AquaFauna

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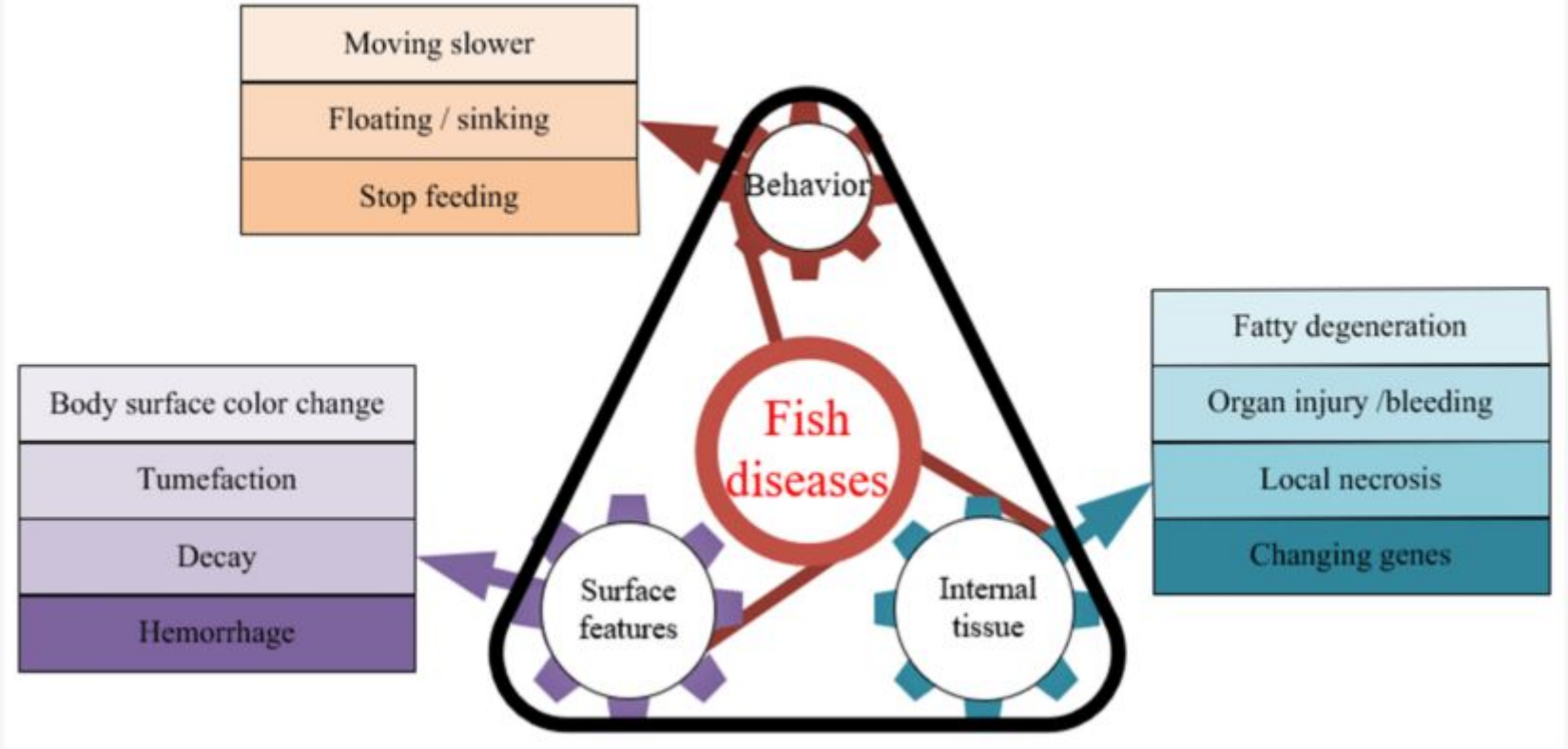
Disease Detection

