FishSense

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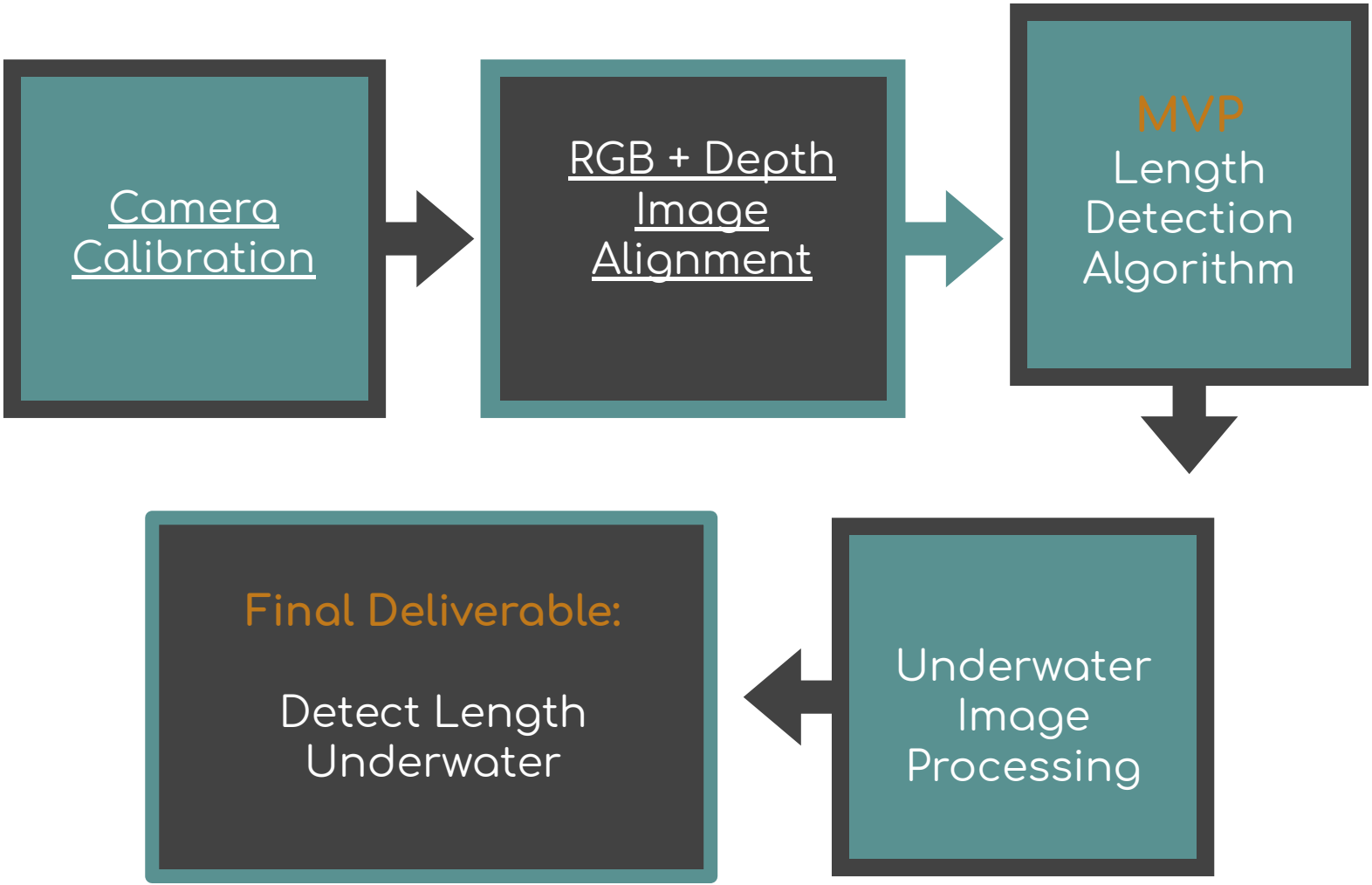
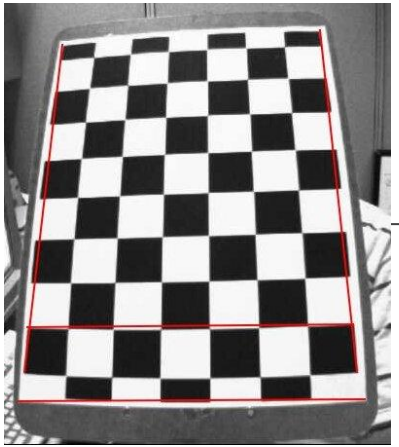

