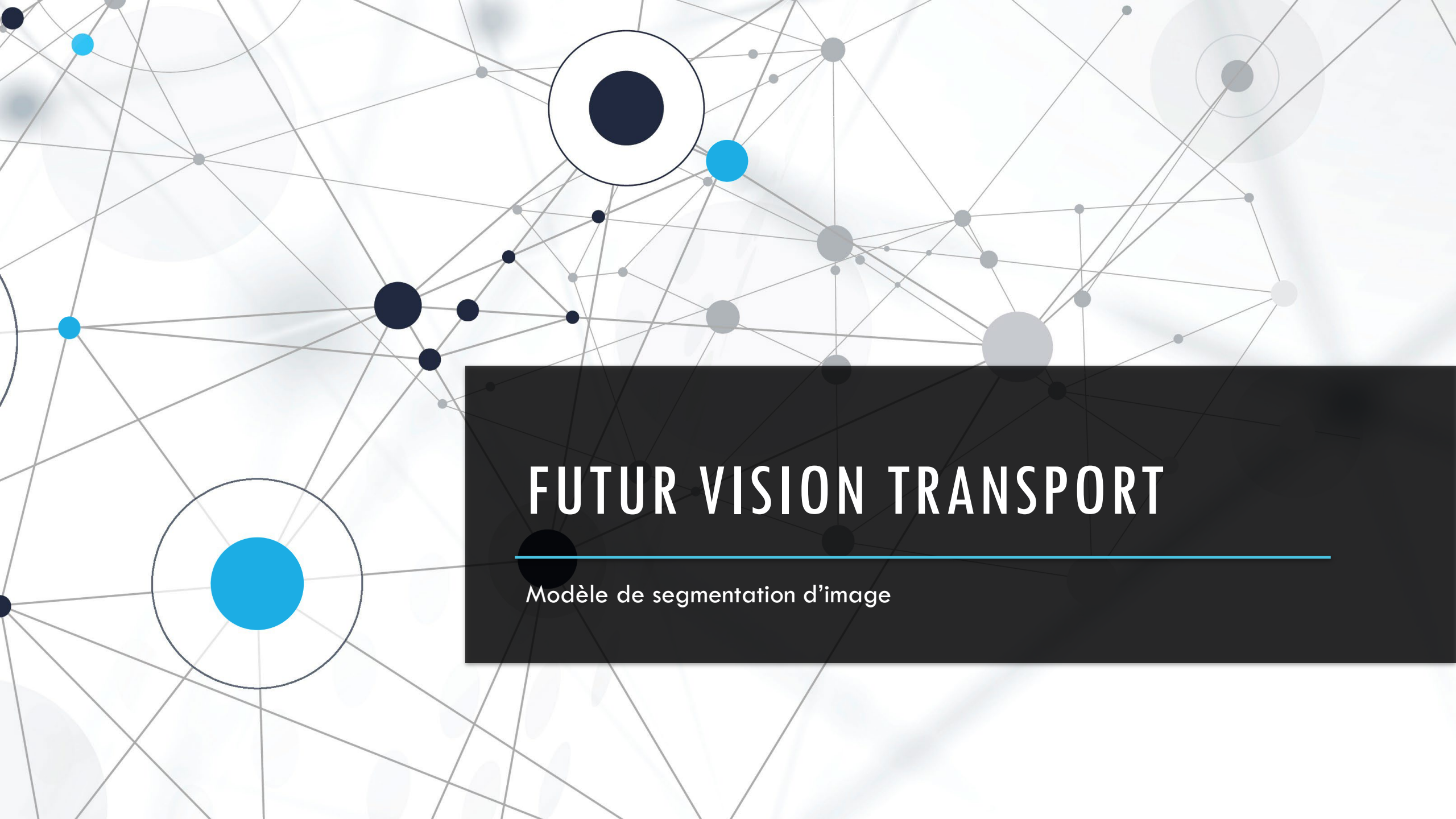


FUTUR VISION TRANSPORT

Modèle de segmentation d'image

Acquisition des images en temps réel

Traitement des images

Segmentation des images

Système de décision

Segmentation des images

Plan

1. Analyse exploratoire
2. Modèle
3. API
4. Conclusion
5. Axe d'amélioration

Analyse exploratoire

Analyse exploratoire

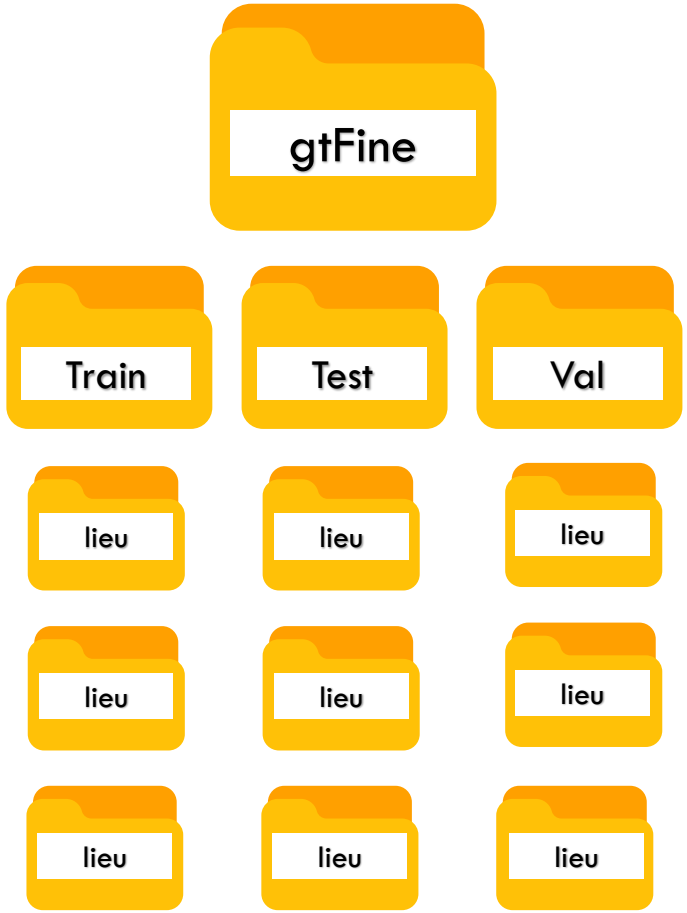
Organisation du jeu de données

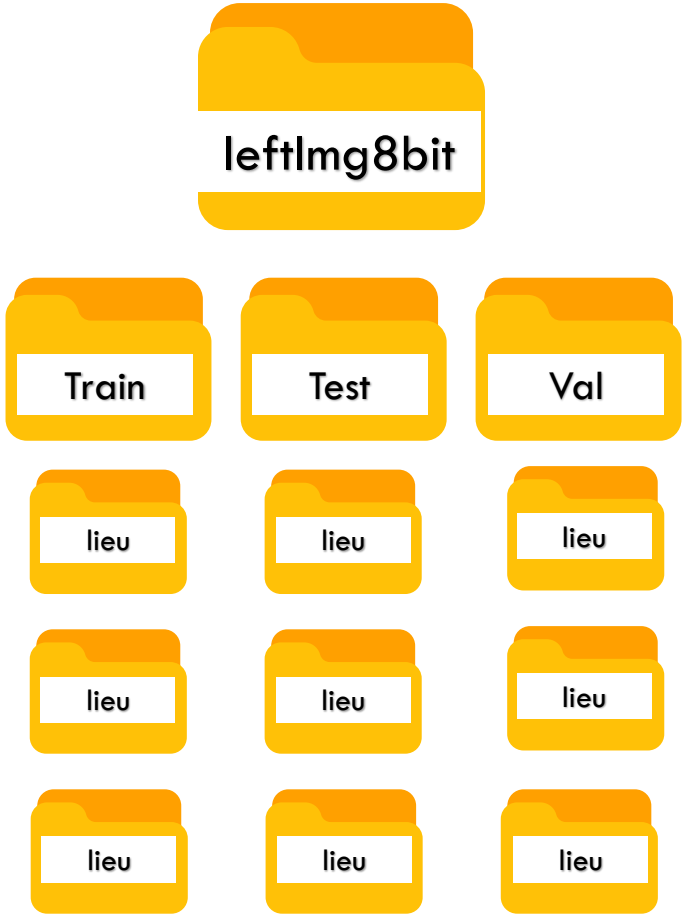
Analyse exploratoire

Organisation du jeu de données

Analyse exploratoire

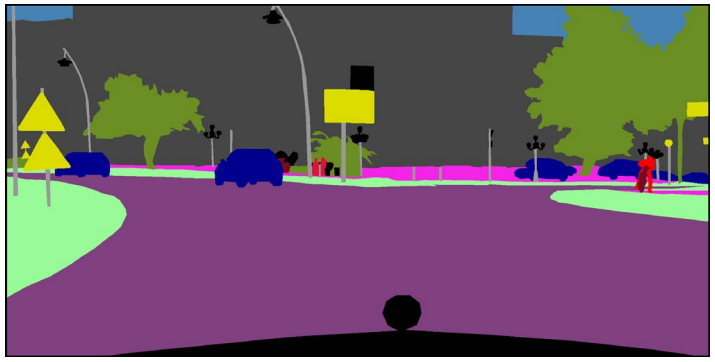
Organisation du jeu de données





Analyse exploratoire

Organisation du jeu de données



gtFine_color

gtFine_instanceIds

gtFine_labelIds

Analyse exploratoire

Organisation du jeu de données

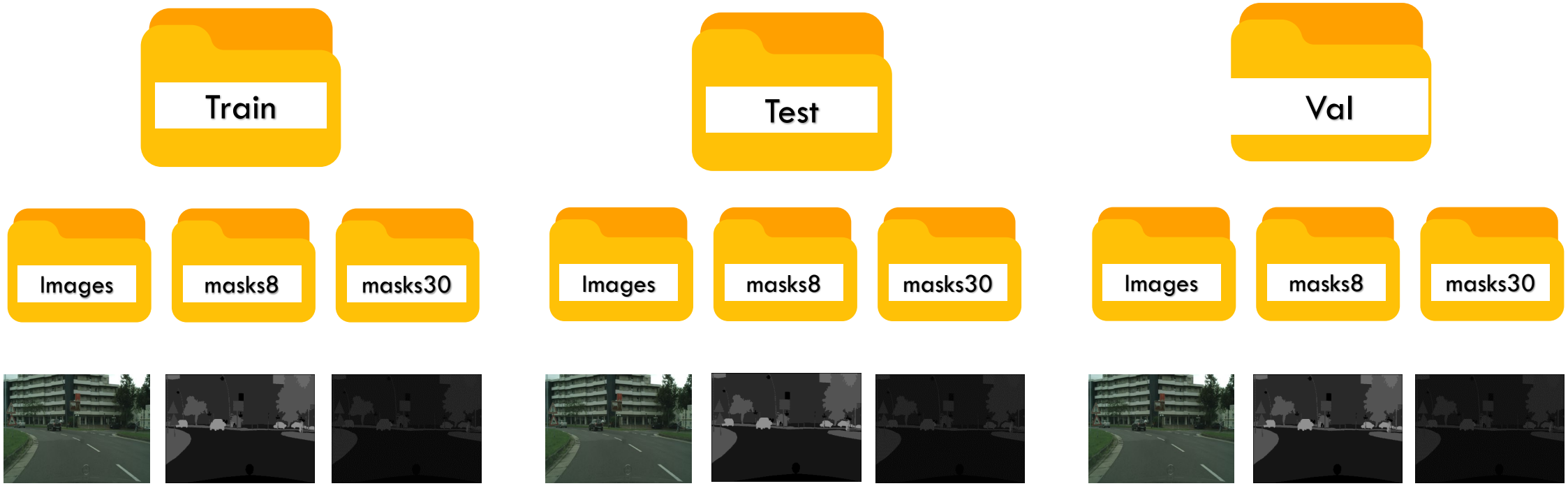
gtFine_labelIds

Analyse exploratoire

Organisation du jeu de données

Analyse exploratoire

Organisation du jeu de données



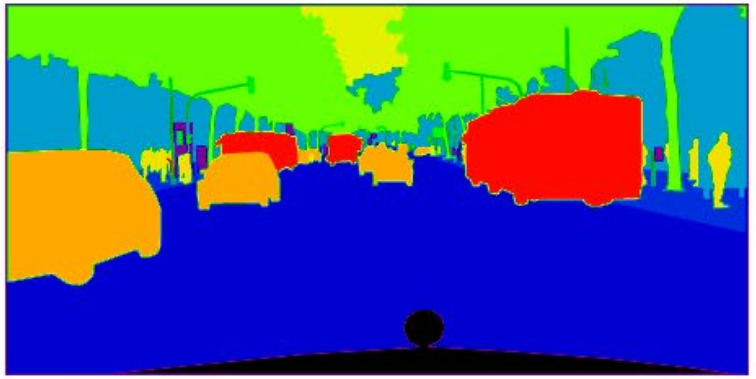
Analyse exploratoire

Organisation du jeu de données

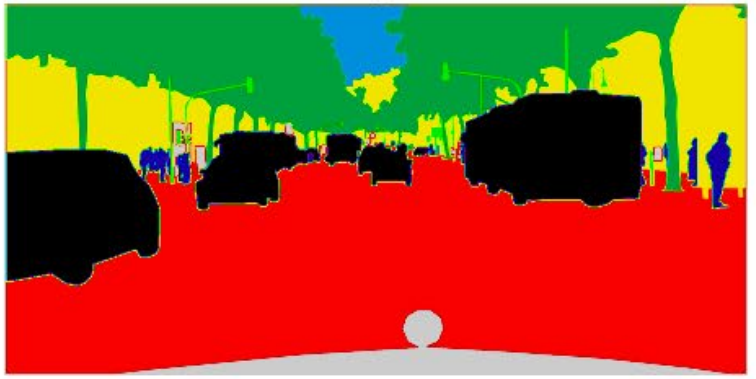
Group	Classes
flat	road · sidewalk · parking+ · rail track+
human	person* · rider*
sky	sky
void	ground+ · dynamic+ · static+

