Using object oriented image analysis to classify open water, sea ice, and seals in Johns Hopkins Inlet in Southeast Alaska

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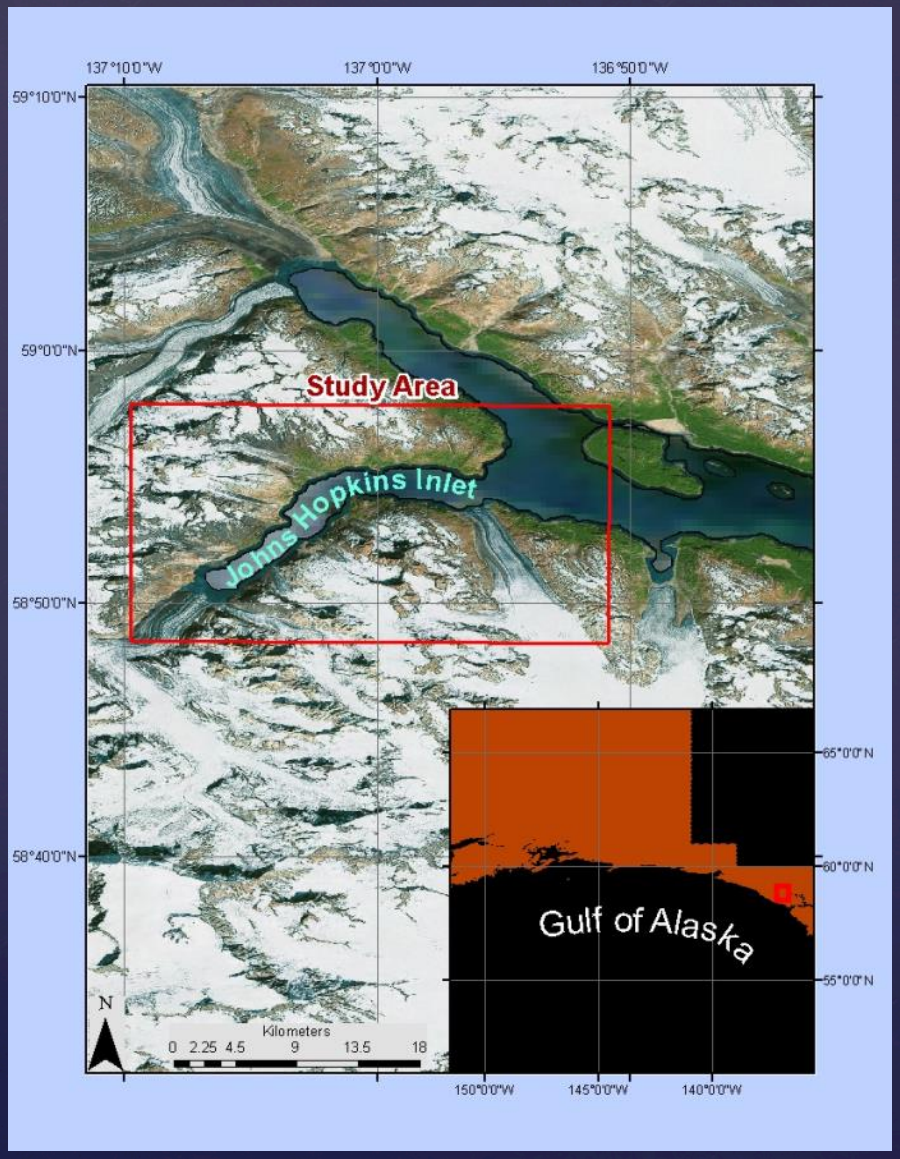
Background Information

- Glacial ice is important for harbor seals
- Most supervised classification only takes into account pixel values
- Automating the process can greatly improve efficiency of surveys

Johns Hopkins Inlet



- Located in Glacier Bay National Park
- 9 miles long, 1 mile wide (NPS)
- Home to a variety of marine mammals
- Glacier is actively advancing

