

Overview

Stream Gauge water pixel classification
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Unsupervised Learning

Generate Mask (One time processing)

1. Average and Subtract

2. Generate Mask
(with 4 color regions)

Pick ROI and Generate Hogs

3. Sample ROI
(from each region)

4. Generate HOGs
(Using ROI)

5. Learn Regions using ANN

(Run HOG through ANN to learn the 4 regions)

Daily Usage process (After the learning process)

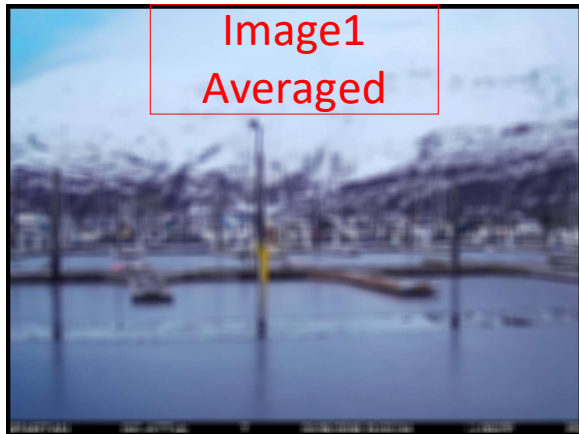
6. Load Image

Run an Image through ANN

7. Output Mask

Generate image of Water Pixels

1. Averaging and Subtracting



Load Image1

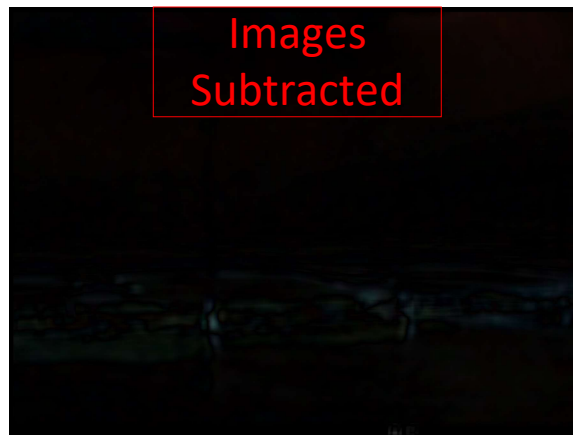
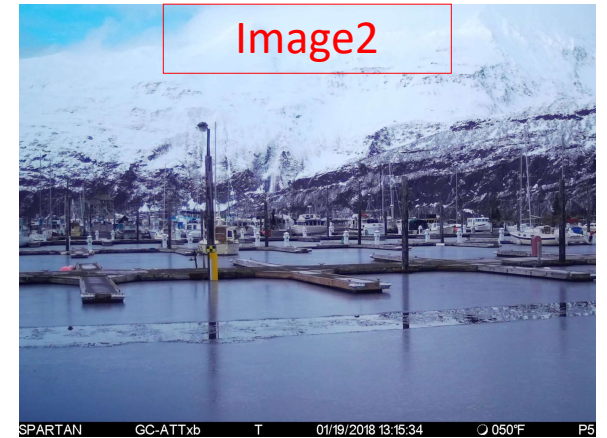
Load Image2