Original

30 catégories

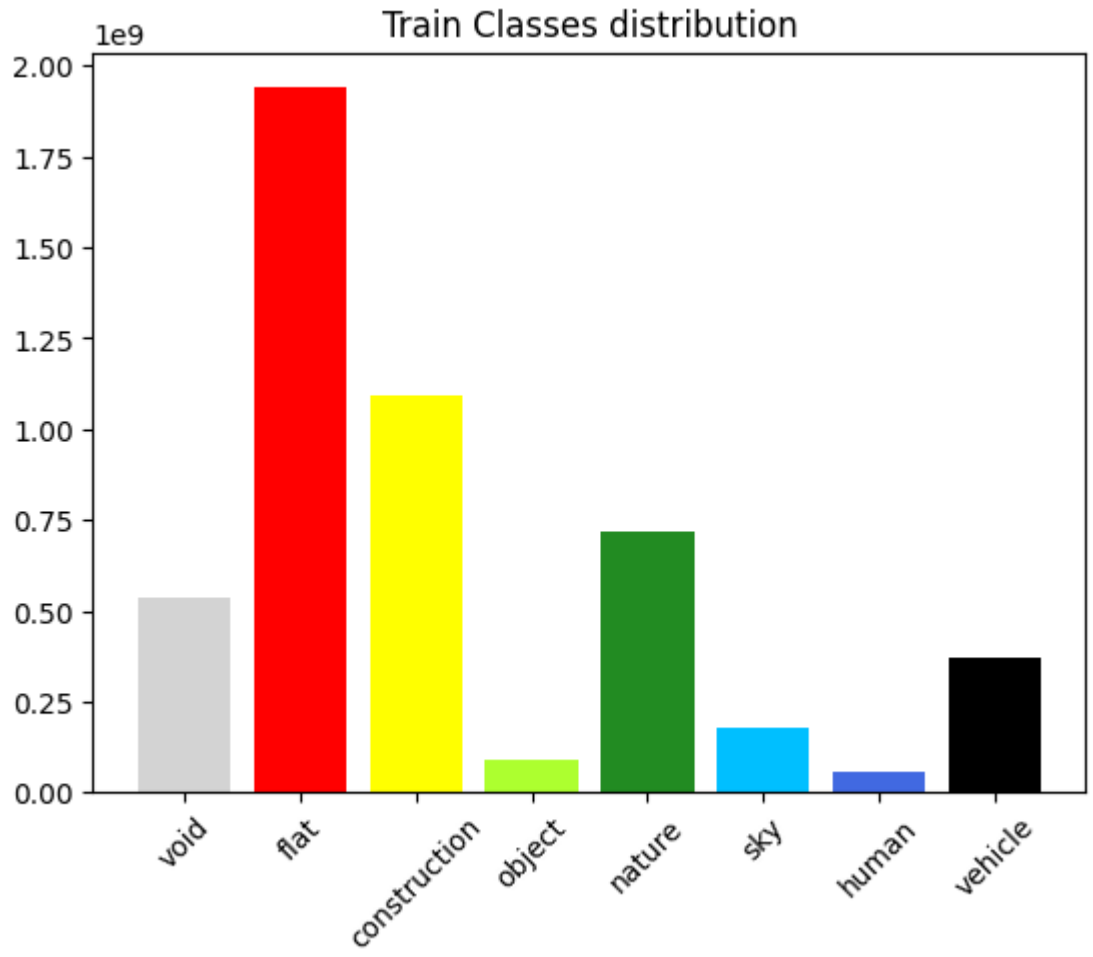


8 catégories



Analyse exploratoire

Visualisation

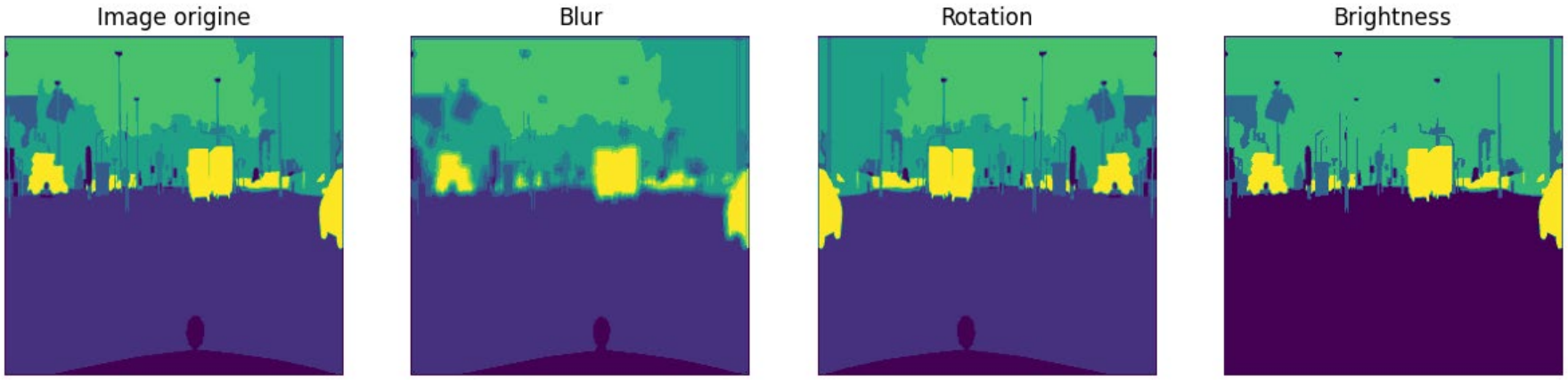


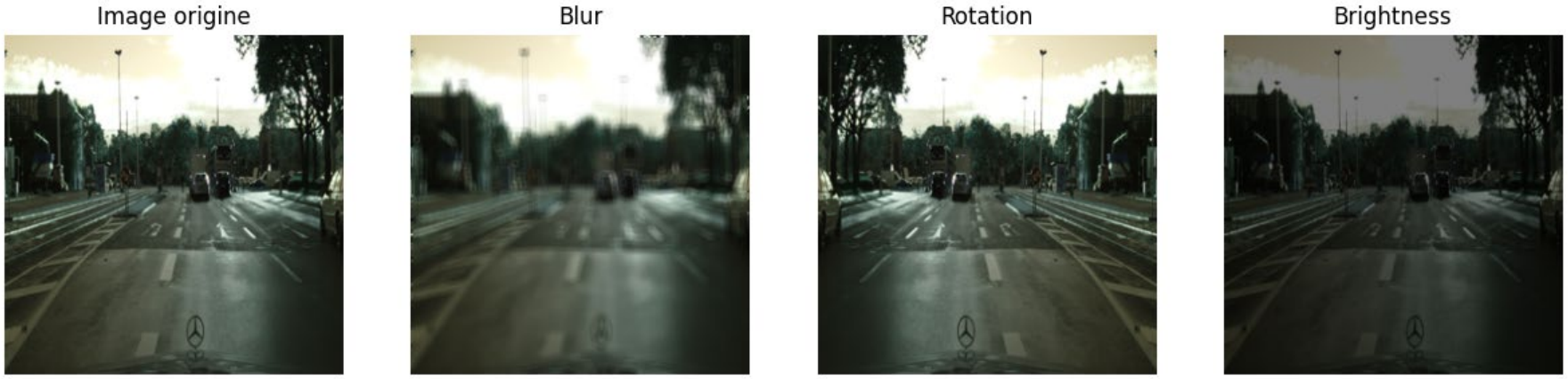
Analyse exploratoire

Redimensionnement

Analyse exploratoire

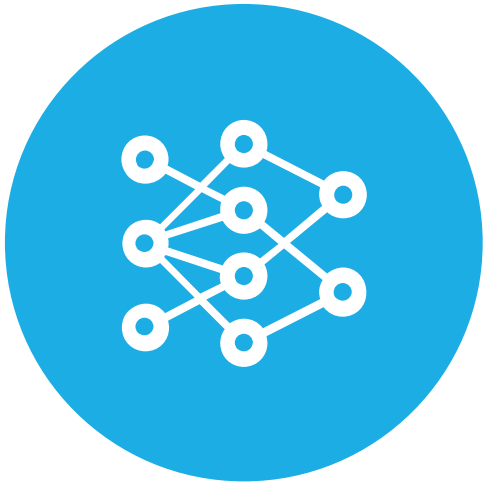
Data augmentation





Modèle

Étapes



FCN et Unet

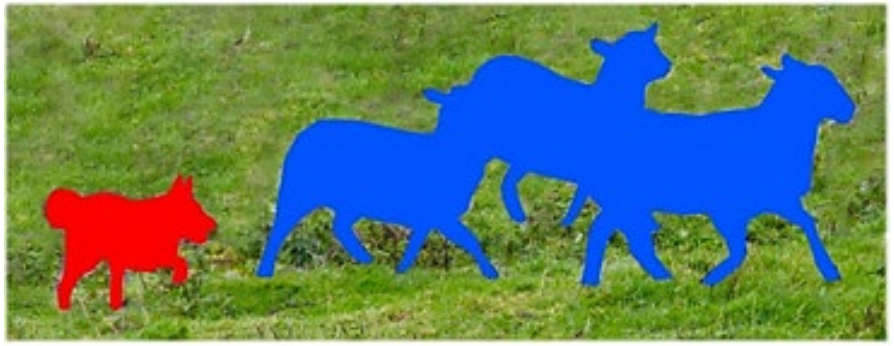
Data generator

Comparatif

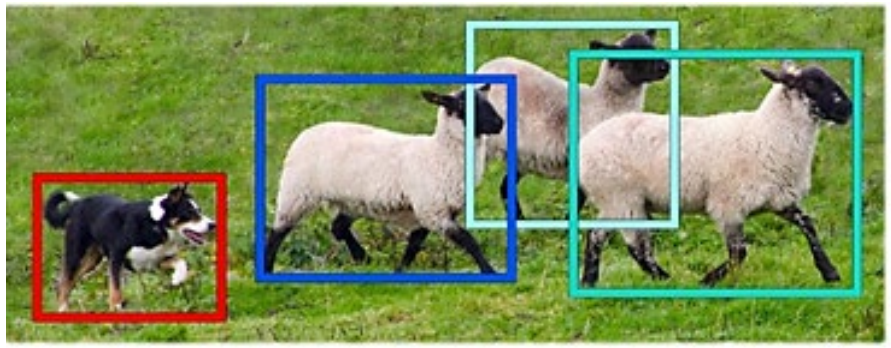
Modèle

Concept général

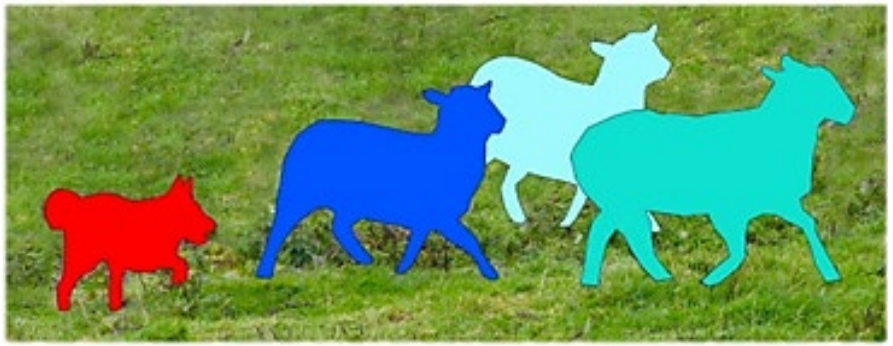
Reconnaissance d'images



Segmentation sémantique



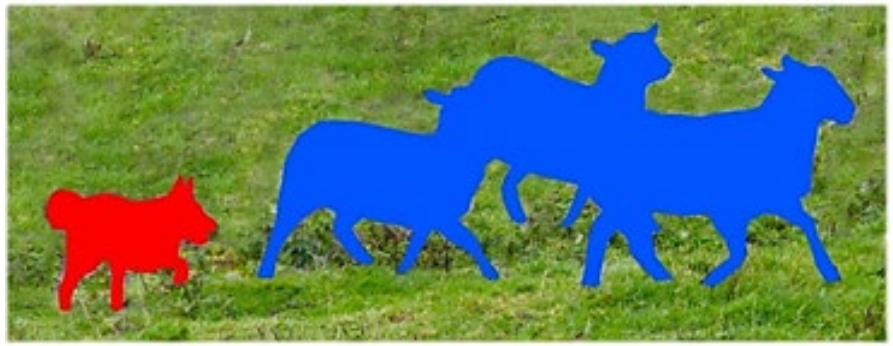
Détection d'objets



