

# River Ice Segmentation with Deep Learning Supplementary

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This supplementary provides results on additional unlabeled images (Fig. 1, 2), details of tested video sequences (Table 2) and categorized links for Google photos albums showing results on labeled images (Table 1) and Google Drive folders containing video results (Table 3). Each row in the albums shows (from left to right) the original image, its ground truth label and its segmentation result. All these results are also available in the accompanying data [1].

**Table 1:** Google Photos albums showing labeled qualitative results for ablation tests

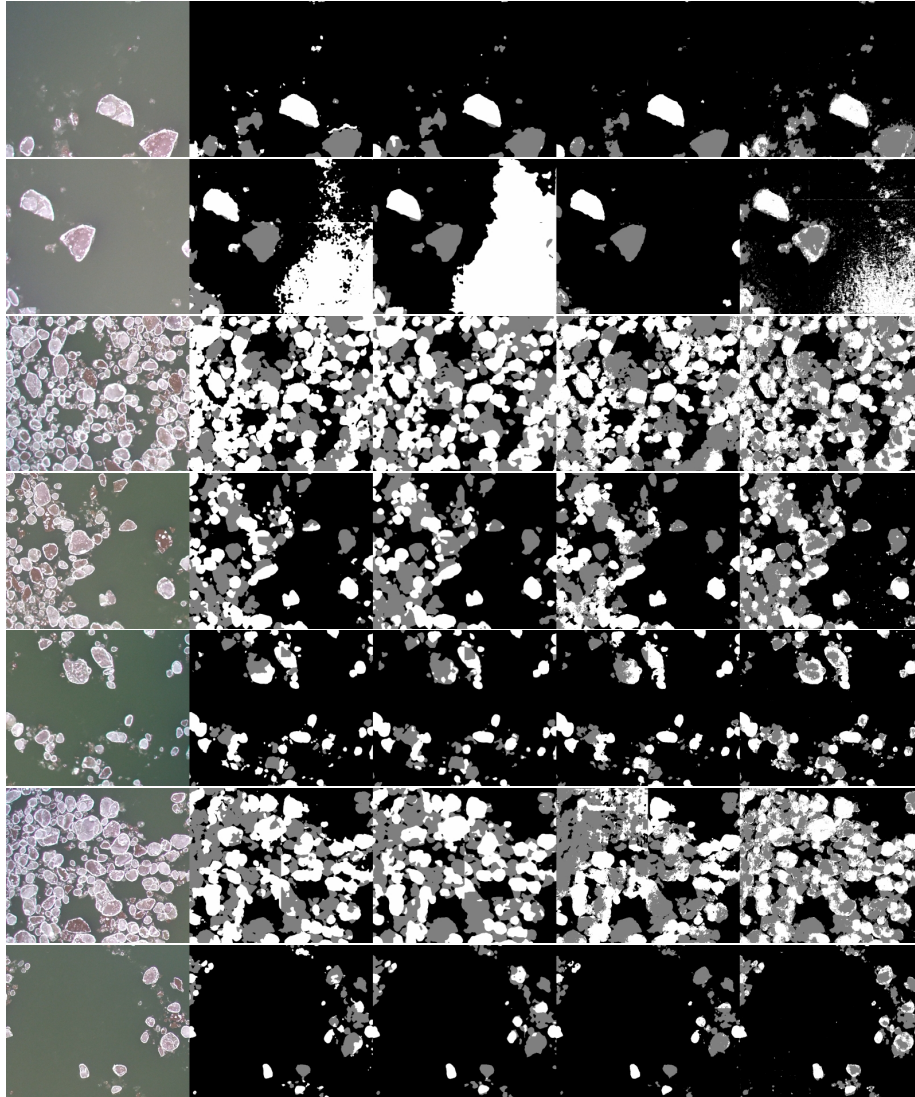
| Model    | n_training_images |    |    |   |   | n_pixels_per_class |     |    |   |
|----------|-------------------|----|----|---|---|--------------------|-----|----|---|
| SVM      | 32                | 24 | 16 | 8 | 4 | -                  |     |    |   |
| Deeplab  | 32                | 24 | 16 | 8 | 4 | 1000               | 100 | 10 | 2 |
| UNet     | 32                | 24 | 16 | 8 | 4 | 1000               | 100 | 10 | 2 |
| SegNet   | 32                | 24 | 16 | 8 | 4 | 1000               | 100 | 10 | 2 |
| DenseNet | 32                | 24 | 16 | 8 | 4 | 1000               | 100 | 10 | 2 |