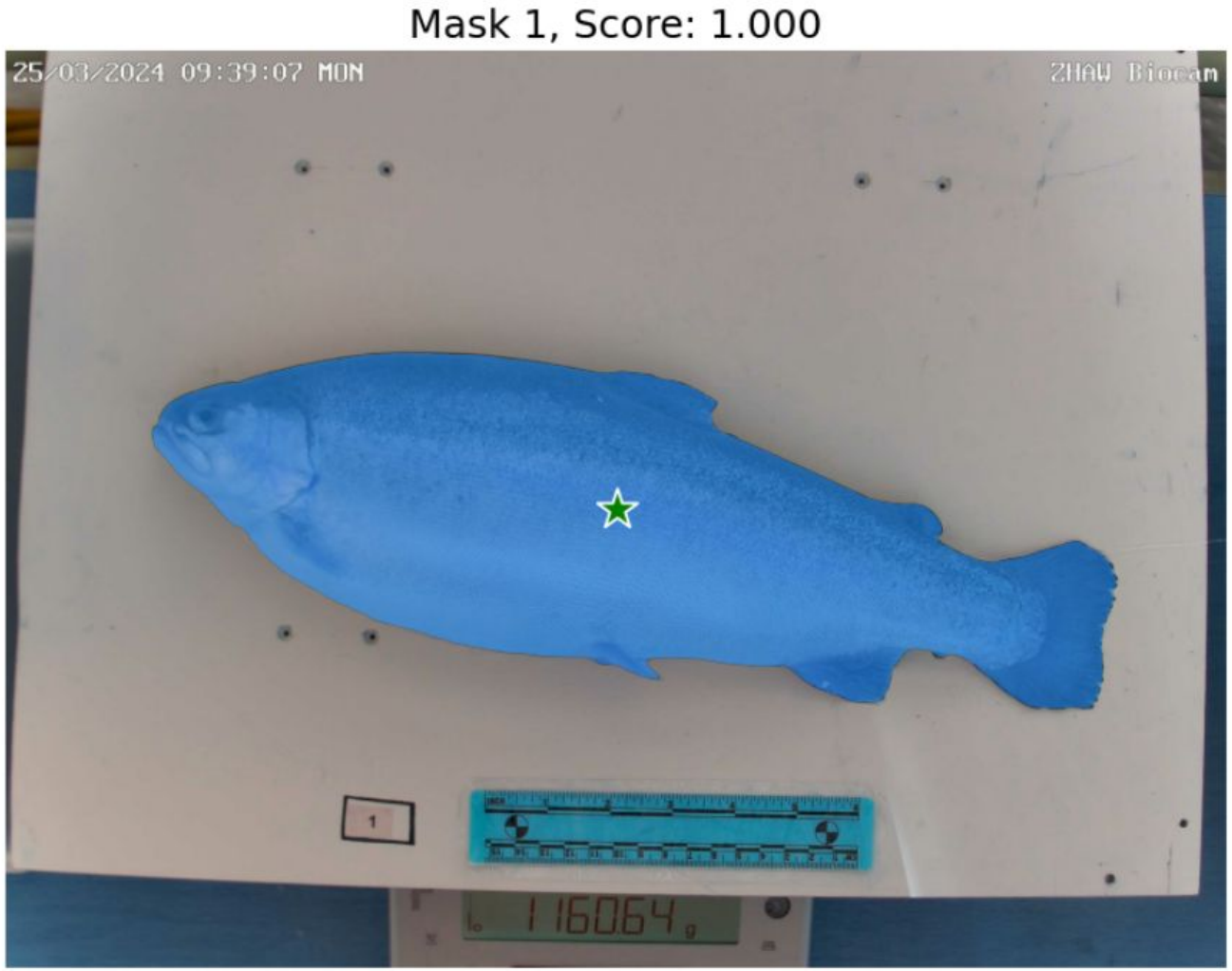
Disease detection is important.

Figure 3. The surface and internal tissues as well as behavioral changes that may result from fish disease.



Is a fishes eye diseased or healthy?

Automatic Segmentatinon with SAM



- Identify common location of the fish on the image
- Prompted segmentation
- This was used to generate a yolov11 fish detection model