Camera Calibration
RGB + Depth Image Alignment
MVP
Length Detection Algorithm
Underwater Image Processing
Final Deliverable:
Detect Length Underwater

Camera Calibration

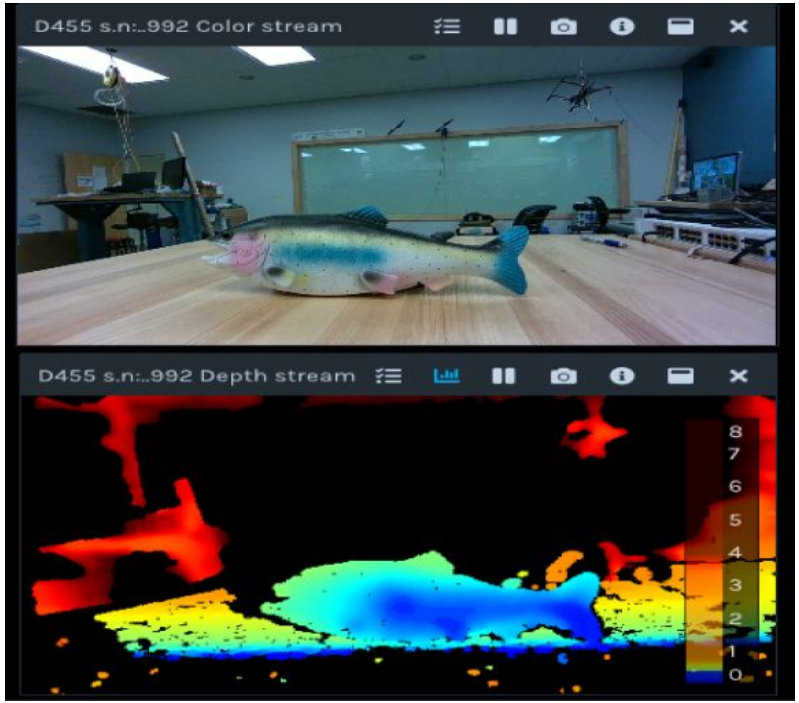


Site from openCV Camera Calibration

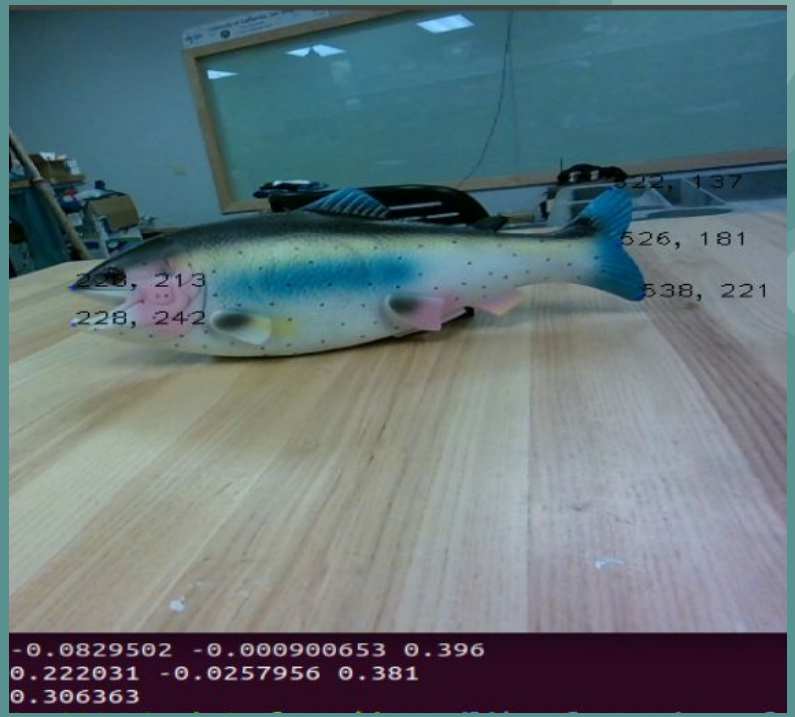
Align RGB & Depth Images

(1) Point-to-point mapping

(2) Create align filter



MVP: Fish Length Detection Algorithm



Length Detection Demos:

Manual vs. **Automatic**

Underwater Image Processing

HE / RGHS 1

CLAHE/ GC/ ICM 2

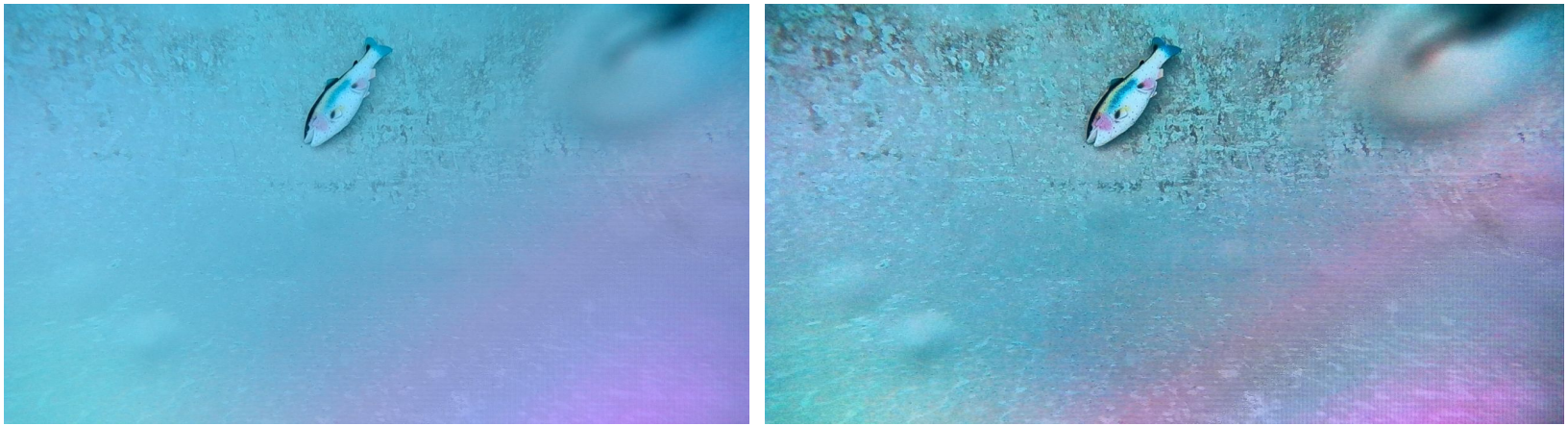
Dehazing 3

Gaussian + Canny 4

Noise Filteration on underwater images

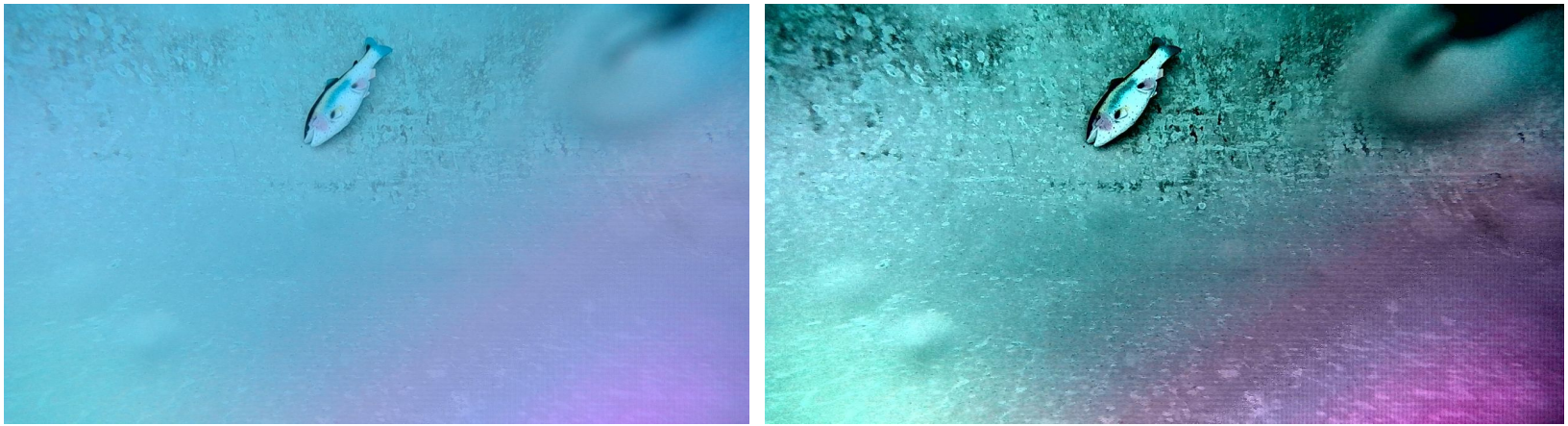
HE Image enhancement by histogram transformation (2011)

