IMAGE SEGMENTATION

MODEL
structure of the architecture

01

LOSS FUNCTION
misclassification penalty

02

THRESHOLD CV and POST-PROCESSING
further optimizations

03

POSSIBLE IMPROVEMENTS
TO DO

04

01

MODEL

ARCHITECTURE

U-NET shaped network with a pre-trained ENCODER (**Efficient Net**) and 5 layers-deep DECODER

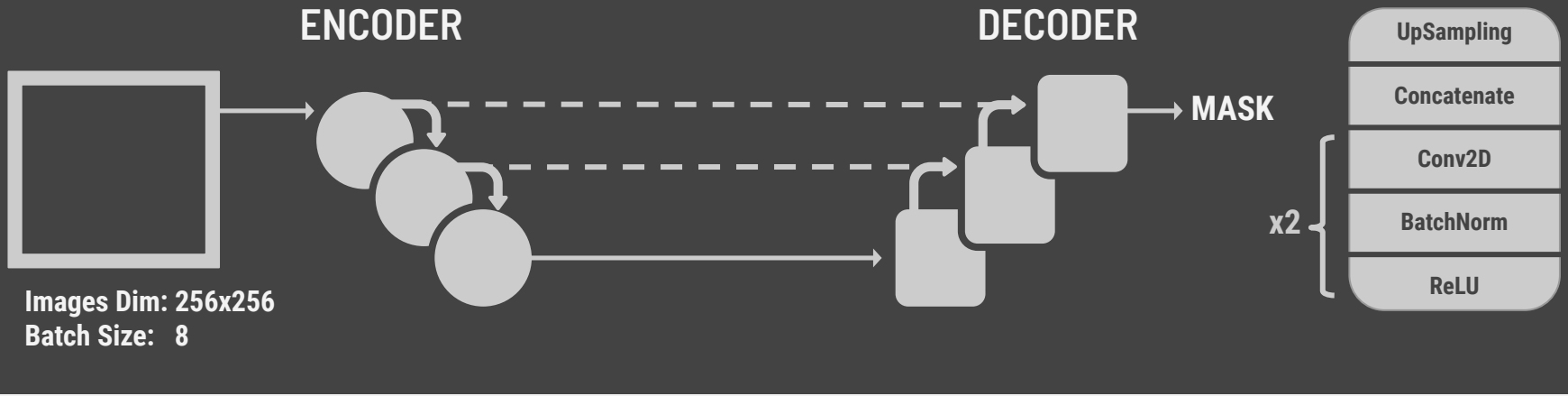
ARCHITECTURE

U-NET shaped network with a pre-trained ENCODER (**Efficient Net**) and 5 layers-deep DECODER


```
pip install -U git+https://github.com/qubvel/efficientnet
```

ARCHITECTURE

U-NET shaped network with a pre-trained ENCODER (**Efficient Net**) and 5 layers-deep DECODER

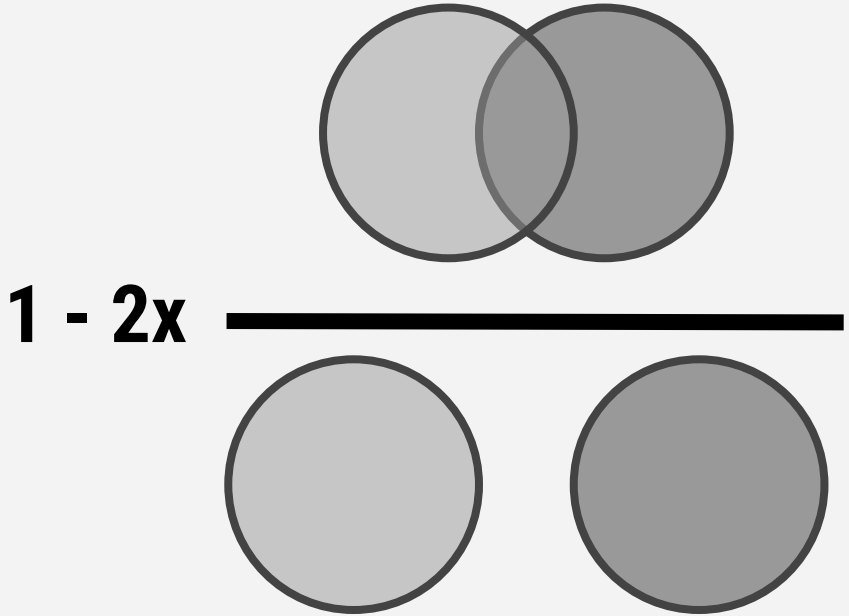



```
pip install -U git+https://github.com/qubvel/efficientnet
```