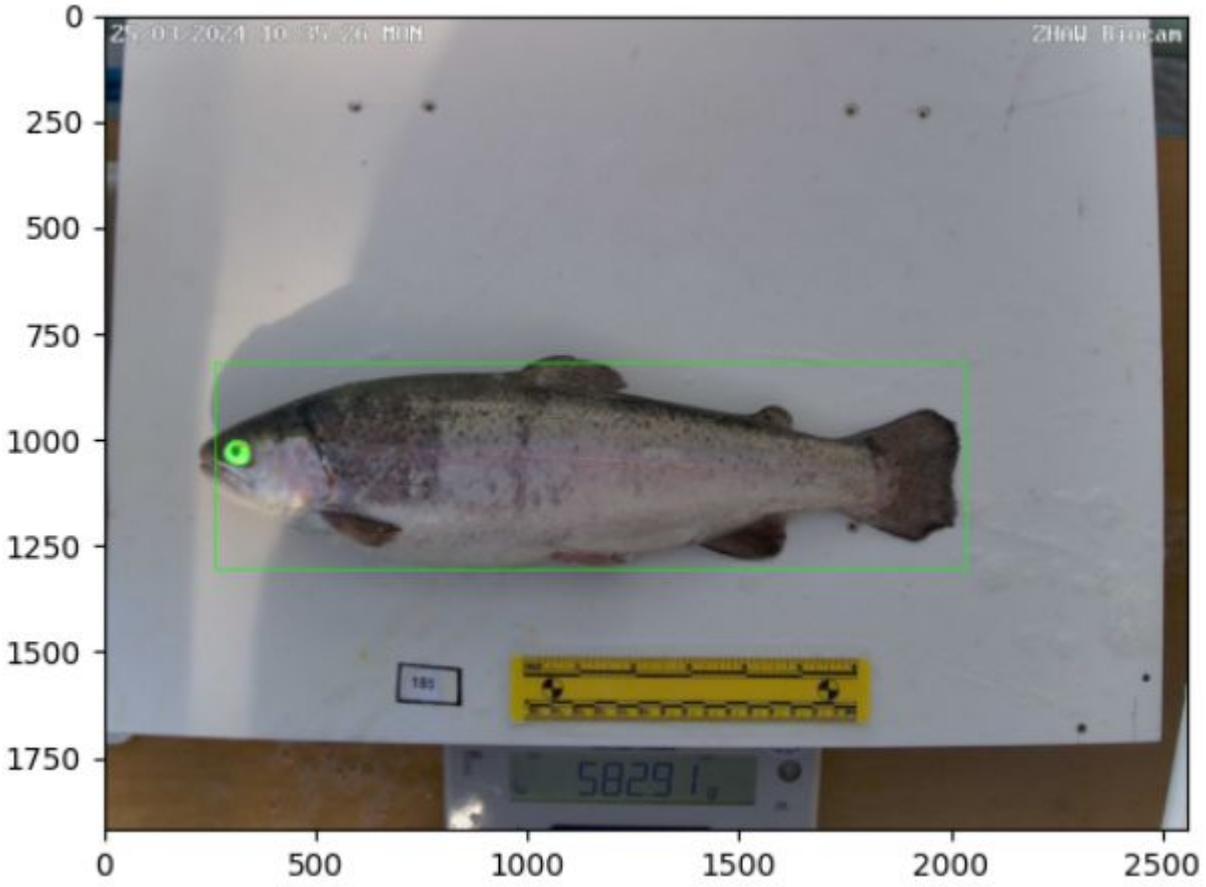
- Autoannotate() for segmentation model

```
auto_annotate(
    data,
    det_model="yolo11x.pt",
    sam_model="sam_b.pt",
    device="",
    conf=0.25,
    iou=0.45,
    imgsz=640,
    max_det=300,
    classes=None,
    output_dir=None,
)
```