Noise Filteration on underwater images



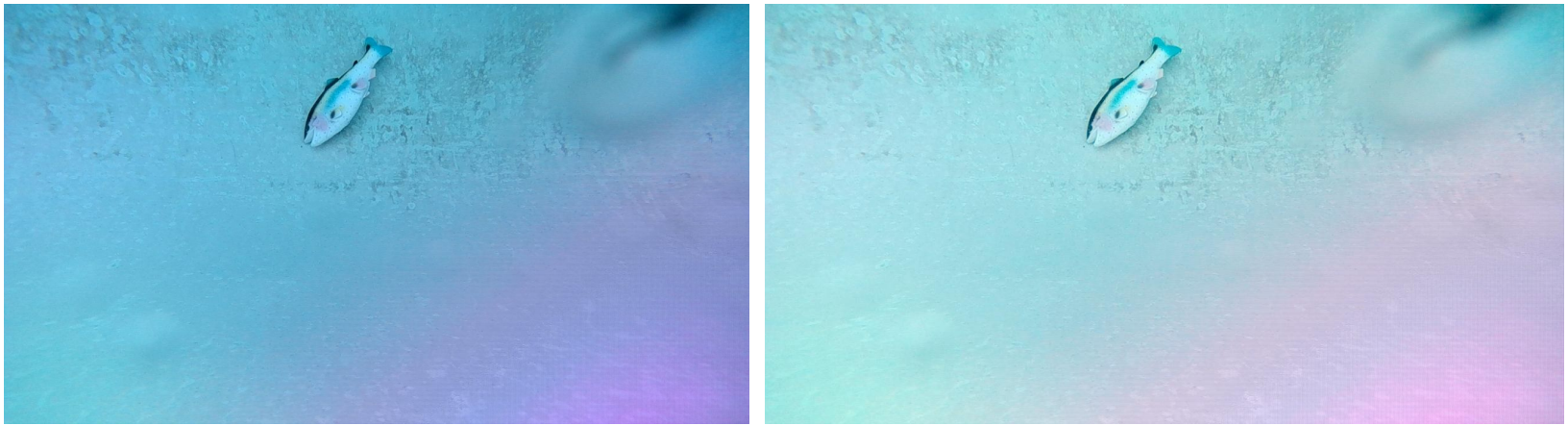
CLAHE Contrast limited adaptive histogram equalization (1994)