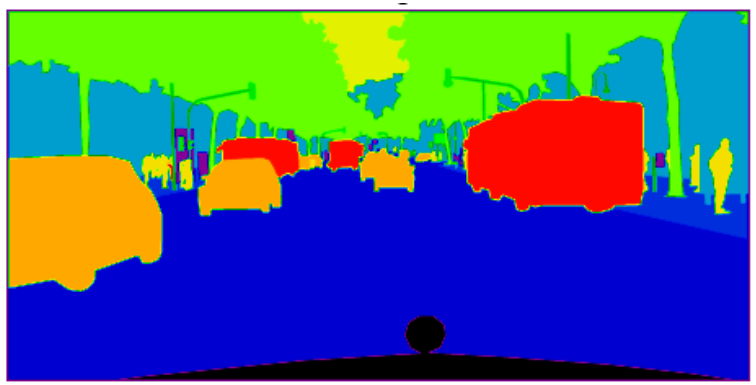
Segmentation d'instance

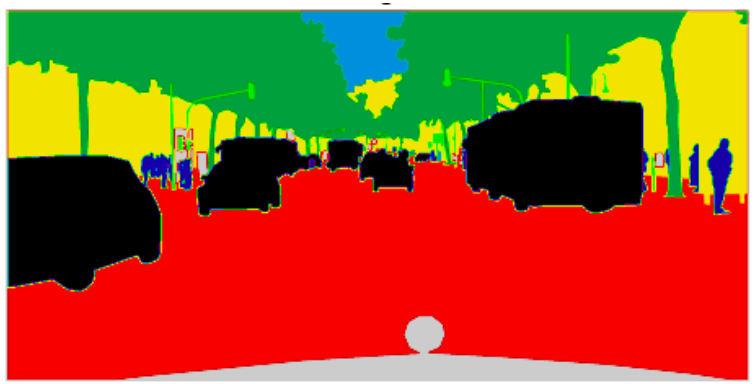
Modèle

Concept général



Segmentation sémantique





Modèle

Concept général

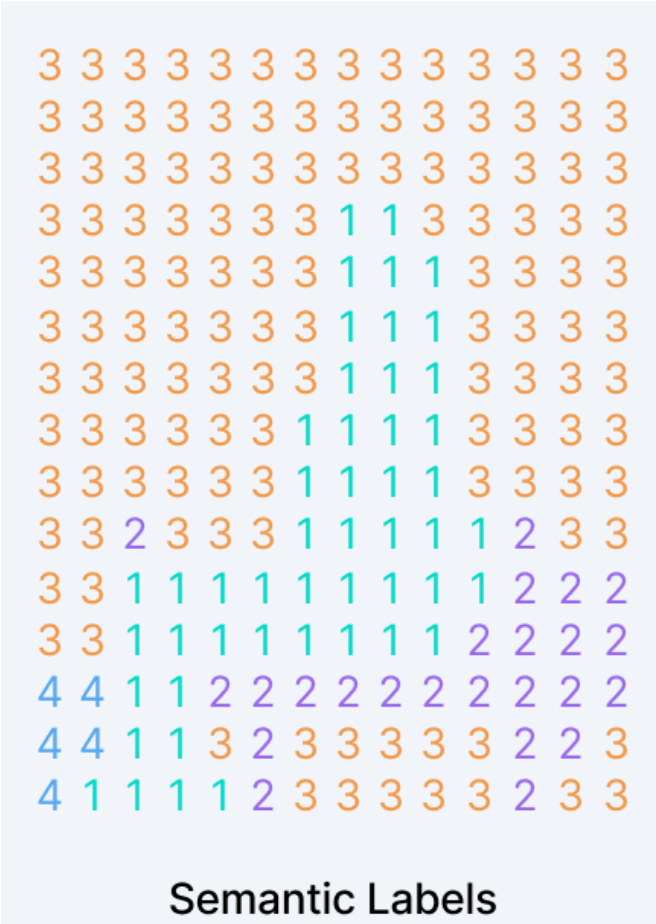
Input

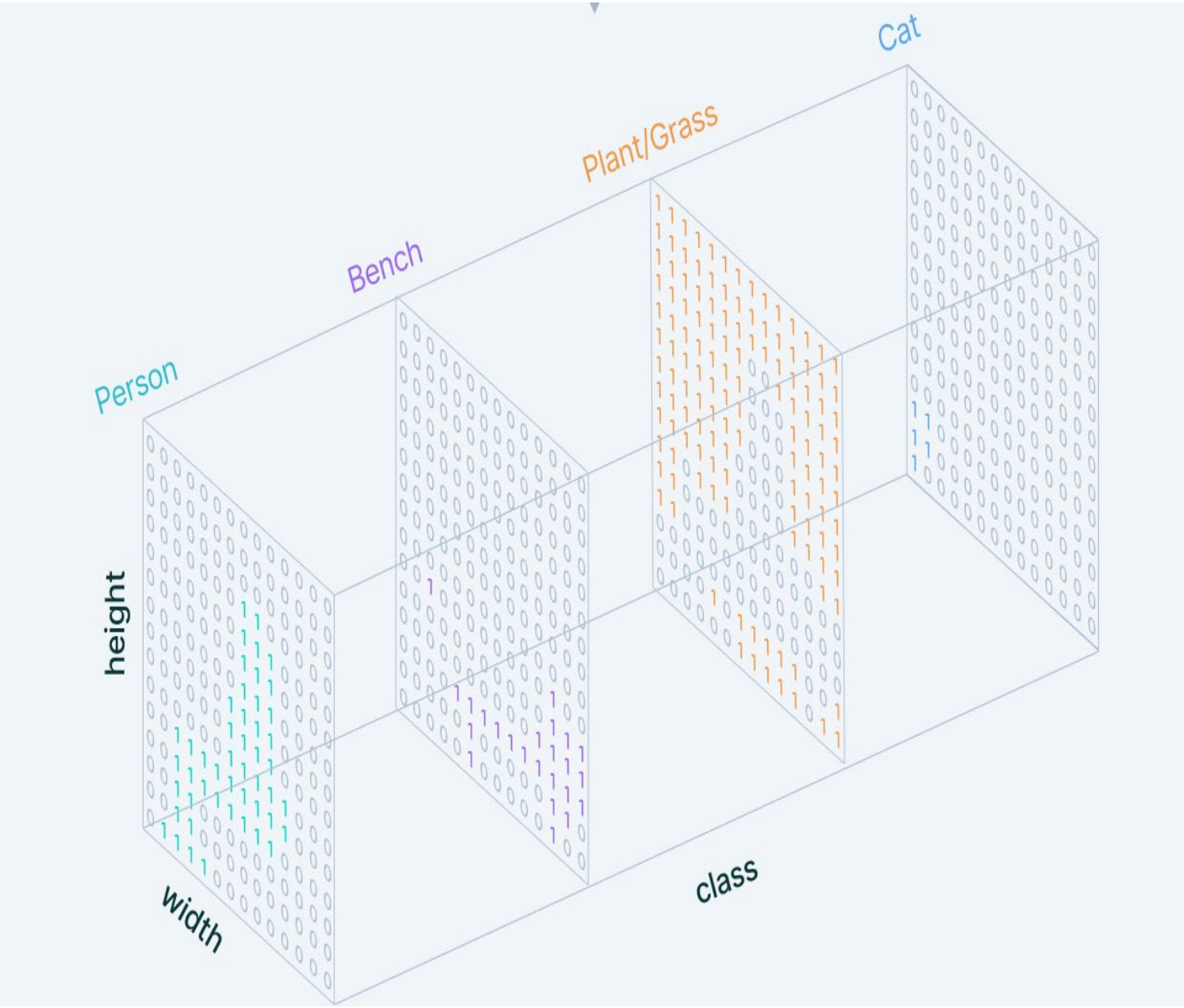
Segmented

1: Person
2: Bench
3: Plant/Grass
4: Cat

Modèle

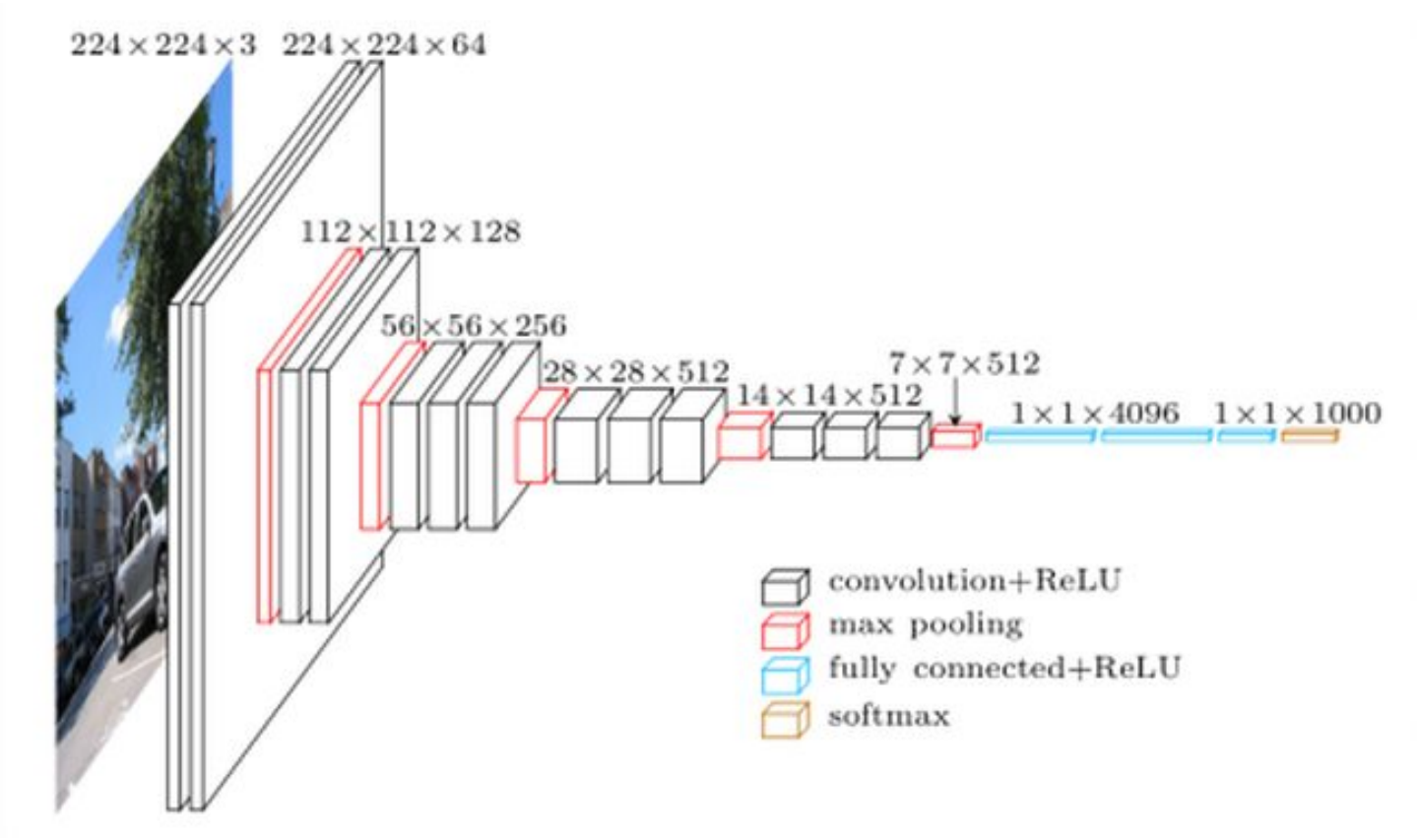
Concept général





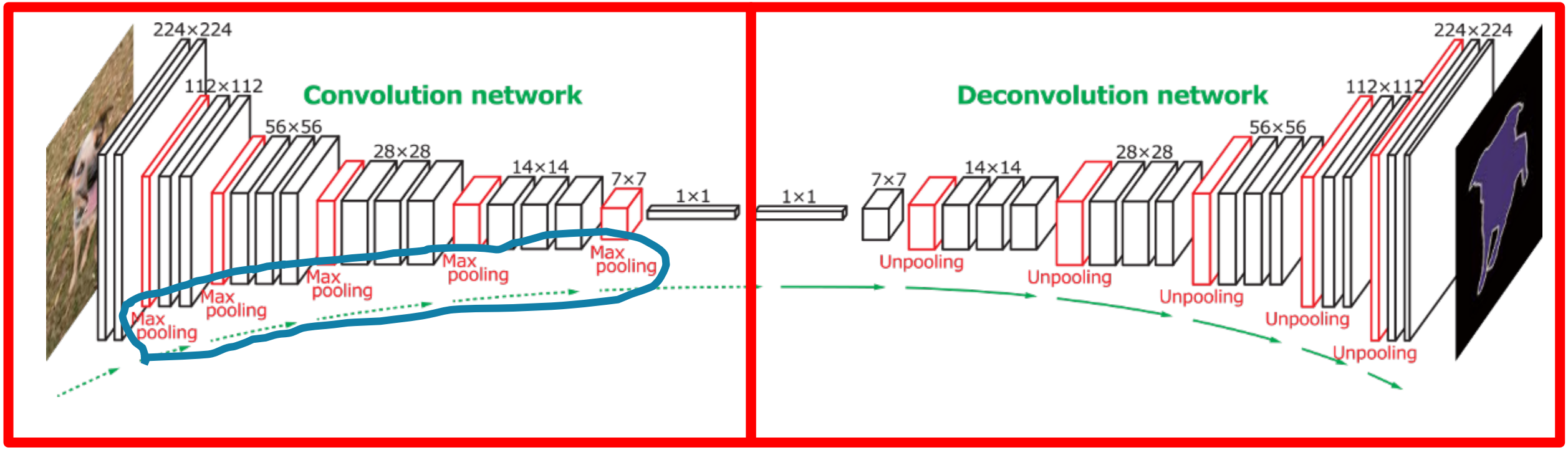
Modèle

FCN


224 × 224 × 3
224 × 224 × 64
112 × 112 × 128
56 × 56 × 256
28 × 28 × 512
14 × 14 × 512
7 × 7 × 512
1 × 1 × 4096
1 × 1 × 1000
convolution+ReLU
max pooling
fully connected+ReLU
softmax