Train on approx. 400 autoannotated images of fishes from all datasets

Can be used to extract detailed mask

Create eye estimator prompt from fish detection

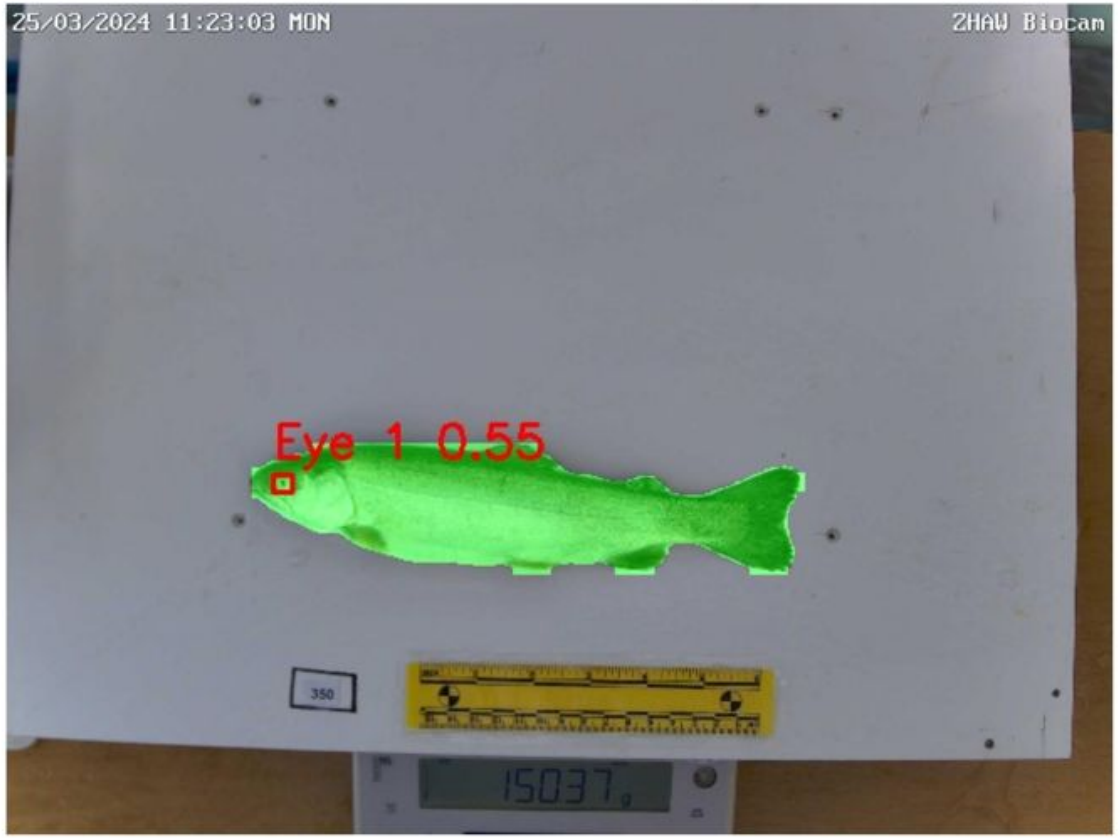


Use diseased and healthy fisheyes as input