**Table 2:** Details of the 5 video sequences used for testing

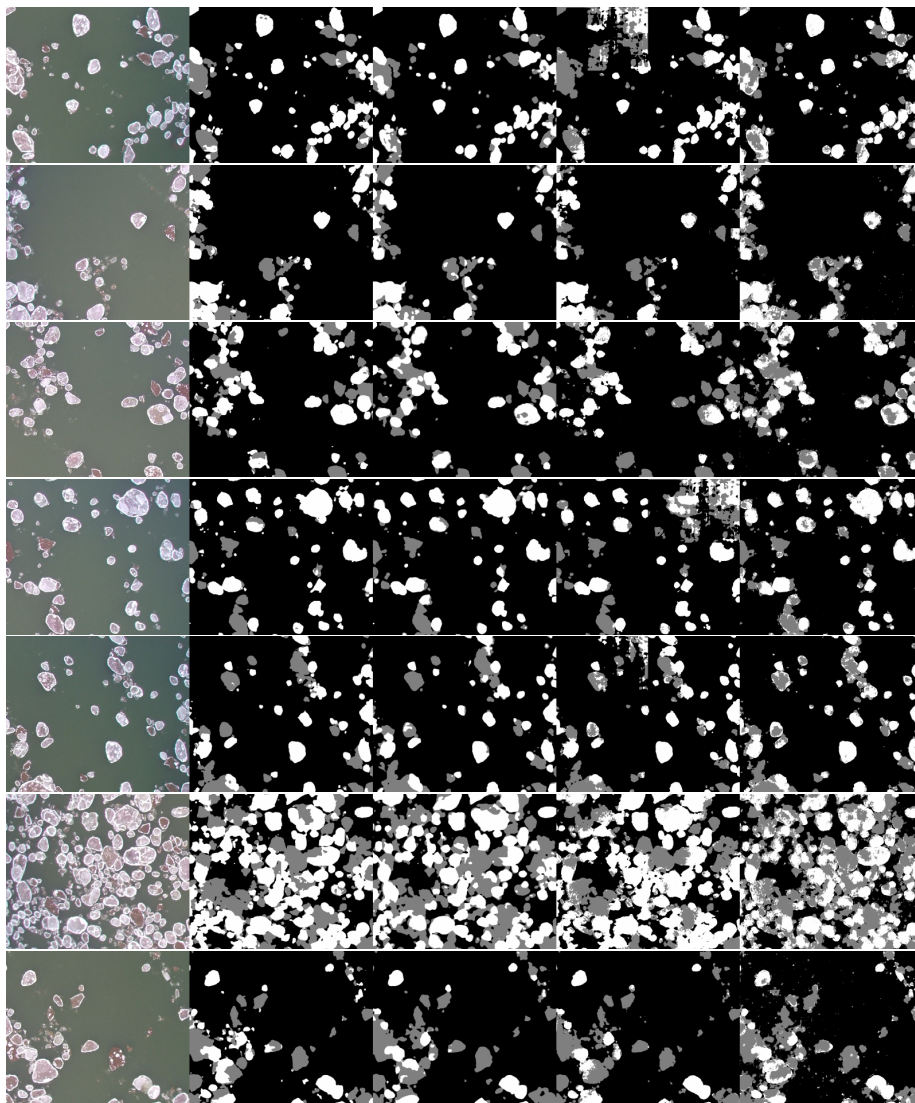
| ID | Name                             | Frame Count | Start Frame | End Frame |
|----|----------------------------------|-------------|-------------|-----------|
| 1  | 20160121 / YUN00001              | 3600        | 1           | 3600      |
| 2  | 20160122 / YUN00002              | 1800        | 701         | 2500      |
| 3  | 20160122 / YUN00020              | 1800        | 2001        | 3800      |
| 4  | 20161203 / Deployment_1_YUN00001 | 1800        | 901         | 2700      |
| 5  | 20161203 / Deployment_1_YUN00002 | 1800        | 1           | 1800      |

## References

- [1] Alberta River Ice Segmentation Dataset. <http://dx.doi.org/10.21227/ebax-1h44>, 2019.



**Figure 1:** Results of applying the best configurations of the four models on unlabeled images: left to right: Raw image, UNet, SegNet, Deeplab, DenseNet



**Figure 2:** Results of applying the best configurations of the four models on unlabeled images: left to right: raw image, UNet, SegNet, Deeplab, DenseNet

**Table 3:** Google Drive links for video results

| Type                                  | Video ID |   |   |   |   | Type                                     | Video ID |   |   |   |   |
|---------------------------------------|----------|---|---|---|---|--|----------|---|---|---|---|
| <a href="#">deeplab_densenet_unet</a> |          |   |   |   |   | <a href="#">selective_pixel_ablation</a> |          |   |   |   |   |
| <b>combined</b>                       | 1        | 2 | 3 | 4 | 5 | <b>densenet</b>                          | 1        | 3 |   |   |   |
| <b>frazil</b>                         | 1        | 2 | 3 | 4 | 5 | <b>deeplab</b>                           | 1        | 3 |   |   |   |
| <b>anchor</b>                         | 1        | 2 | 3 | 4 | 5 | <b>unet</b>                              | 1        | 3 |   |   |   |
| <a href="#">svm_densenet_unet</a>     |          |   |   |   |   | <b>compare</b>                           | 1        |   |   |   |   |
| <b>combined</b>                       | 1        | 3 |   | 4 |   | <a href="#">training_images_ablation</a> |          |   |   |   |   |
| <b>frazil</b>                         | 1        | 3 |   | 4 |   | <b>densenet</b>                          | 1        | 2 | 3 | 4 | 5 |
| <b>anchor</b>                         | 1        | 3 |   | 4 |   | <b>deeplab</b>                           | 1        | 2 | 3 | 4 | 5 |