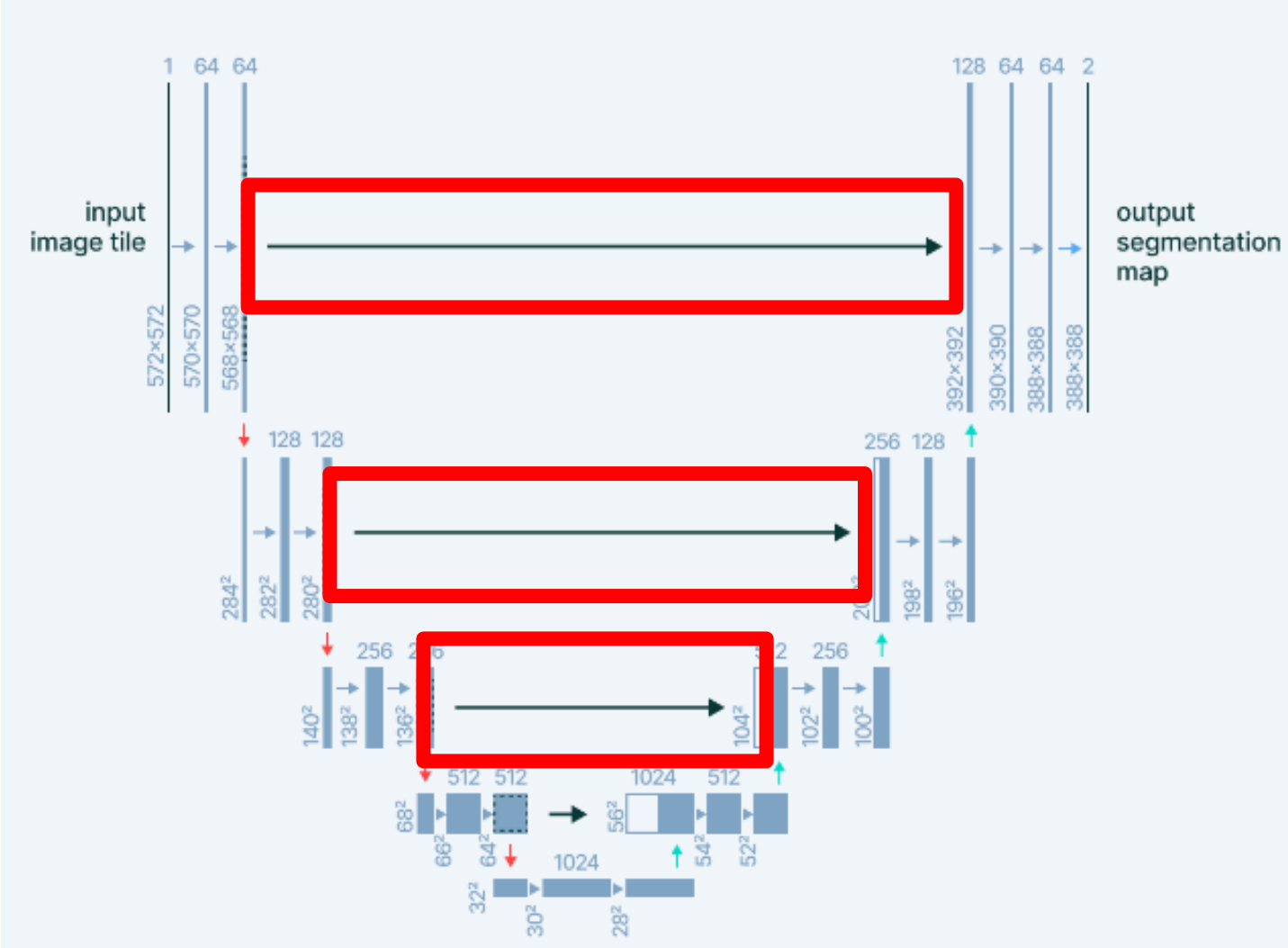
Modèle

FCN


Convolution network
224×224
112×112
56×56
28×28
14×14
7×7
1×1
Max pooling
Max pooling
Max pooling
Max pooling
Max pooling
1×1
Deconvolution network
7×7
14×14
28×28
56×56
112×112
224×224
Unpooling
Unpooling
Unpooling
Unpooling
Unpooling

Modèle

Unet


input
image tile
output
segmentation
map
1 64 64
128 64 64 2
572×572
570×570
568×568
392×392
390×390
388×388
388×388
128 128
256 128
284²
282²
280²
198²
196²
256
140²
138²
136²
104²
102²
100²
512 512
1024 512
68²
66²
64²
56²
54²
52²
1024
32²
30²
28²