Comparison: ZHAW Biocam_00_20240325112303.jpg

Original Image

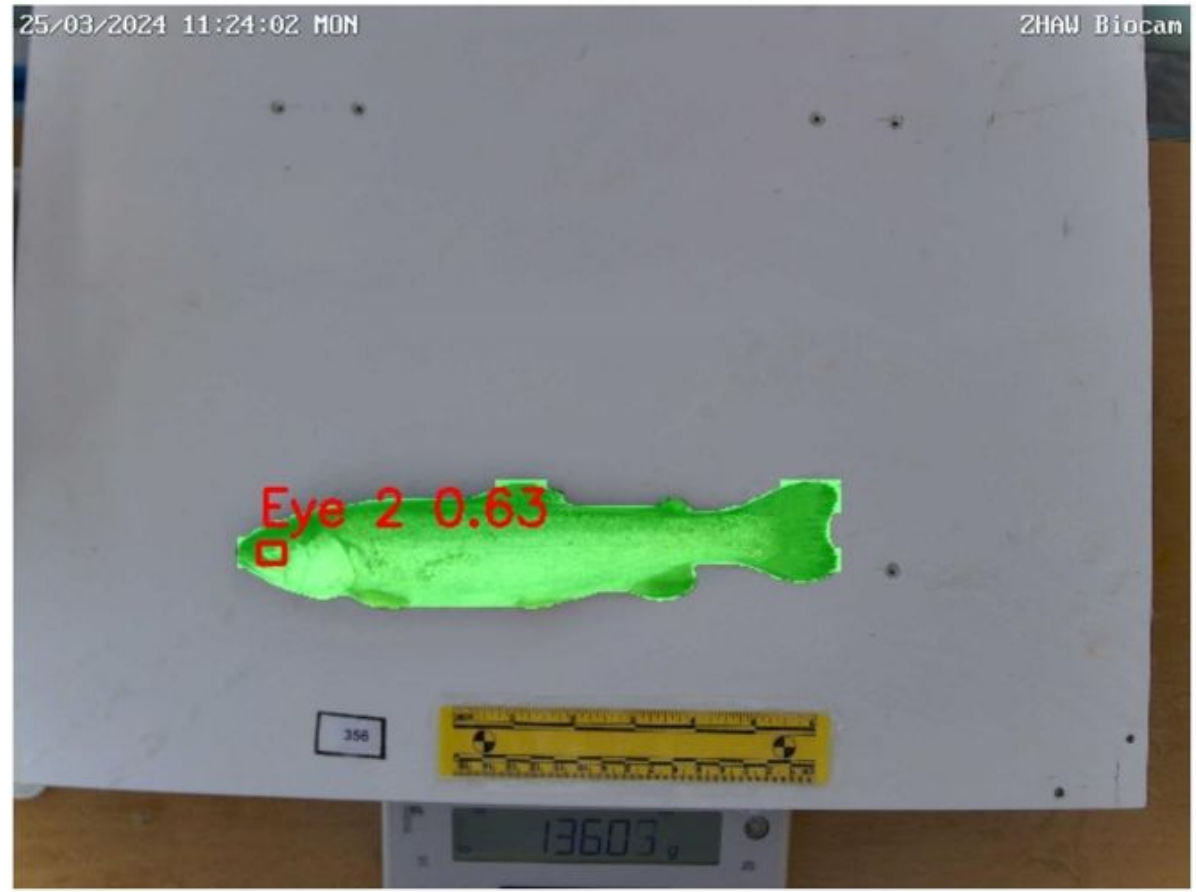
Prediction Image



Comparison: ZHAW Biocam_00_20240325112402.jpg

Original Image

Prediction Image

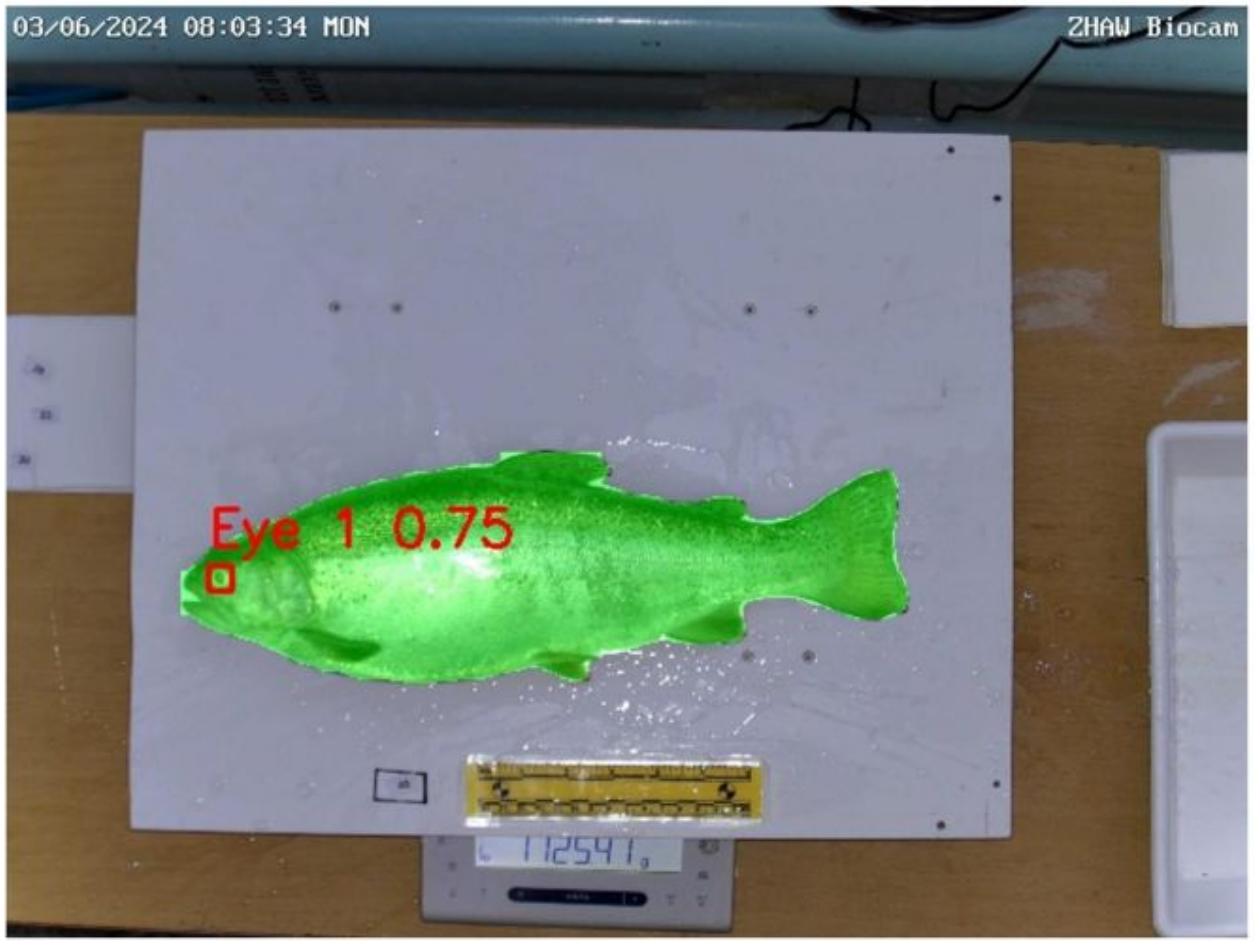