Average Image1

Average Image2

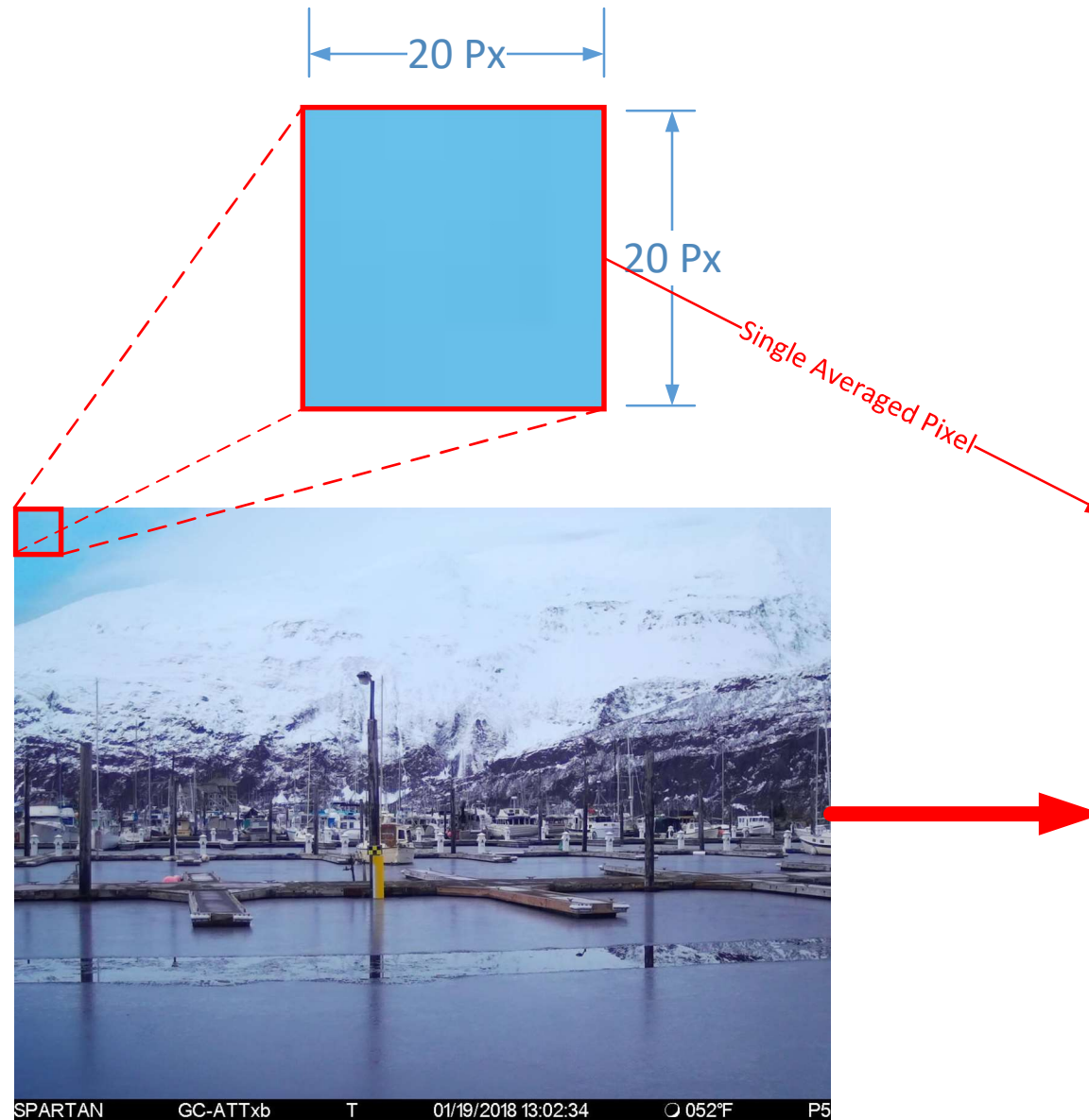
Subtract Averaged
Images

Images
Subtracted



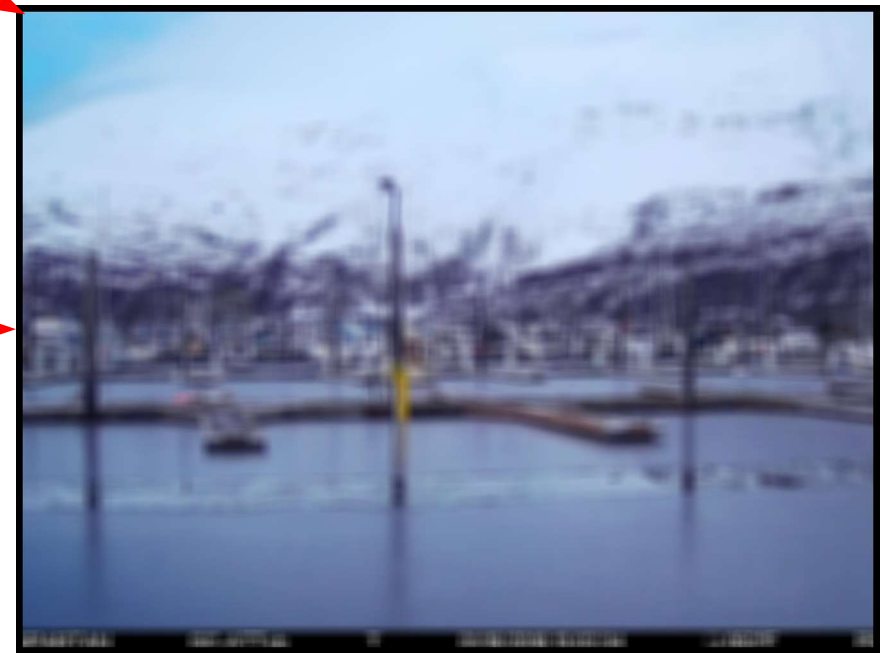
1. Averaging and Subtracting (Averaging Details)

A 20 x 20 block of pixels is averaged to produce a single center pixel for the resulting Averaged image



This produces the below averaged image which reduces artifacts by small differences in the image.

The averaged image ends up with a board of 10 pixels we are unable to create an average for



Original Image