Data Type Used

Aerial imagery

- 4 cm spatial resolution
- 8 bit radiometric resolution (256 DN values)
- RGB spectrums

Examples of imagery used

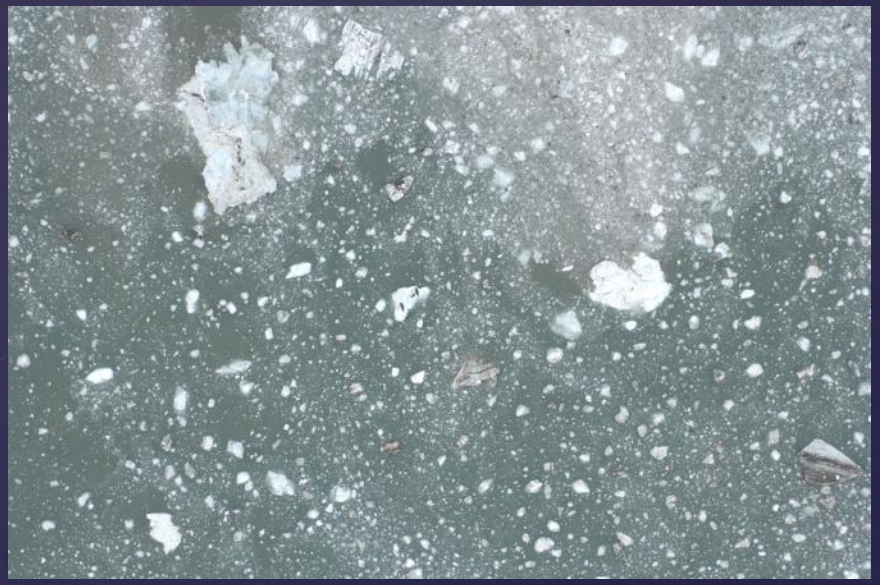
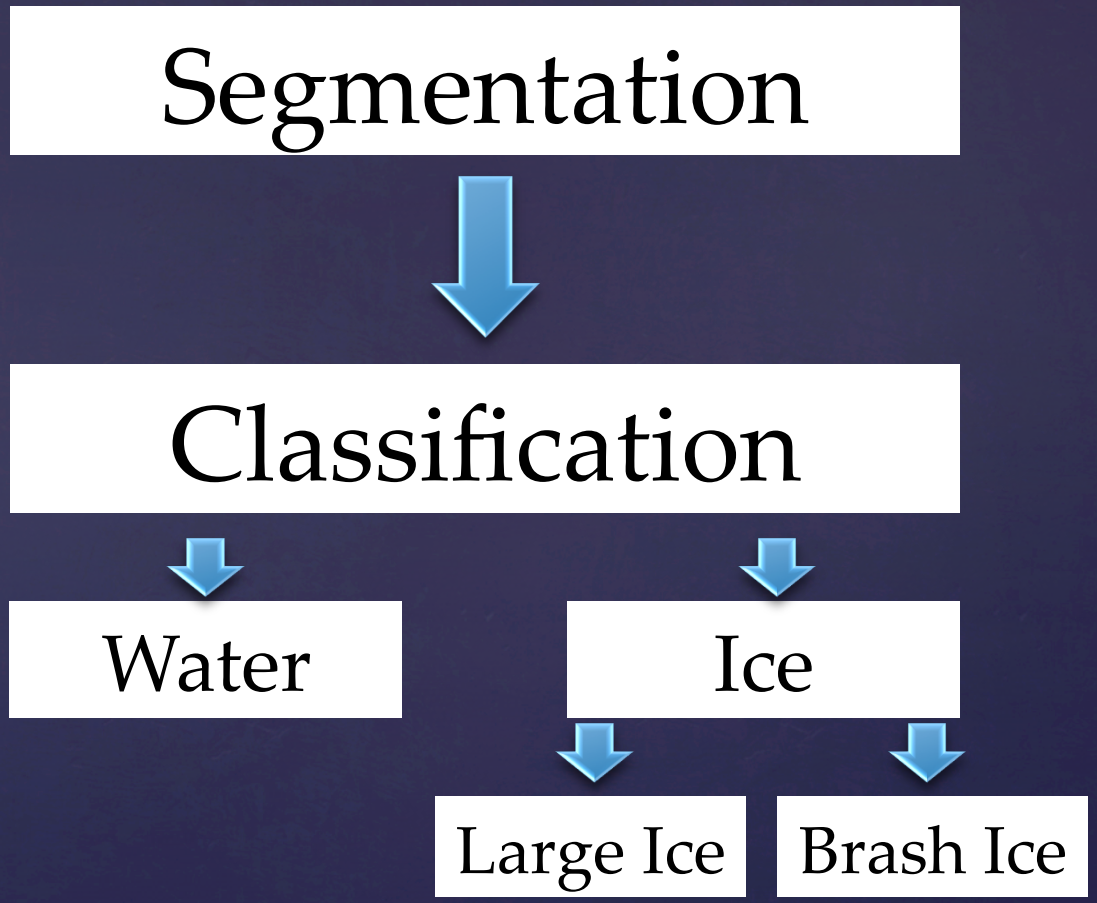
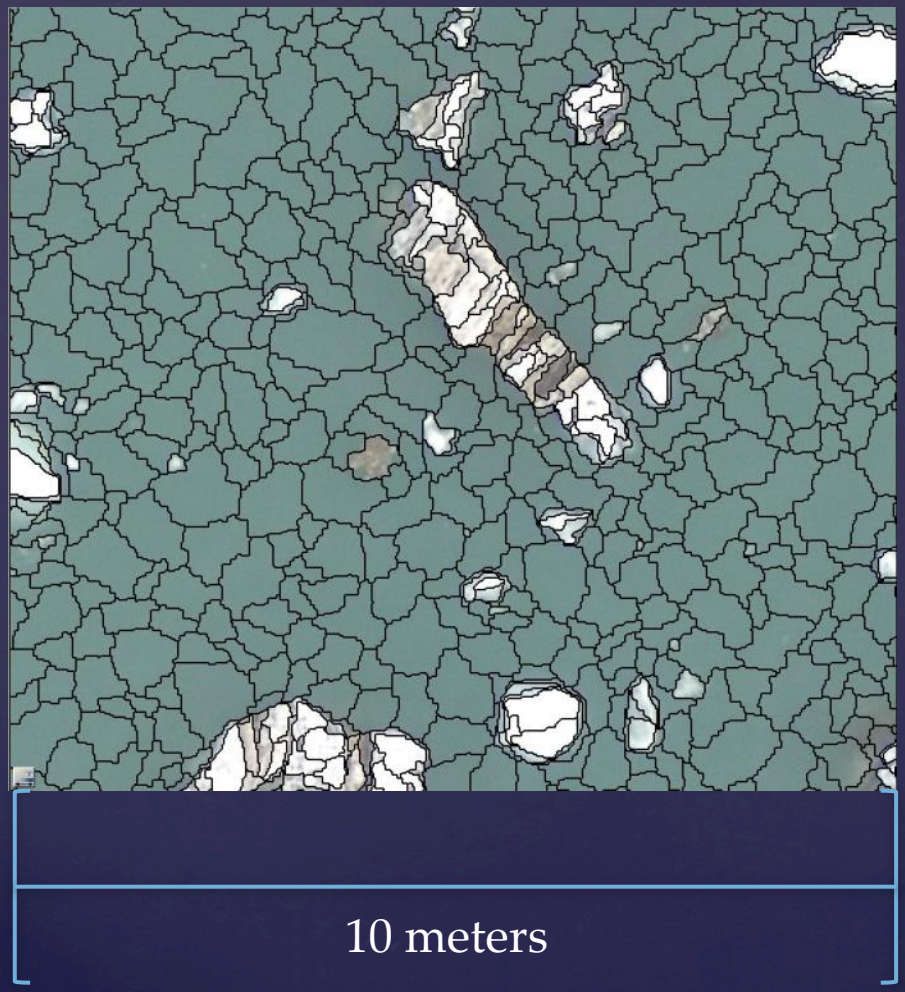