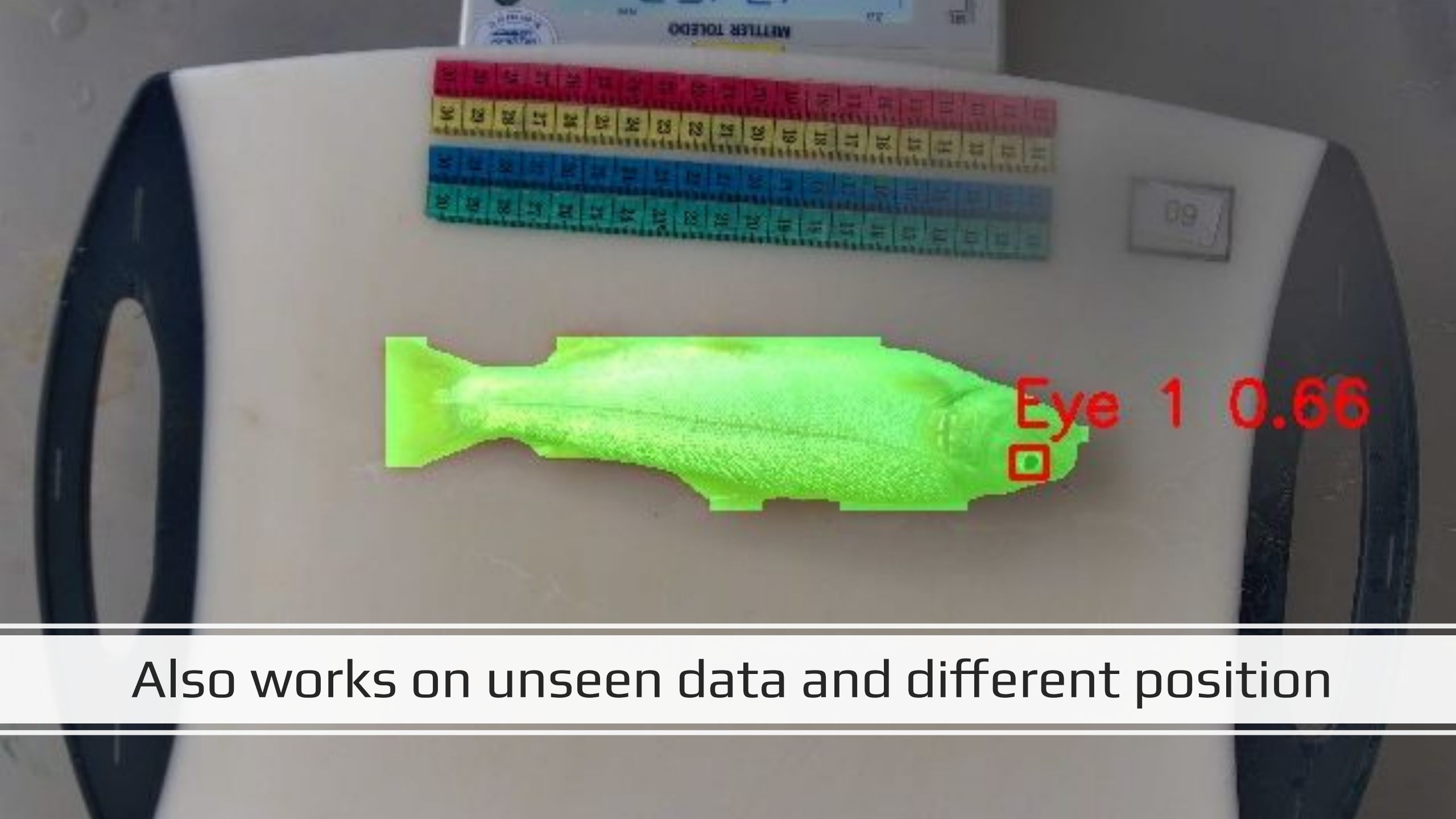
Is this really a diseased eye?

Comparison: ZHAW Biocam_00_20240603080334.jpg

Original Image

Prediction Image





Also works on unseen data and different position

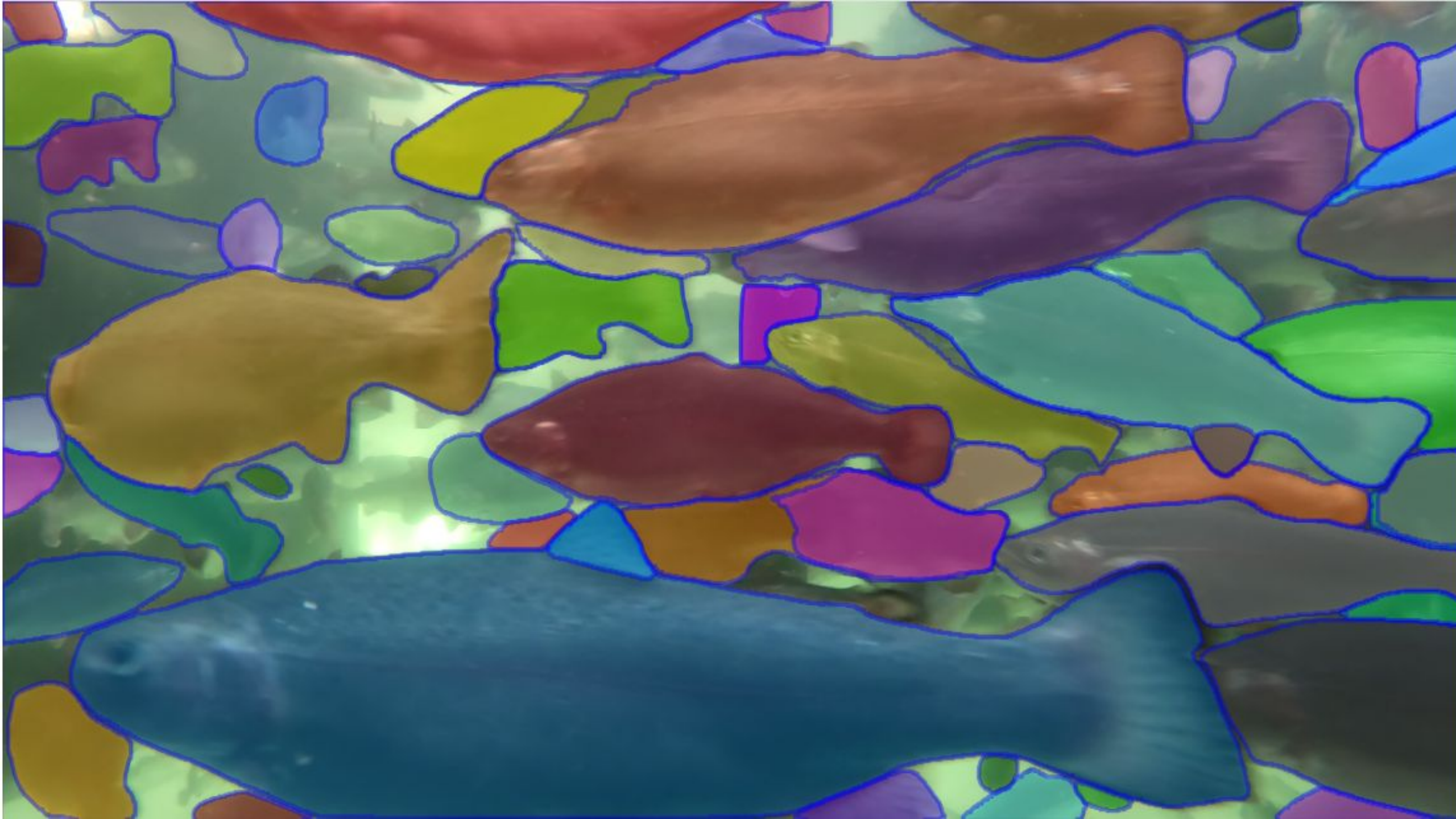
Does it work in real-life?

