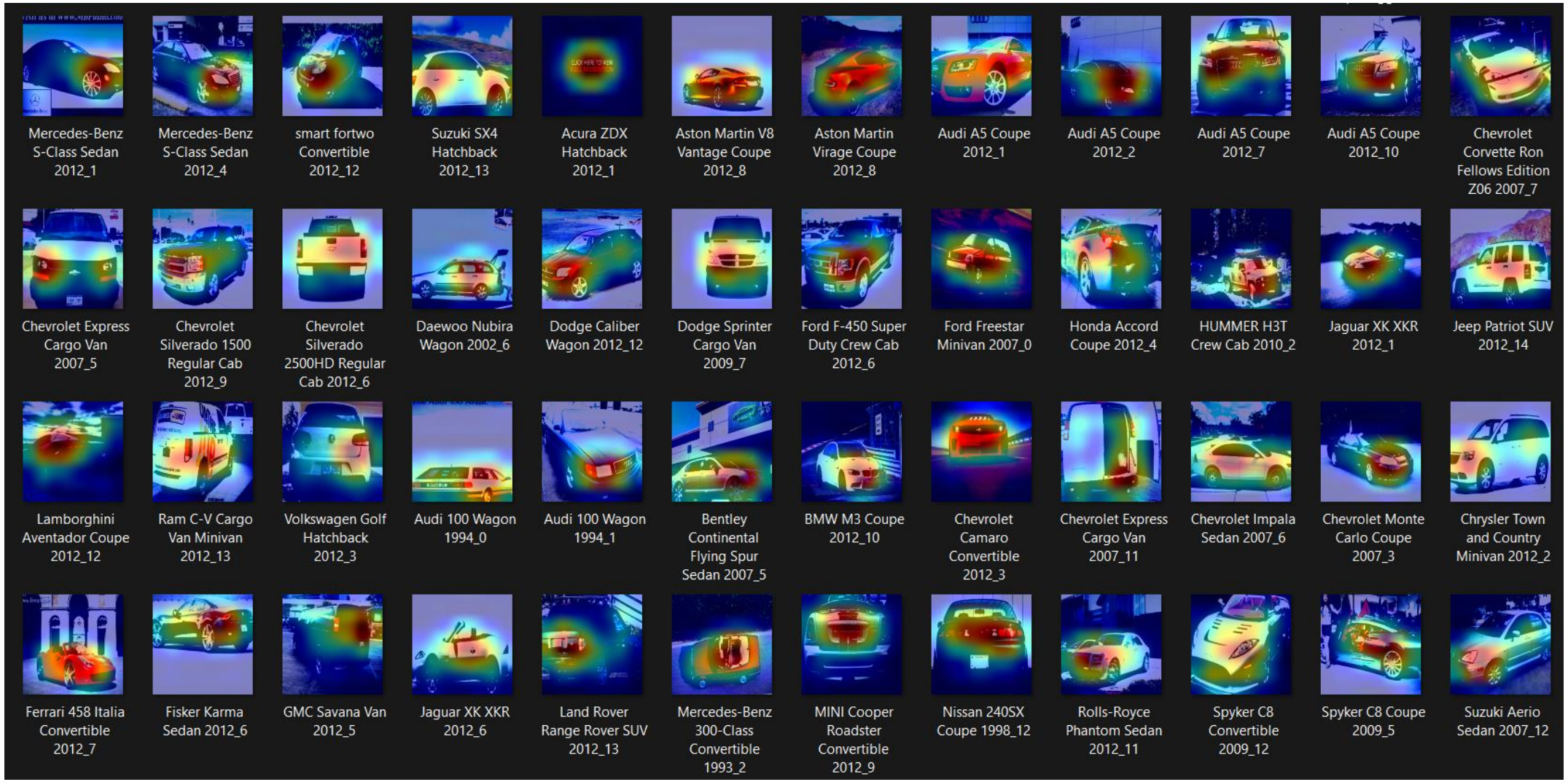


Image avec fausse prediction

Bentley Continental GT Coupe 2012

['Volkswagen Beetle Hatchback 2012'] confidence: 5.346620559692383

Volkswagen Beetle Hatchback 2012

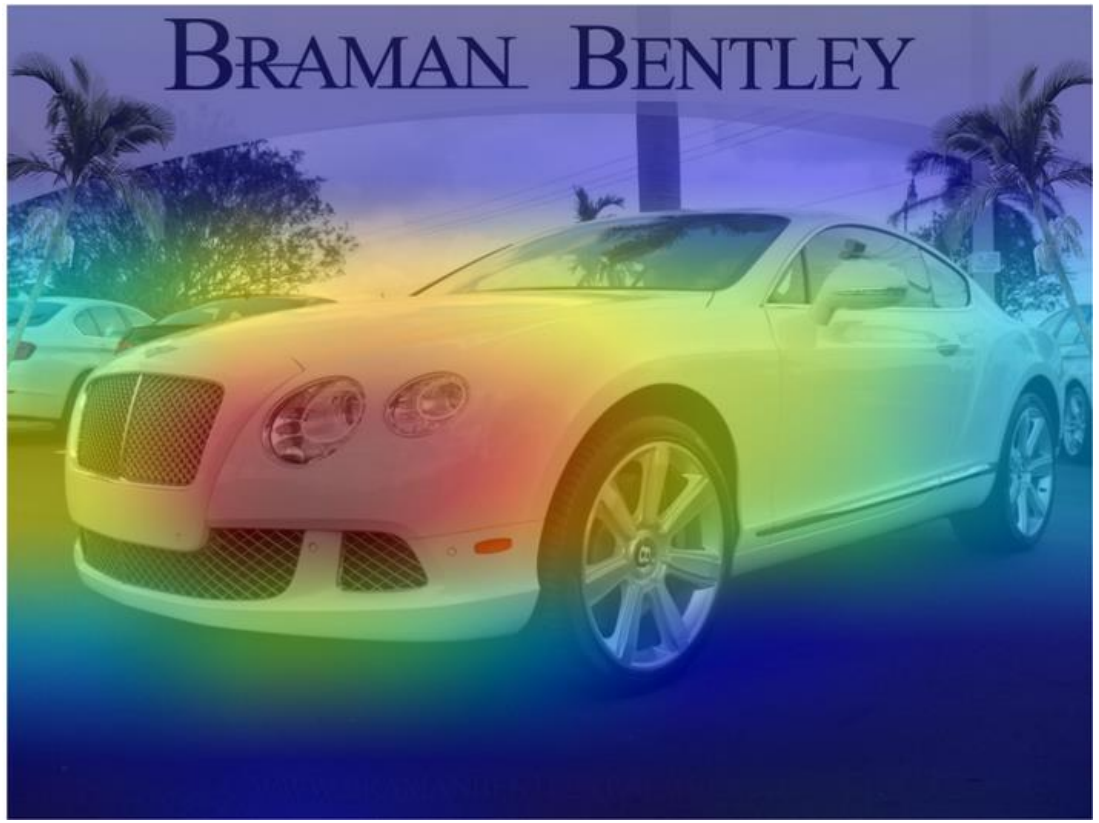







Image avec fausse prediction

Bentley Continental GT Coupe 2012



Volkswagen Beetle Hatchback 2012

Difficultés recontrées

- Stabilité des plateformes insuffisantes pour nos entrainements
