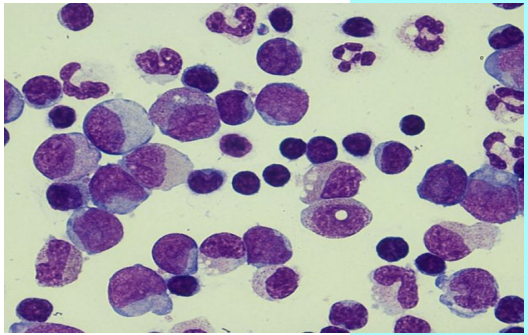
Segmentation d’images

Objectifs

- Introduction à la segmentation d'images : entraînement + évaluation
- Explorer la quantification d'un modèle et l'intégration dans une application mobile

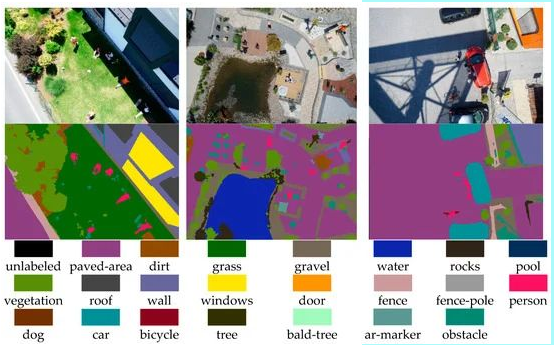
https://github.com/Marouan-git/image_segmentation

Applications

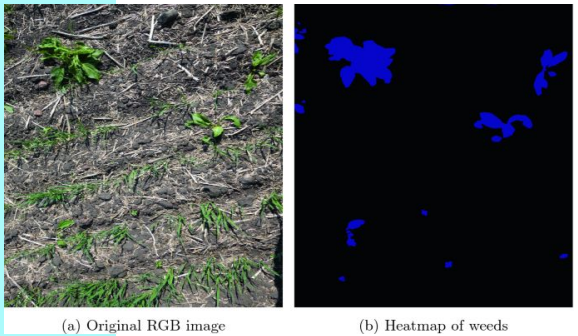


Identifier des cellules
(e.g cellules sanguines)

Véhicules autonomes



Zones d'atterrissage pour
les drones



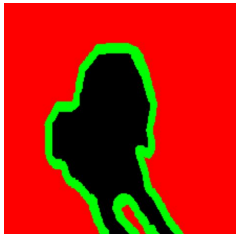
(a) Original RGB image (b) Heatmap of weeds