Pain points

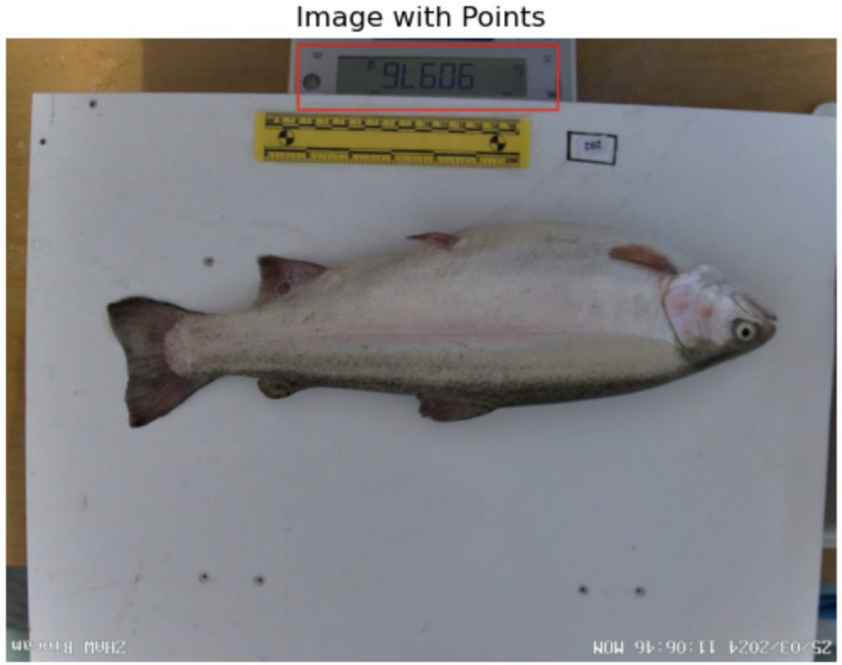
- Working with “agile” code
- What does the model actually learn
- Rapid finetuning capabilities

Future work

- Create a reference object correction for underwater images
- Process the images before detection
- Finetune on underwater images

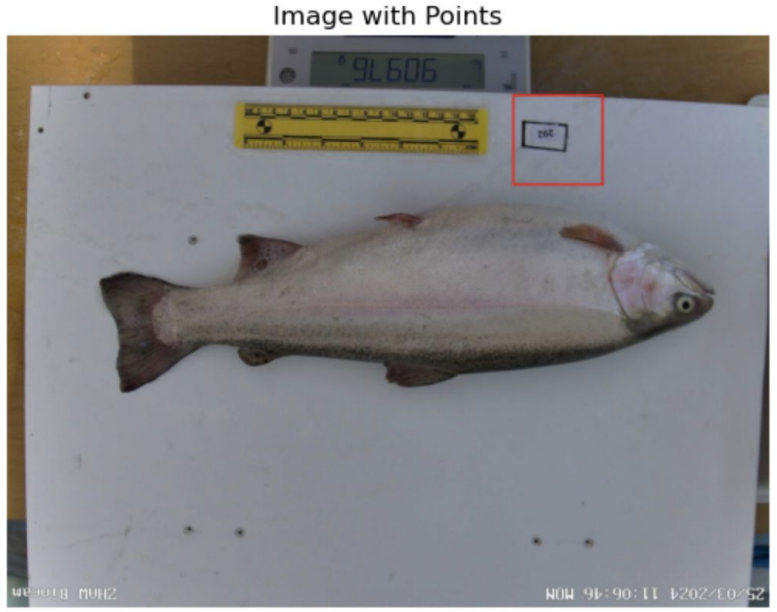


Fish bleeding gills clustering



'90976'