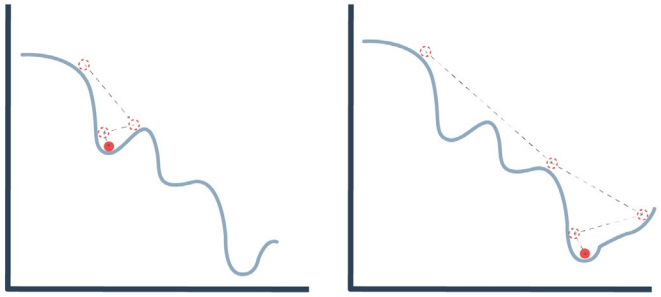
Modèle

Amélioration

Couche

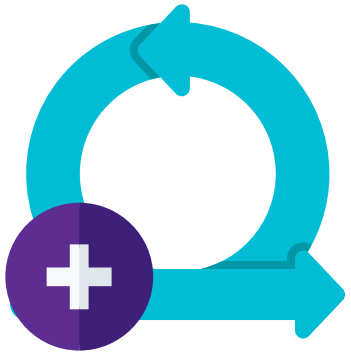
activaton

optimizer



Learning Rate

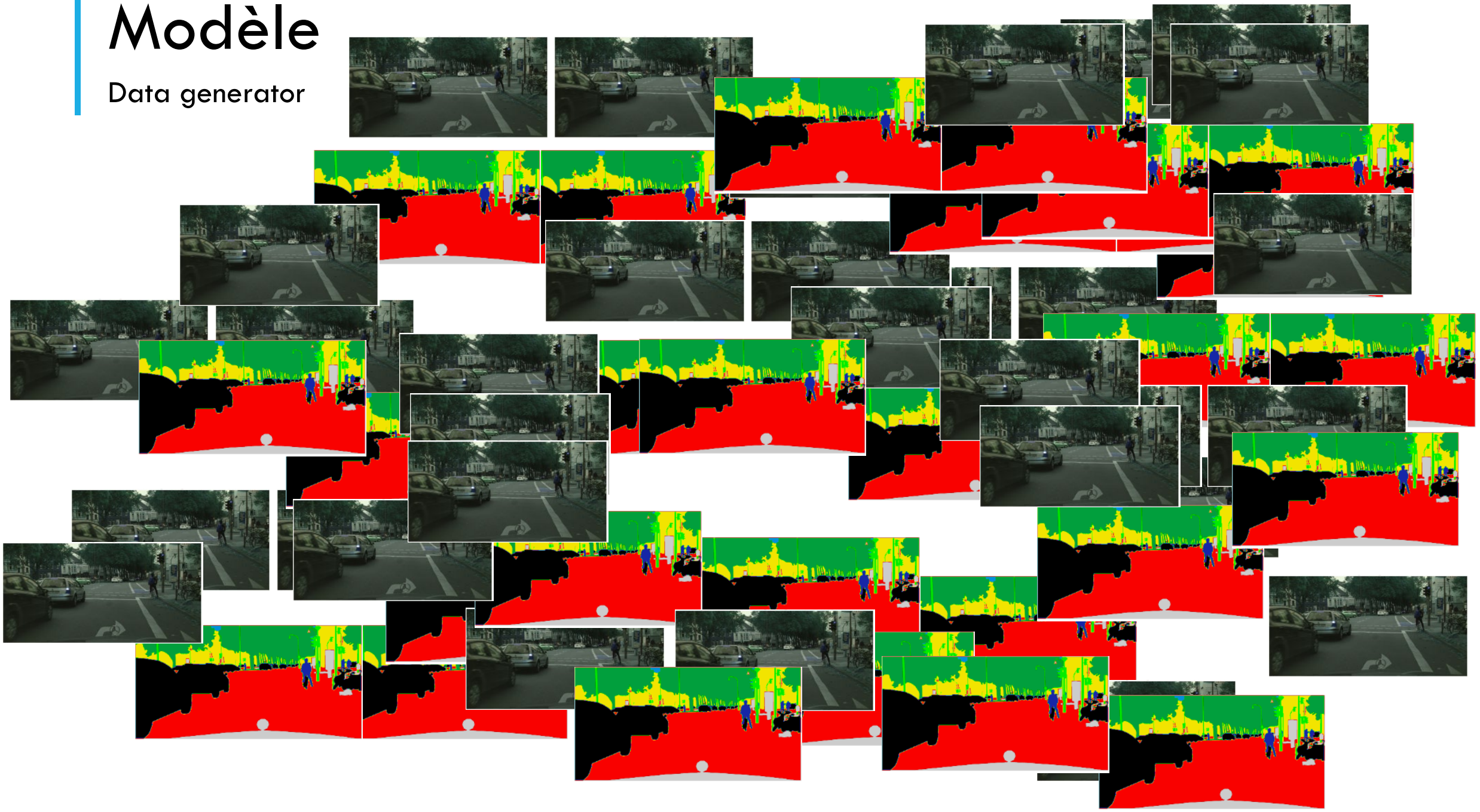
+ de données



Epoch

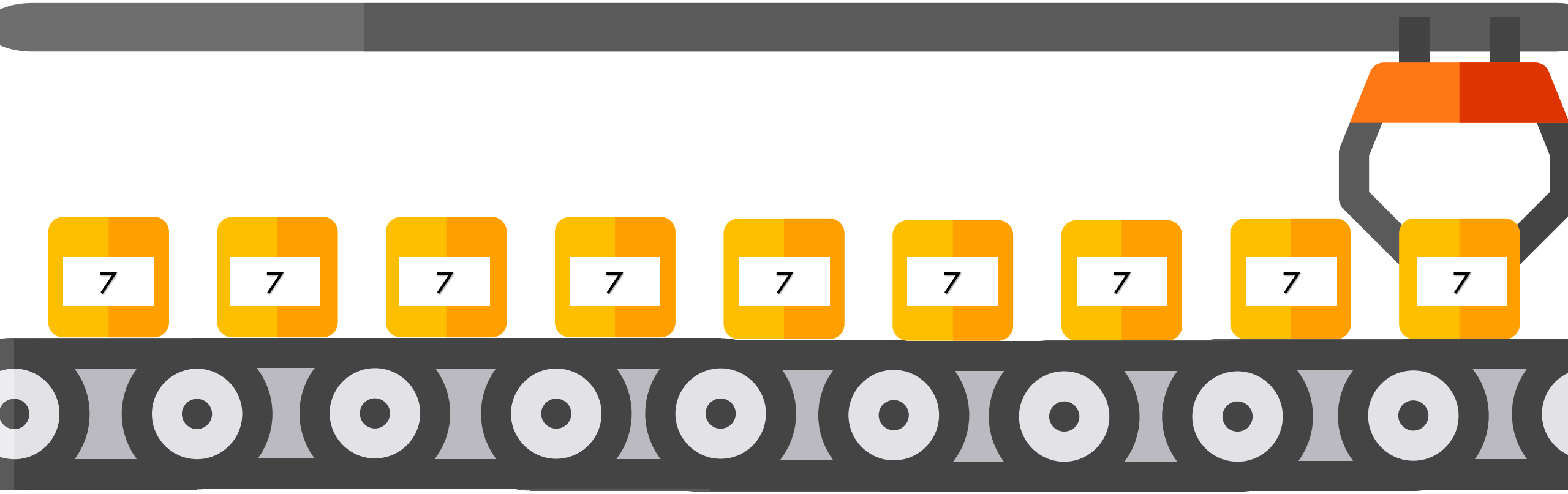
Modèle

Data generator



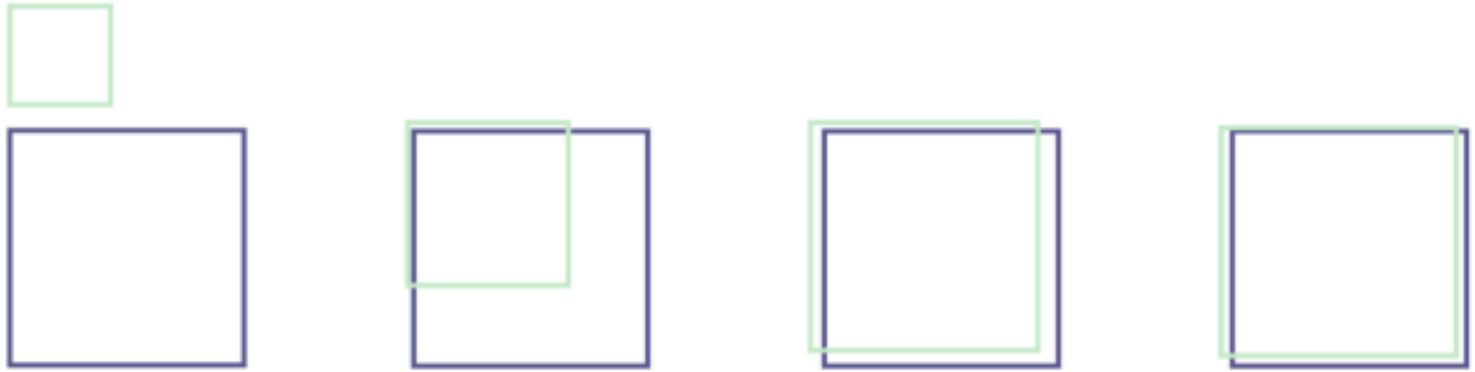
Modèle

Data generator



Modèle

Metrique

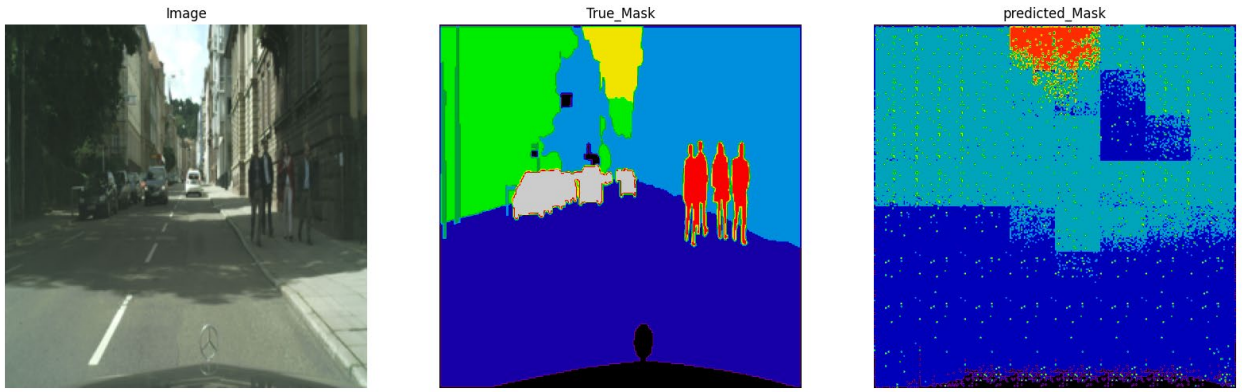


Modèle

FCN

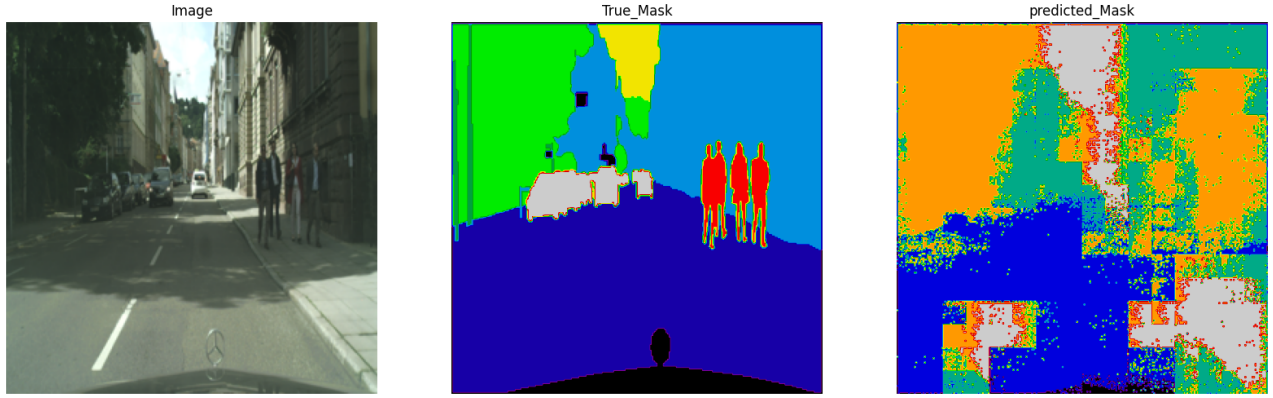
Sans data augmentation