02

LOSS FUNCTION

COMBINATION OF LOSSES



DICE LOSS

COMBINATION OF LOSSES

DICE LOSS

FOCAL LOSS

COMBINATION OF LOSSES

DICE LOSS

FOCAL LOSS

BORDER LOSS

COMBINATION OF LOSSES

DICE LOSS

FOCAL LOSS

BORDER LOSS

COMBINATION OF LOSSES

DICE LOSS

FOCAL LOSS

BORDER LOSS

LOSSES COMPARISON

LOSSES COMPARISON

LOSSES COMPARISON

Dice+Focal+Boundary Loss	Binary Cross-Entropy

LOSSES COMPARISON

Dice+Focal+Boundary Loss

Binary Cross-Entropy

LOSSES COMPARISON

Dice+Focal+Boundary Loss	Binary Cross-Entropy
	

03

THRESHOLD CV and MASKS POST PROCESSING

THRESHOLD CROSS-VALIDATION

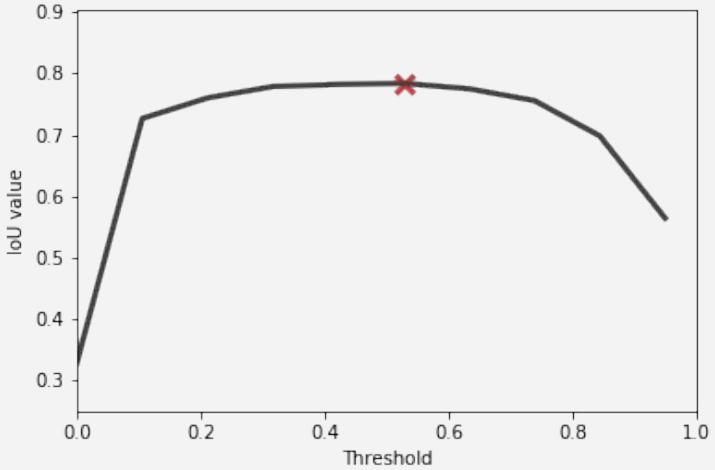
Evaluate the model with different threshold values for 0s and 1s discrimination in the prediction stage.

FIND OPTIMAL THRESHOLD

THRESHOLD CROSS-VALIDATION

Evaluate the model with different threshold values for 0s and 1s discrimination in the prediction stage.

FIND OPTIMAL THRESHOLD



POST-PROCESSING

POST-PROCESSING

Post-process the images with morphological transformations

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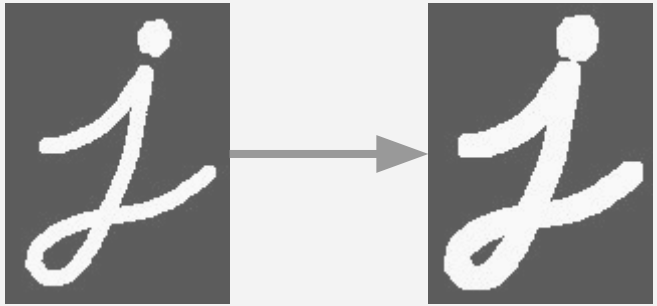
Post-process the images with morphological transformations