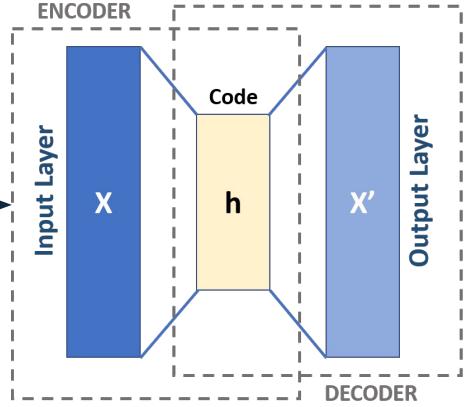
Fish weight extraction

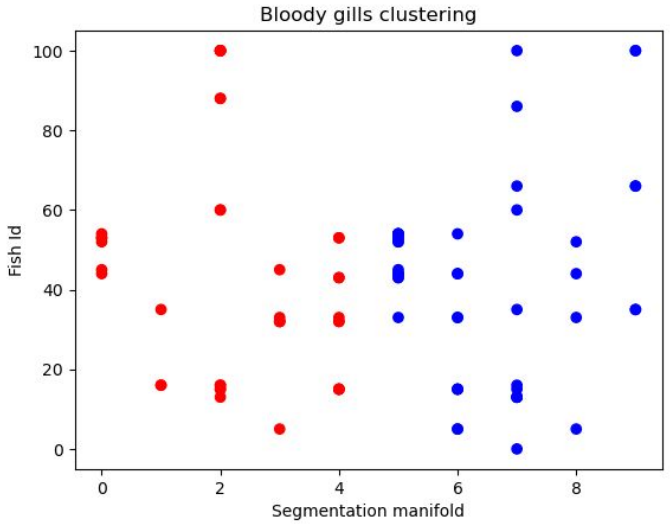


'292'

Fish label extraction

How to cluster?



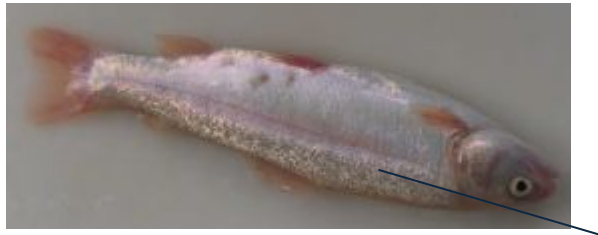


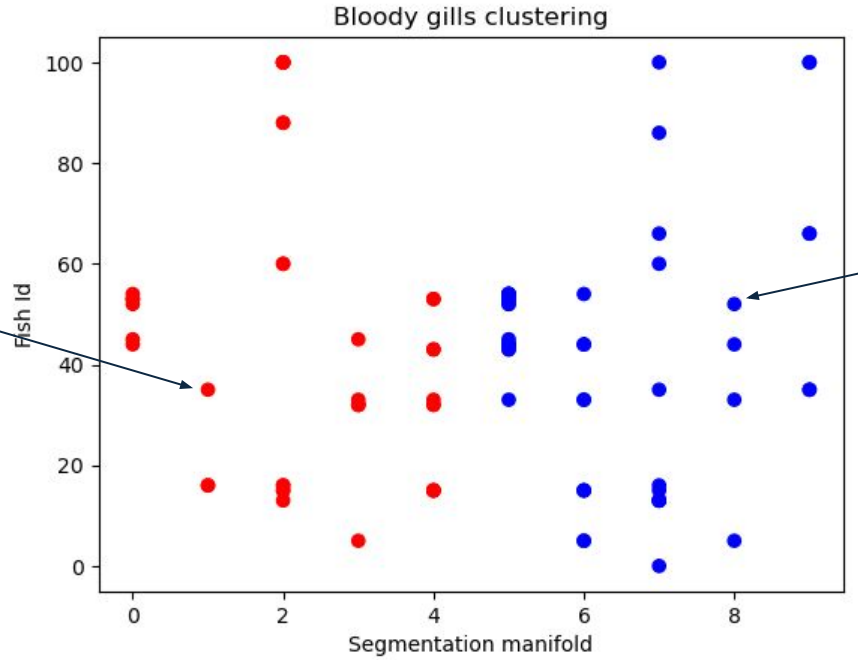
images
300x300

Regularized Autoencoder
with convolutional layers

Pattern extraction

Results




Bloody gills clustering
Fish Id
Segmentation manifold
0
20
40
60
80
100
0
2
4
6
8