Identification des mauvaises
herbes

Principe

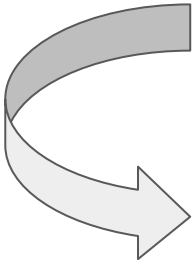
Image

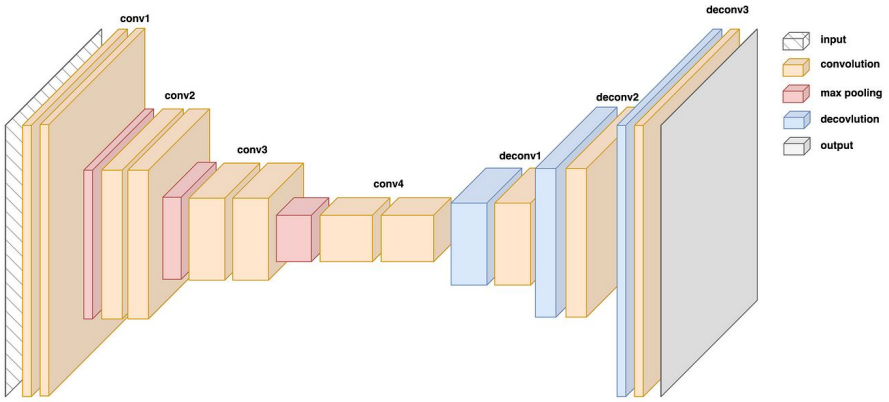
Mask

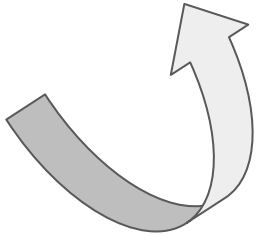


1 pixel = 1 classe

Image segmentée



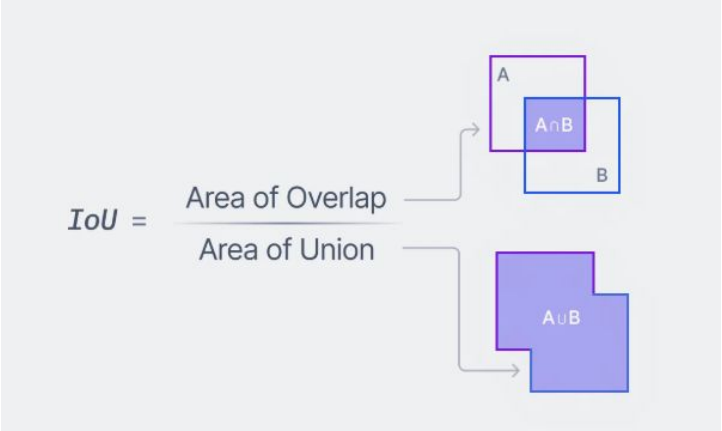




Modèle CNN

Evaluation

https://learnopencv.com/intersection-over-union-iou-in-object-detection-and-segmentation/



1 = correspondance parfaite

0 = aucune correspondance

Intégration

Frameworks DL

PyTorch

TensorFlow

Format intermédiaire

ONNX

.tflite

Frameworks optimisés

ONNX RUNTIME

TensorFlow Lite

Quantification

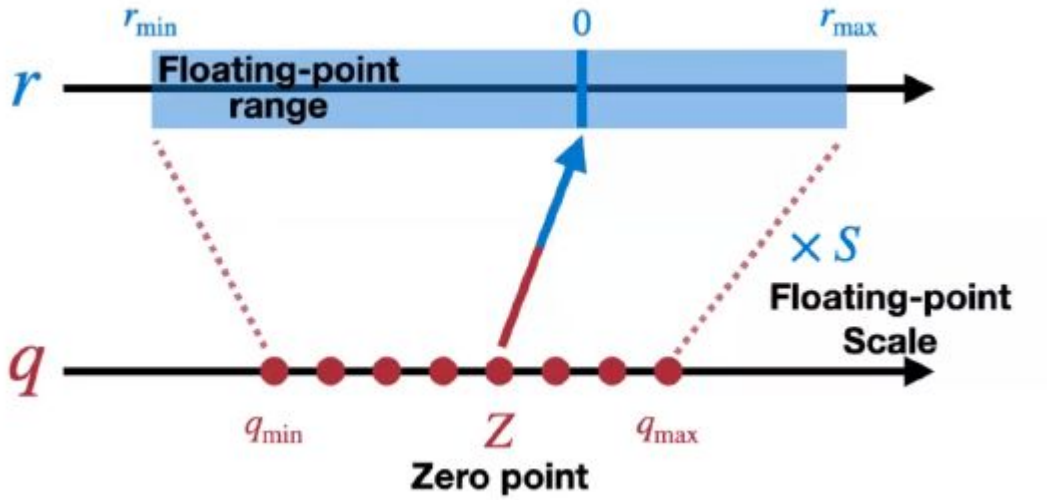
Applications mobiles / embarquées

Quantification

Réduire la taille du modèle

Accélérer l'inférence

Tout en conservant un maximum de précision



$$r = S(q - Z)$$

$$S = (r_{max} + r_{min})/(q_{max} + q_{min})$$

$$r_{min} = S(q_{min} - Z)$$

$$Z = q_{min} - r_{min}/S$$