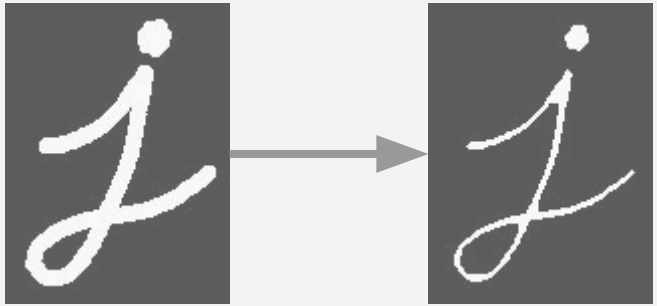
- **DILATION**



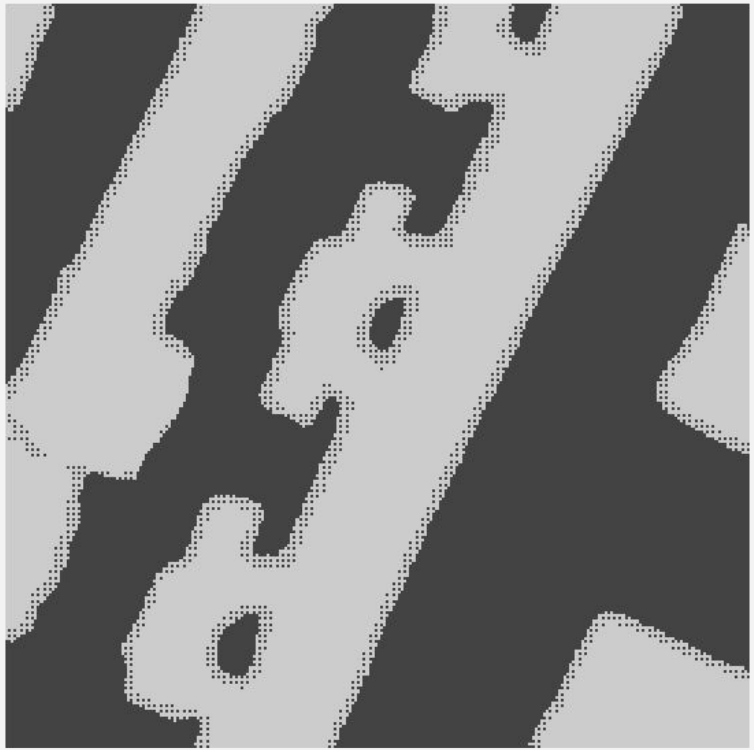
POST-PROCESSING

Post-process the images with morphological transformations

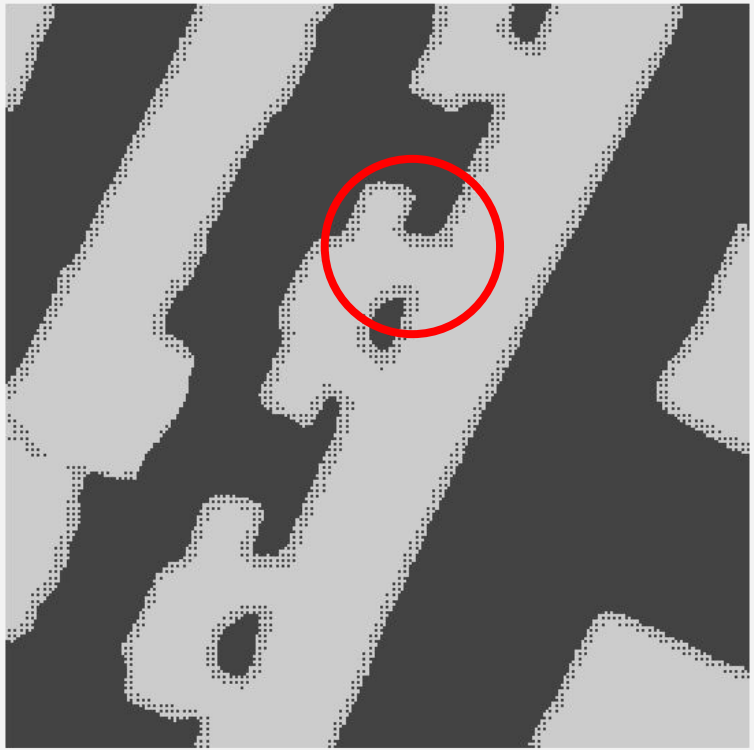
- **DILATION**
- **EROSION**



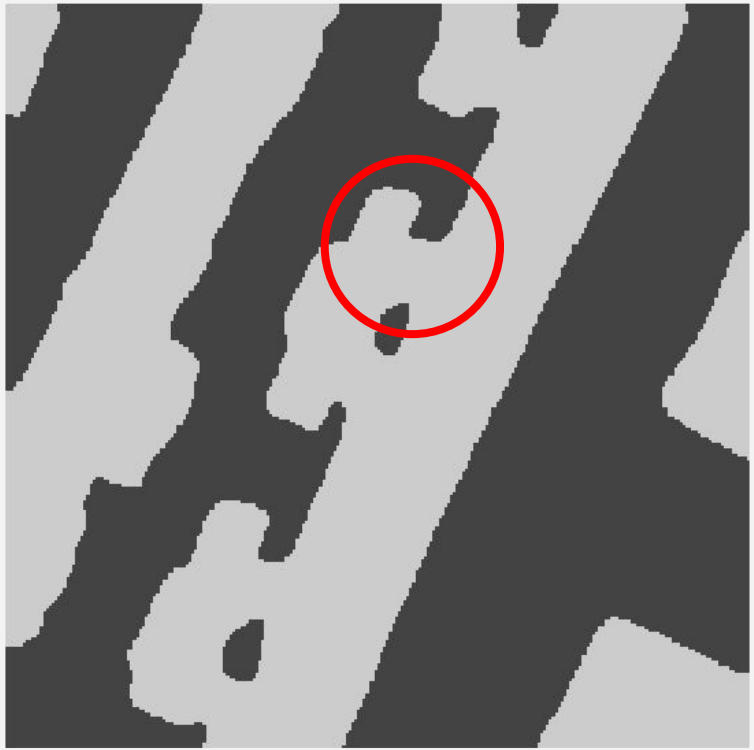
UNPROCESSED PREDICTION



UNPROCESSED PREDICTION



PROCESSED PREDICTION



4. IMPROVEMENTS

POSSIBLE IMPROVEMENTS

- APPLY DATA AUGMENTATION
  FLIPS/SMALL ROTATIONS
  INCREASE CONTRAST - DYNAMICAL RANGE
  SHARPENING
- EXPERIMENTING WITH OTHER BACKBONES or DIFFERENT ARCHITECTURES (LinkNet, FPN-Net,PSPNet)
- ENSEMBLE METHODS

REFERENCES AND LINKS

Efficient-Net

Border Loss

Morphological transformations

THANK YOU