Noise Filteration on underwater images



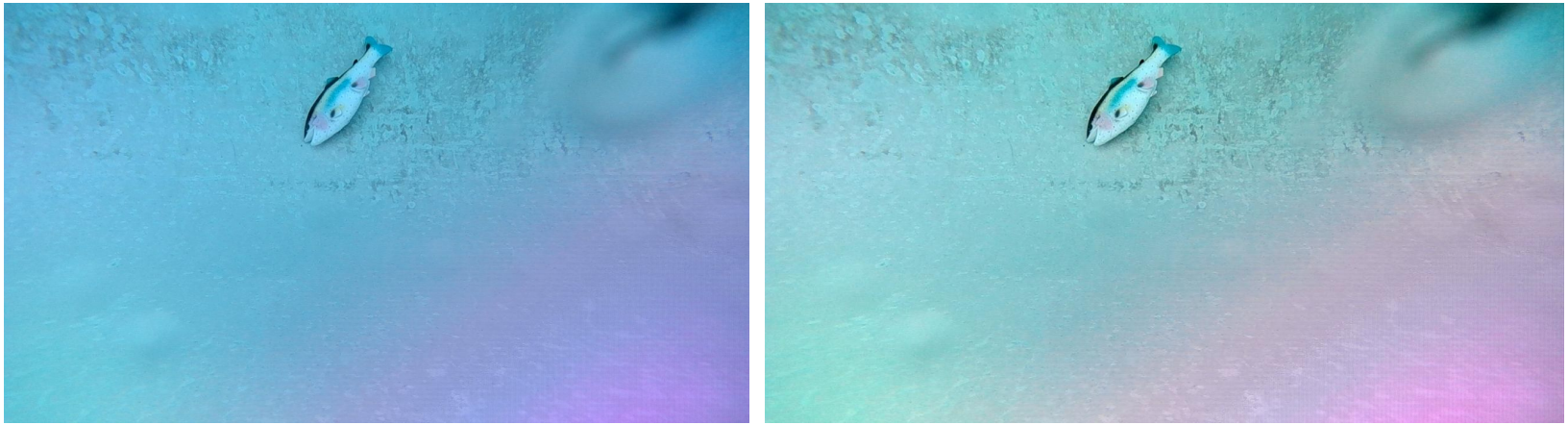
Relative Global Histogram Stretching Based on Adaptive Parameter Acquisition

