Identifying Whales From Aerial Images

Niall Williams and Harry Zhou
Davidson College Departments of Mathematics and Computer Science

What and Why

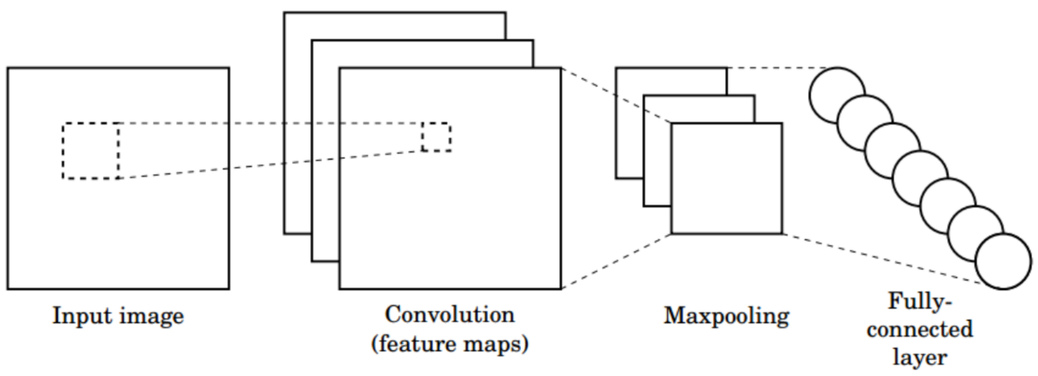
- Train a model that can identify the individual whales in pictures taken from a helicopter
- Right Whales are endangered: less than 500 remain
- Tracking makes researchers' lives easier

Distinguishing Features

- Right whales are prone to whale lice, which create unique white patches on the whale head

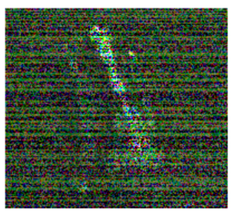
Model Selection

- Convolutional Neural Network (CNN)
  - Dataset is all images, so a CNN is best fit
  - Multiple filters that each learns specific features of the image
  - Pool the results to extract the most important features
  - Repeat as necessary, predict output based on selected important features



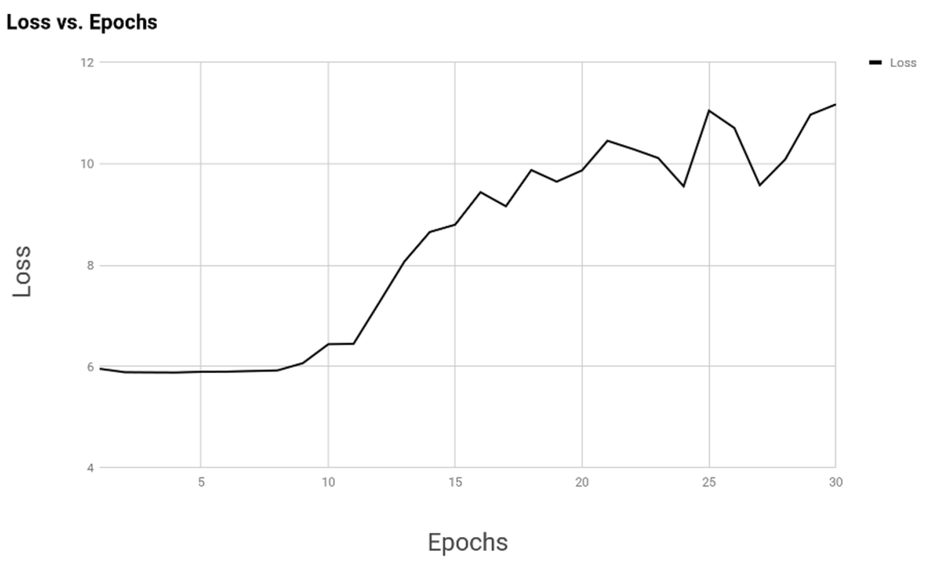
Experiments

- Part 1 – Process The Images
  - Use the whale's bonnet and blowhole to locate the head
  - For each image, rotate the image to align the points uniformly
  - Crop new aligned image
- Part 2 – Train A Whale Classifier
  - Use "passport photos" of whales as training data
  - Augment dataset via controlled image distortions and transformations
  - Run the aligner on the testing data
  - Test trained model on the processed testing data



Results

Average Accuracy After 20 Epochs: **5.08508%**



Acknowledgements

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Sources

- Whale dataset: https://www.kaggle.com/c/noaa-right-whale-recognition
- CNN Image: http://www.vaetas.cz/posts/intro-convolutional-neural-networks/

DAVIDSON