26,43%



Avec data augmentation

25,63%

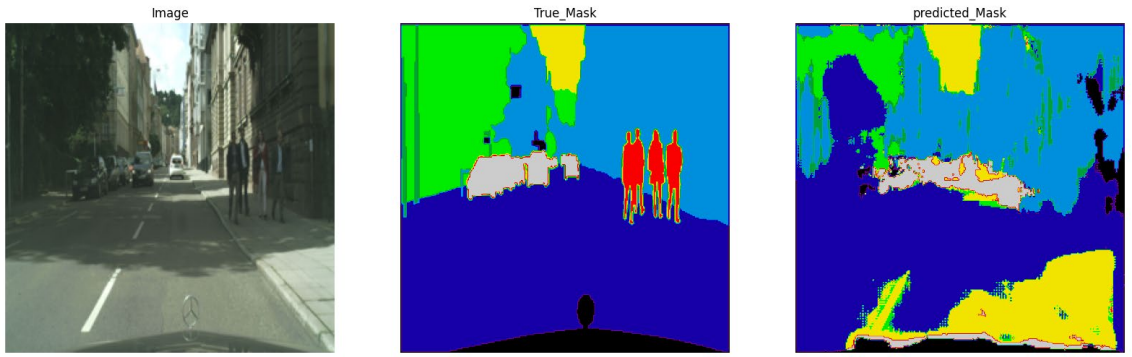


Modèle

Unet

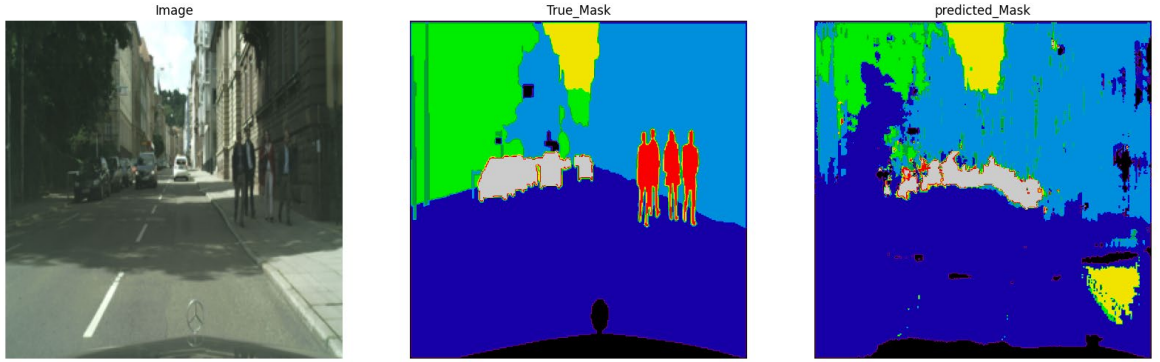
Sans data augmentation

31,08%



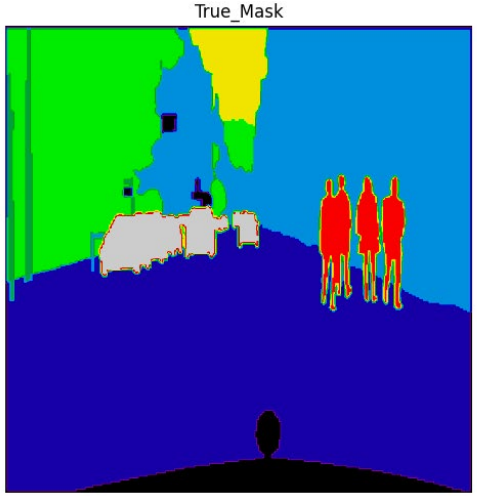
Avec data augmentation

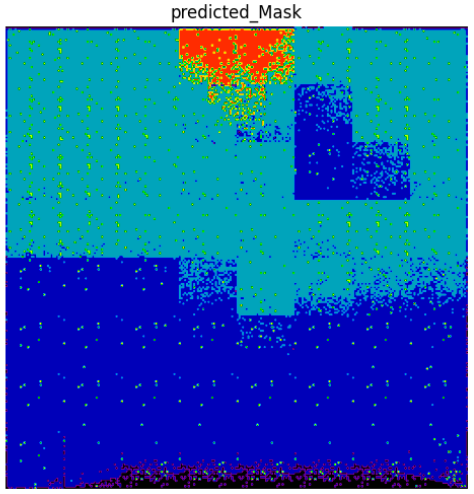
39,98%



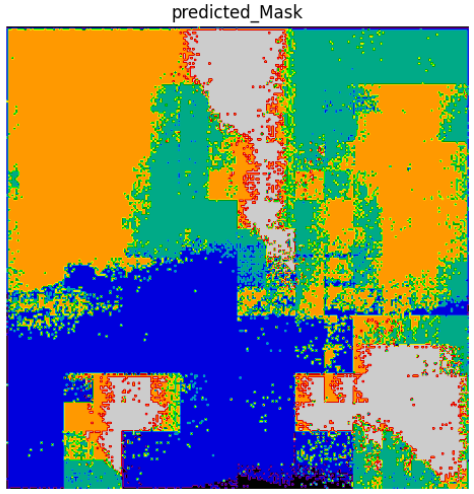
Modèle

Comparatif

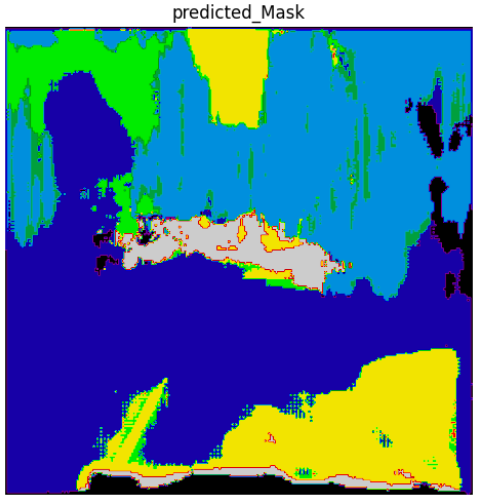




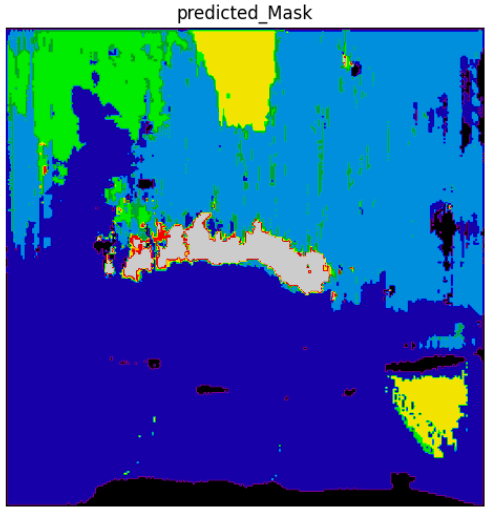
FCN



FCN data aug



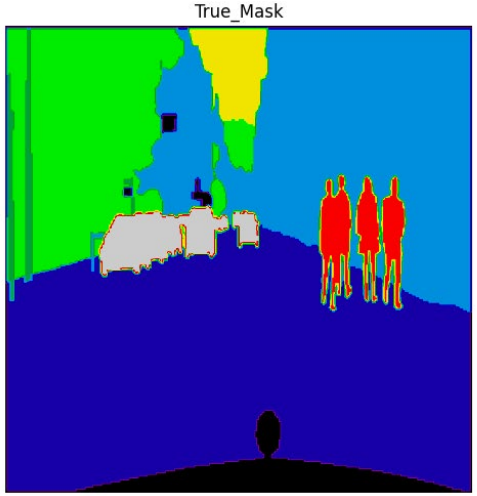