- Obtention de meilleurs résultats sur un pré-traitement incohérent d'images (resize)
- Manque de temps pour l'implementation de futures améliorations

Conclusion

Conclusion

Augmentation du dataset

~80 -> 200 images par modèle
16k -> 40k total

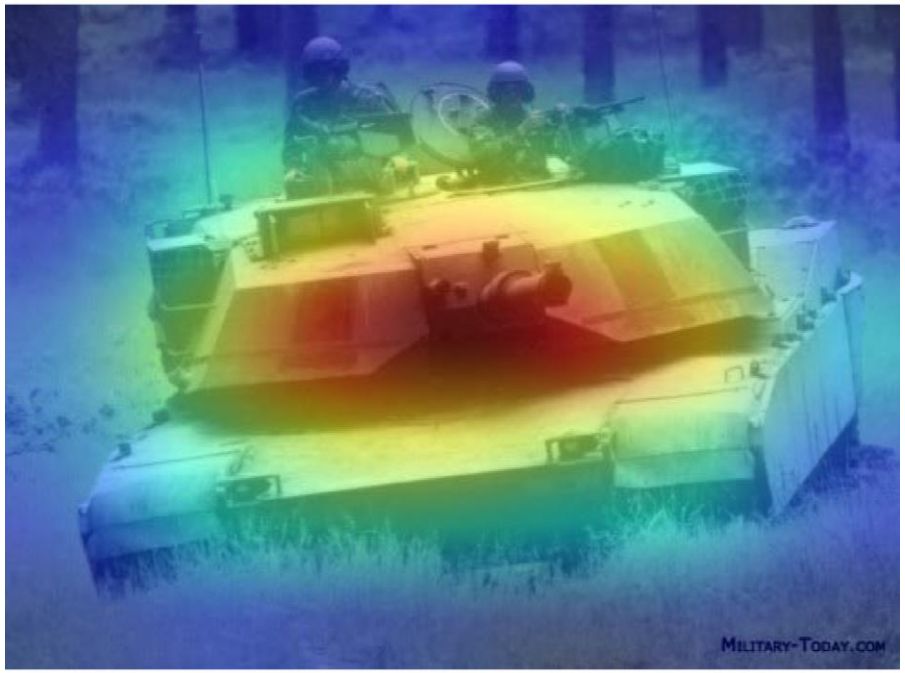
GradCAM

Flouter les zones des prédictions défectueuses

Interprétation des performances

- Recall
- F1 score

Ouverture



Questions