Image Analysis Procedure



Segmentation

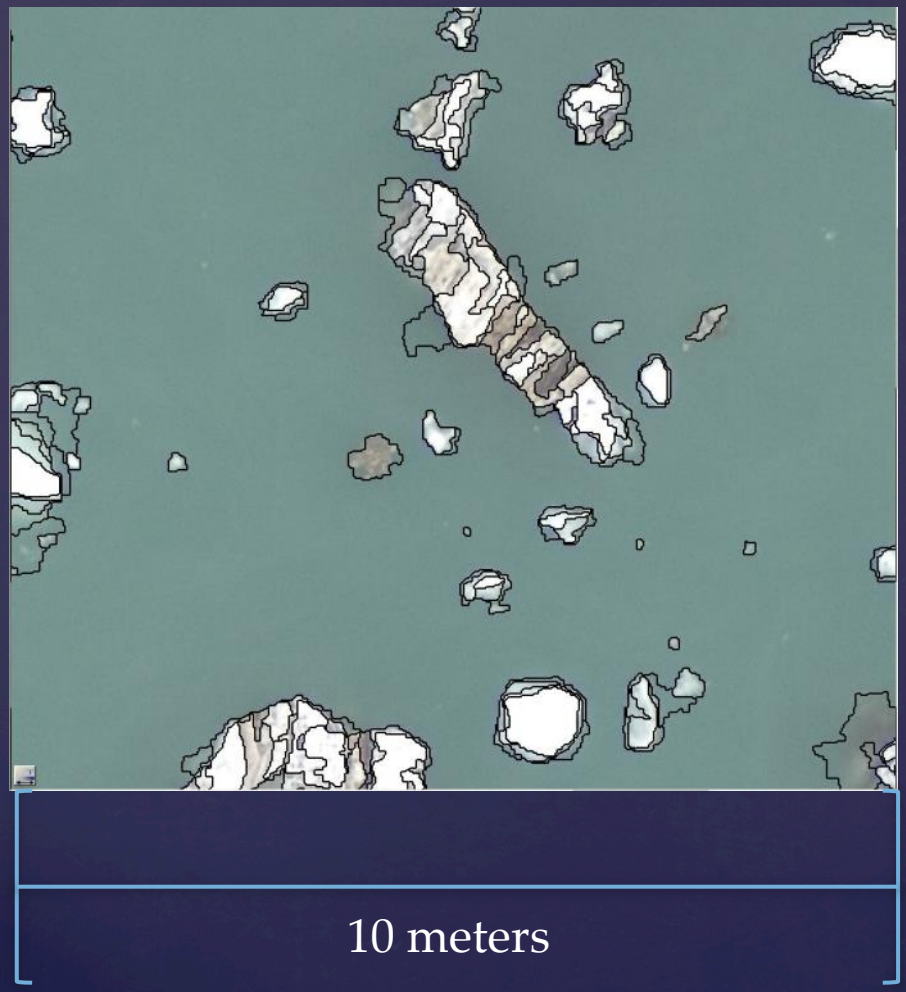


Multiresolution Segmentation

Shape= 0.8

Compactness=0.3

Segmentation



Spectral Difference Segmentation

DN difference=5

Classification

First round of ice classification

- Focused on hue and texture

Classification

First round of water classification

- Used shape index and homogeneity

Classification

Second round of ice classification

- Used a RGB layer statistics and dissimilarity

Classification

Second round of water classification

- Used area and DN values

Classification

Final round of ice classification

- Classified the remaining object
- Merged objects together

Classification

Second level of object classification

- Area >5m^2=orange
- Area <5m^2=red

Discussion

- Ruleset was good for identifying impure ice
- Wasn't ideal for high density flows
- I wasn't always able to accurately classify seals

Conclusion

- Great for rapid classification
- Allows for increased classification accuracy
- Harbor seals are very difficult to classify.

Future Work

- Use multispectral data
- Automate the process