Unet

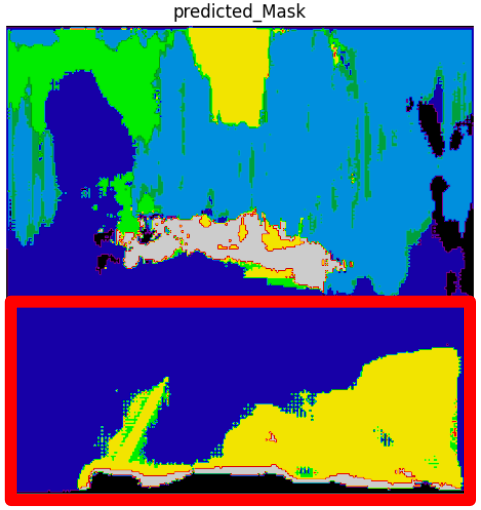


Unet data aug

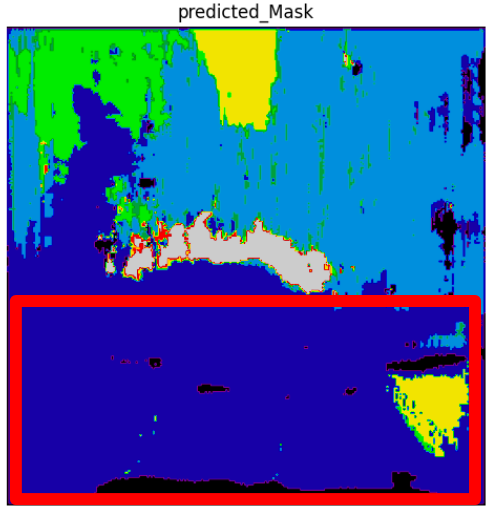
Modèle

Comparatif





Unet

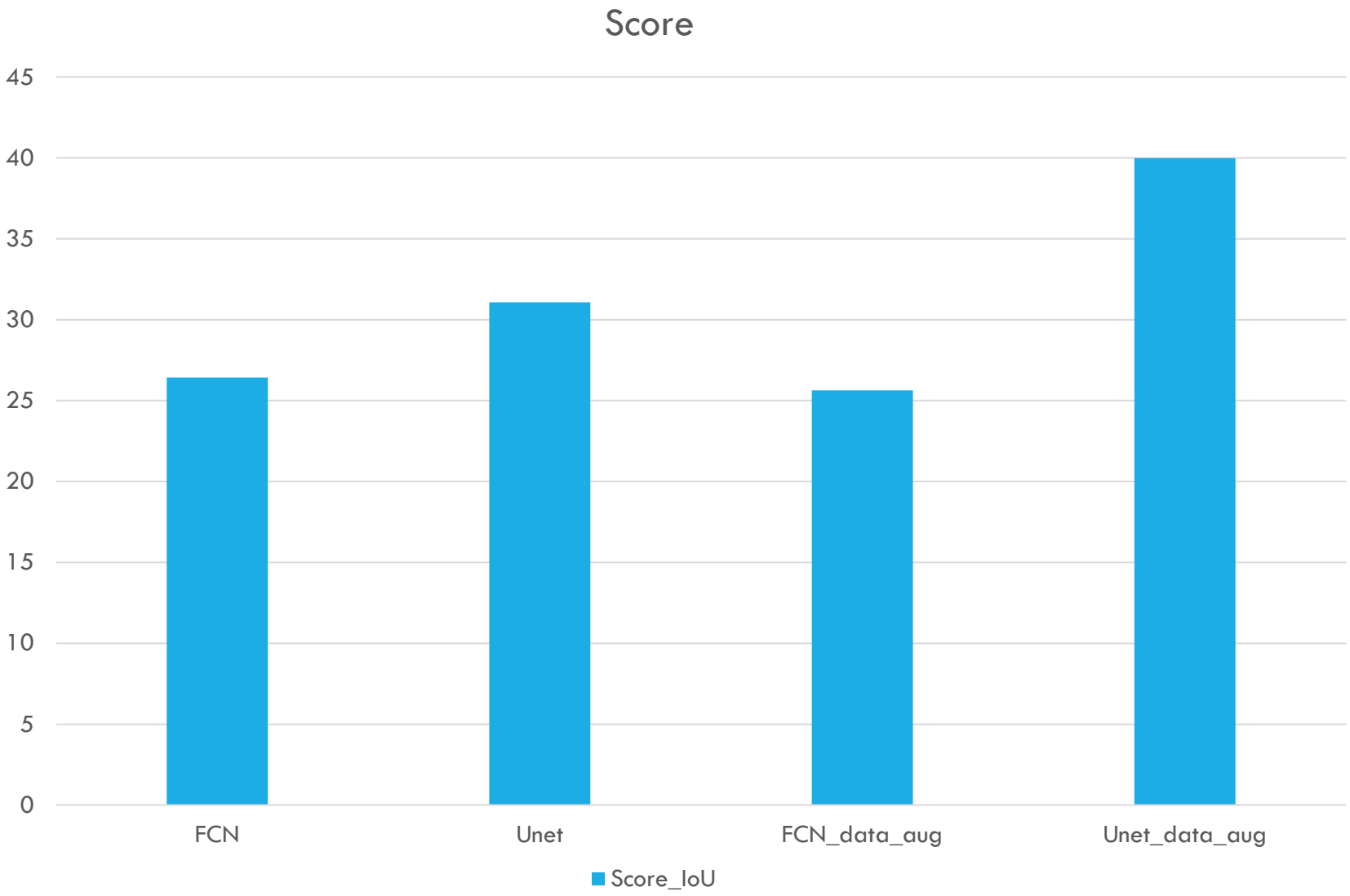


Unet data aug

Modèle

Comparatif - score

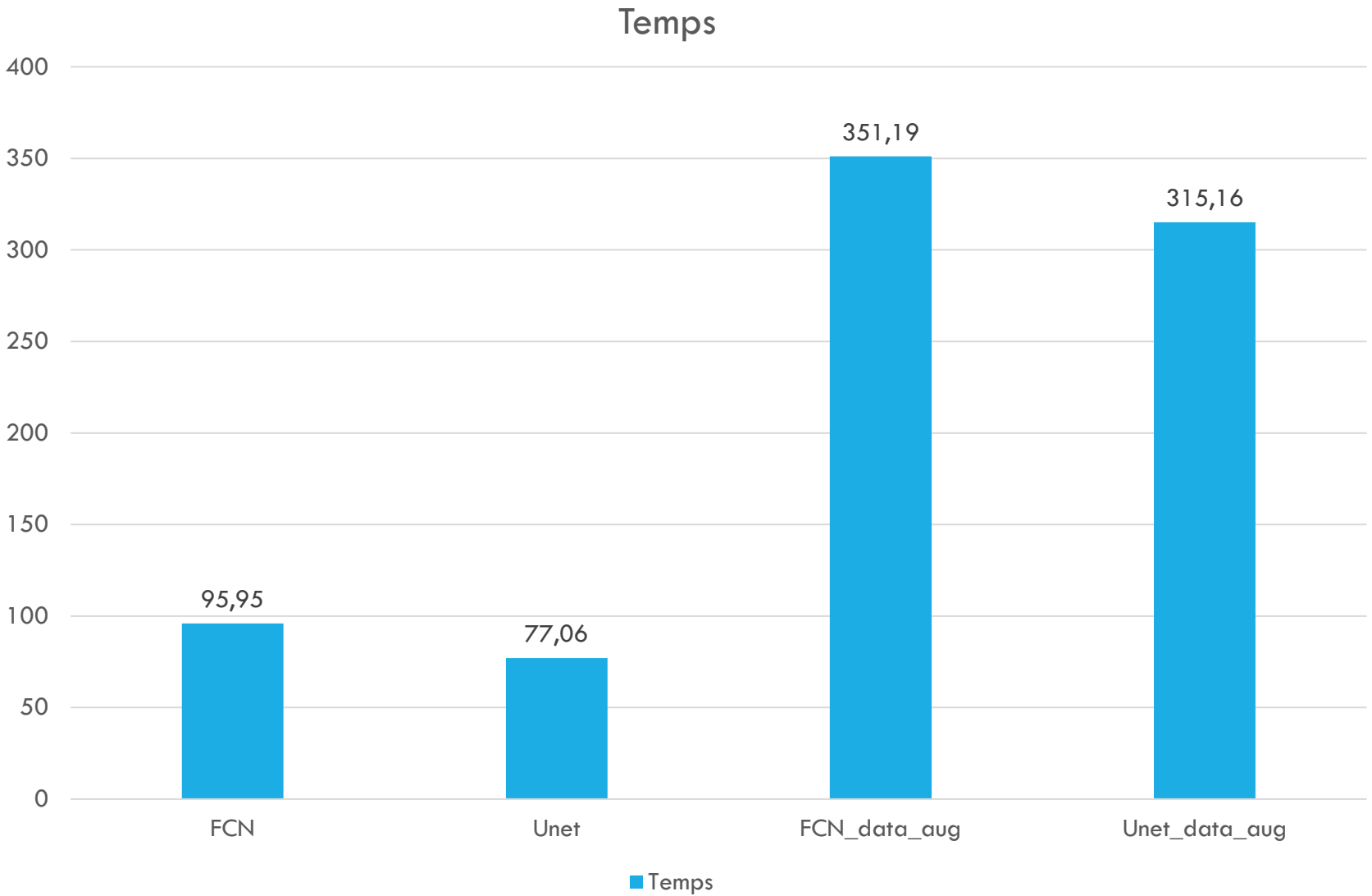
	Model	Temps entrainement (minute)	Score_iou	Loss
3	Unet_adam_mse_aug	315.1619	39.98	0.0657
2	Unet_adam_mse	77.0679	31.08	0.0704
0	FCN_adam_dice	95.9579	26.43	0.2240
1	FCN_adam_dice_aug	351.1985	25.63	0.2703