Noise Filteration on underwater images



GC Gamma Correction

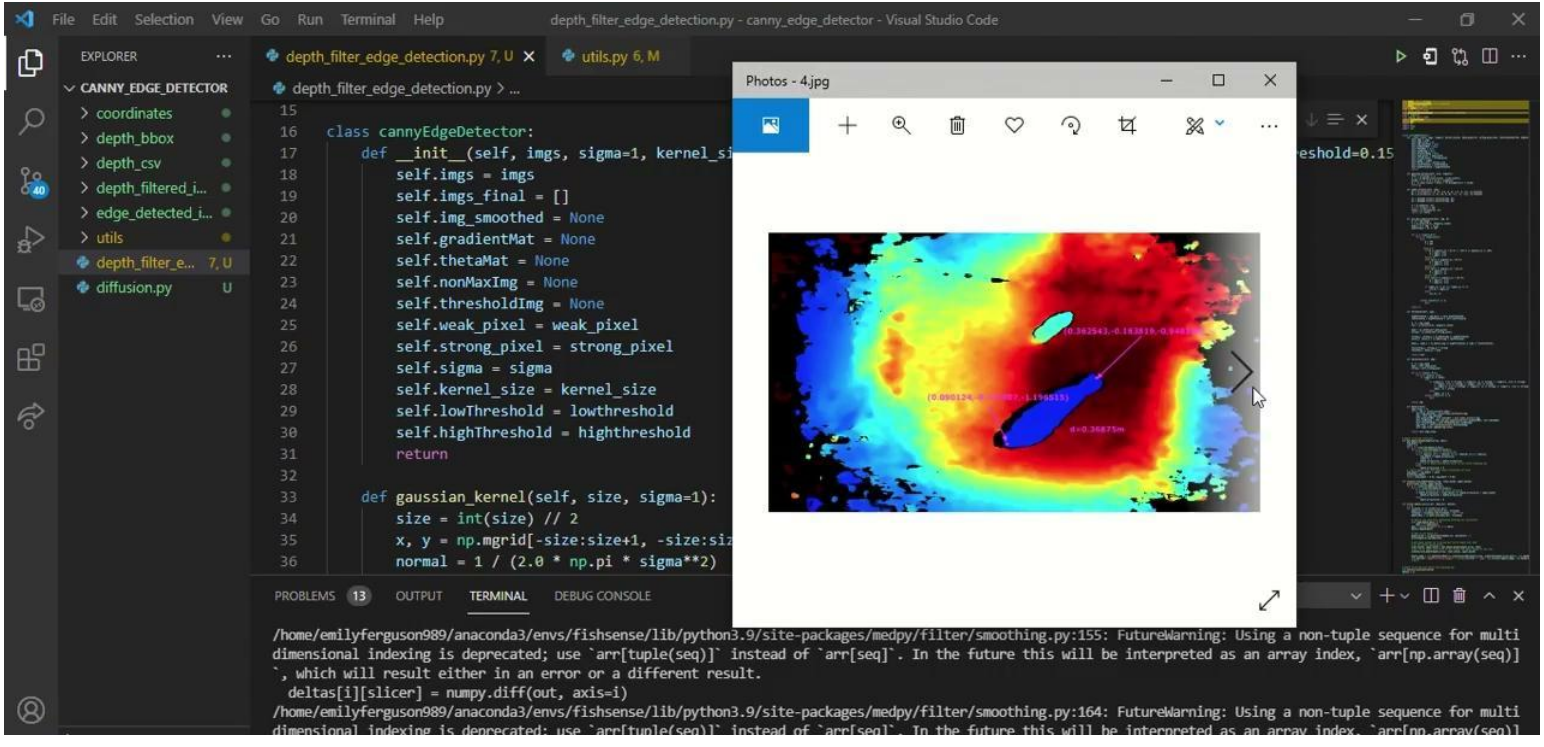
Noise Filteration on underwater images



ICM Integrated Colour Model (2007)

Underwater Image Processing Demo - Underwater Dehazing:

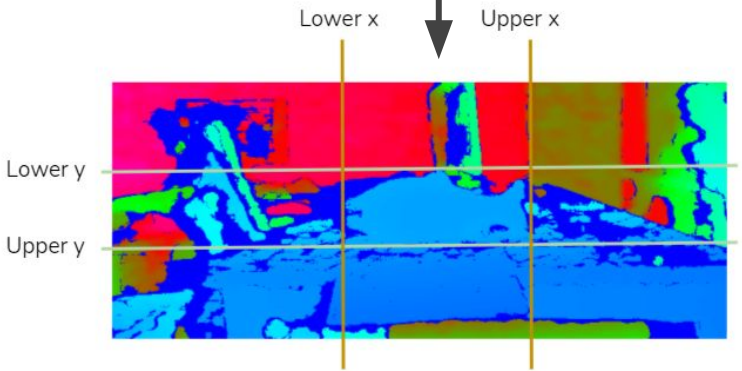
Noise Filtration Demo - Gaussian Blur + Canny Edge Detector

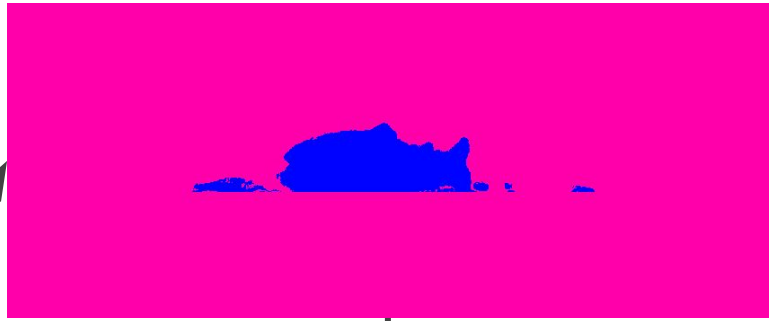


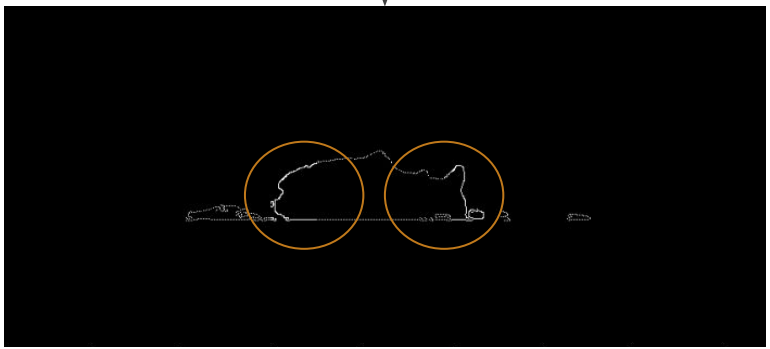
Current Framework

Current Length Detection Framework

0	0	0	4.028
0	4.085	4.07	4.056
0	4.114	4.085	4.07
4.128	4.114	4.114	4.085
4.173	4.158	4.128	4.128
0	4.173	4.158	4.158
0	0	4.188	4.173







Length Detection Framework Demo

Challenges

(1) Setup Difficulty (solved)

(2) Lack of Accurate Data

(3) Underwater calibration

Questions?