Averaged Image

2. Generate Mask

All images averaged and subtracted.

(Exaggerated brightness as it was too dark without for example)



Region mask generation

Example only using equalizeHist, real mask will use connectedComponents



3. Sample ROI

Image converted to greyscale
(Current OpenCV method requires greyscale)

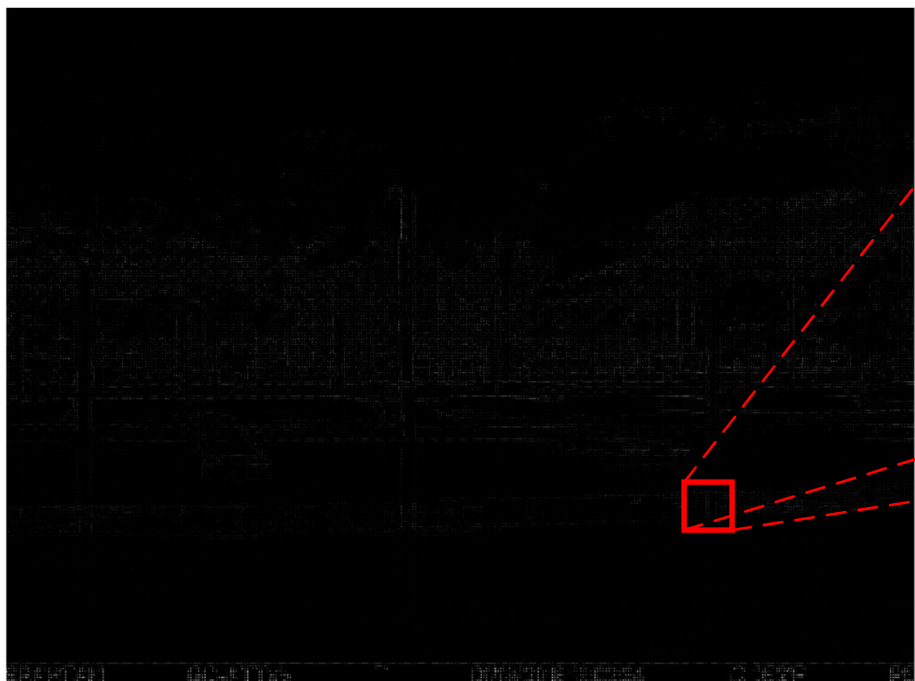
**Grab sections within
each Mask Region**





Extracted ROI

4. Generate HOGs



Resulting HOG

5. Learn regions using ANN

6. Load Image

7 .Water Pixel Classification