Modèle

Comparatif - temps

	Model	Temps entrainement (minute)	Score_iou	Loss
3	Unet_adam_mse_aug	315.1619	39.98	0.0657
2	Unet_adam_mse	77.0679	31.08	0.0704
0	FCN_adam_dice	95.9579	26.43	0.2240
1	FCN_adam_dice_aug	351.1985	25.63	0.2703



Modèle

Comparatif - temps

	Model	Temps entrainement (minute)	Score_iou	Loss
3	Unet_adam_mse_aug	315.1619	39.98	0.0657
2	Unet_adam_mse	77.0679	31.08	0.0704
0	FCN_adam_dice	95.9579	26.43	0.2240
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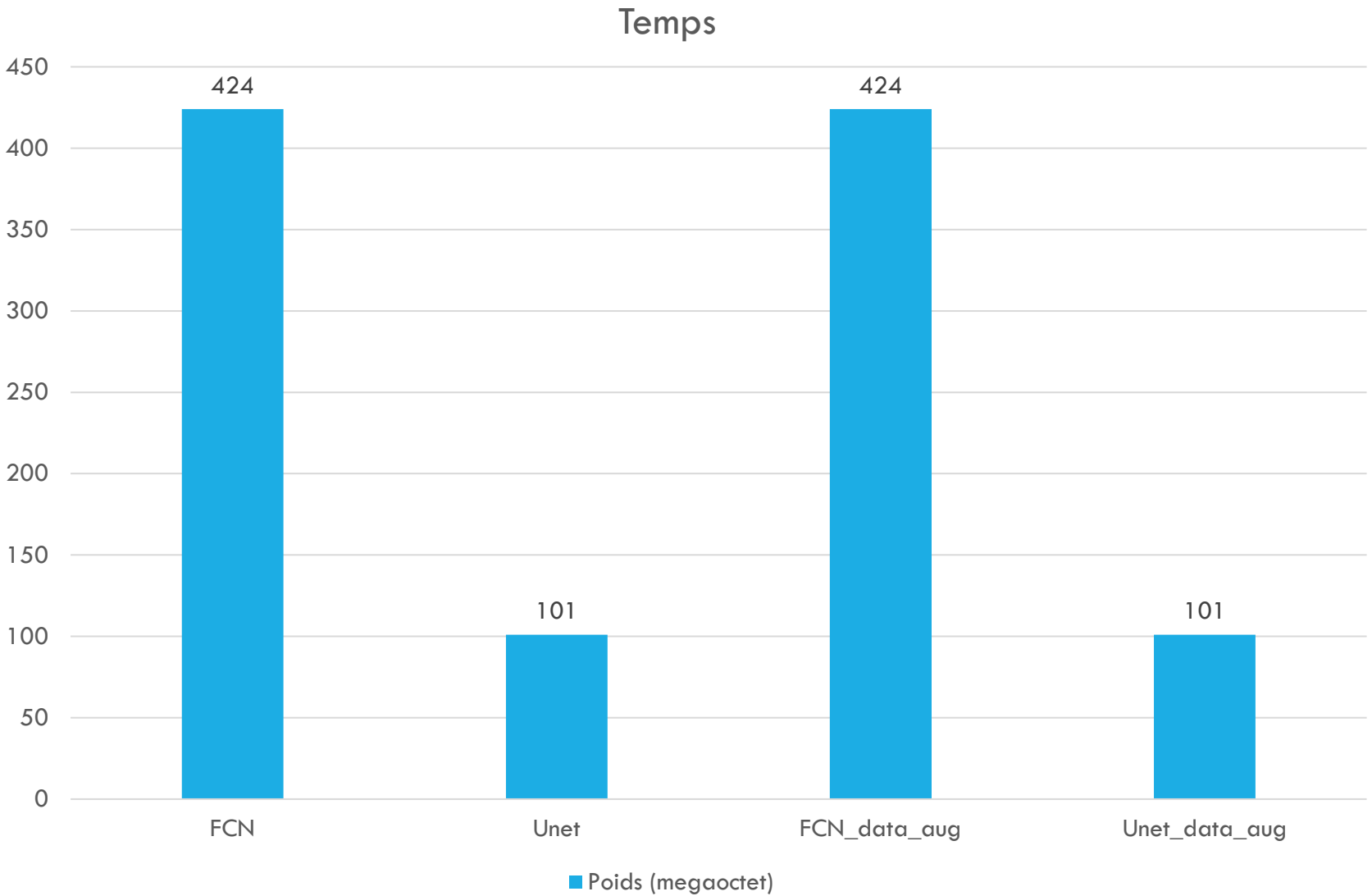
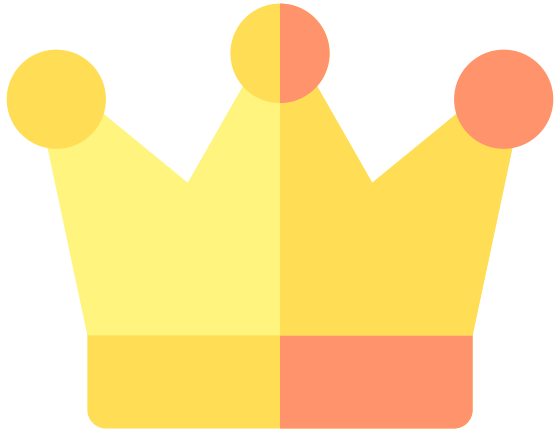


Modèle

Meilleurs modèles



UNET

API

Techo utilisées

Backend (API)

Frontend

API

Techno utilisées

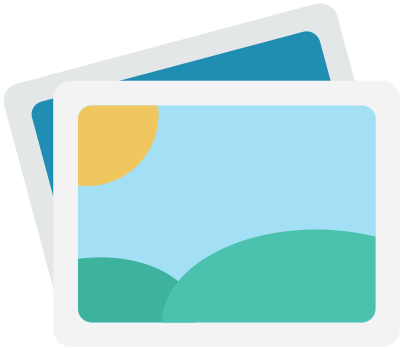
p8backend

p8frontend

API

Fonctionnement

Backend (API)

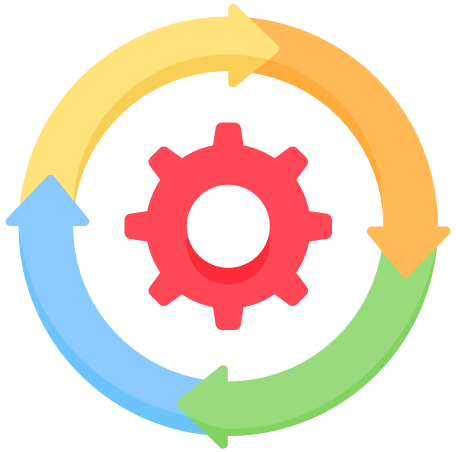


Frontend

API

Fonctionnement

Backend (API)



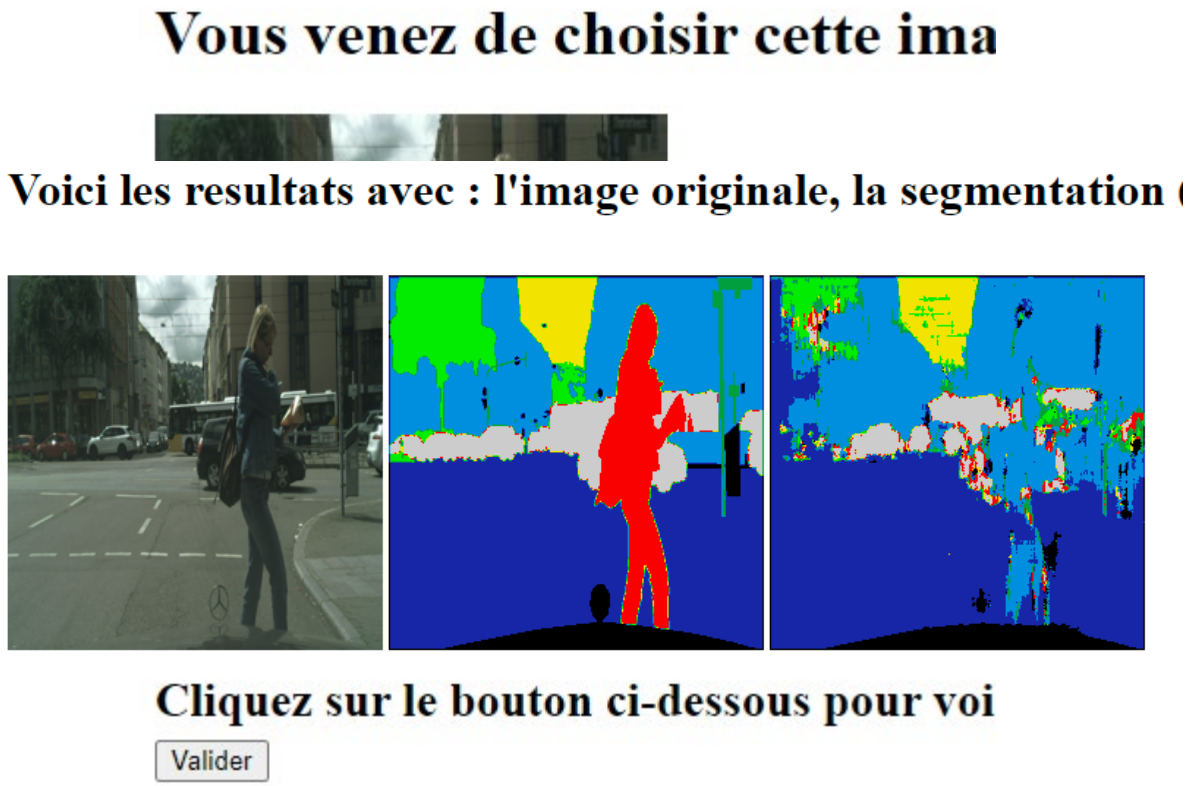
Frontend

API

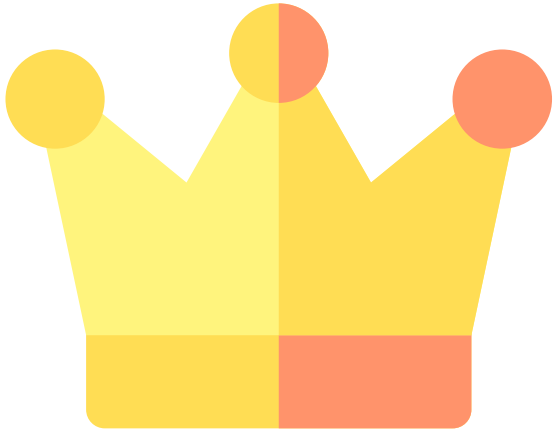
Fonctionnement

Backend (API)

Frontend



Conclusion



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Axe d’amélioration