REI 603M - Final Project
Predicting fish location based on their otoliths

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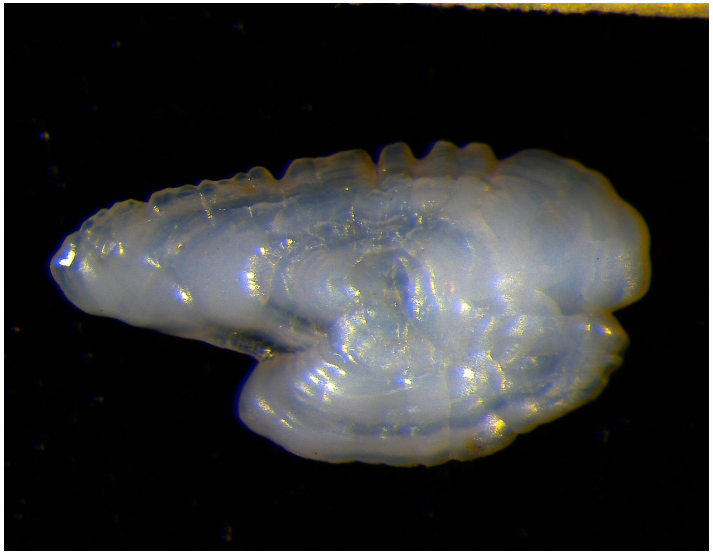
Introduction

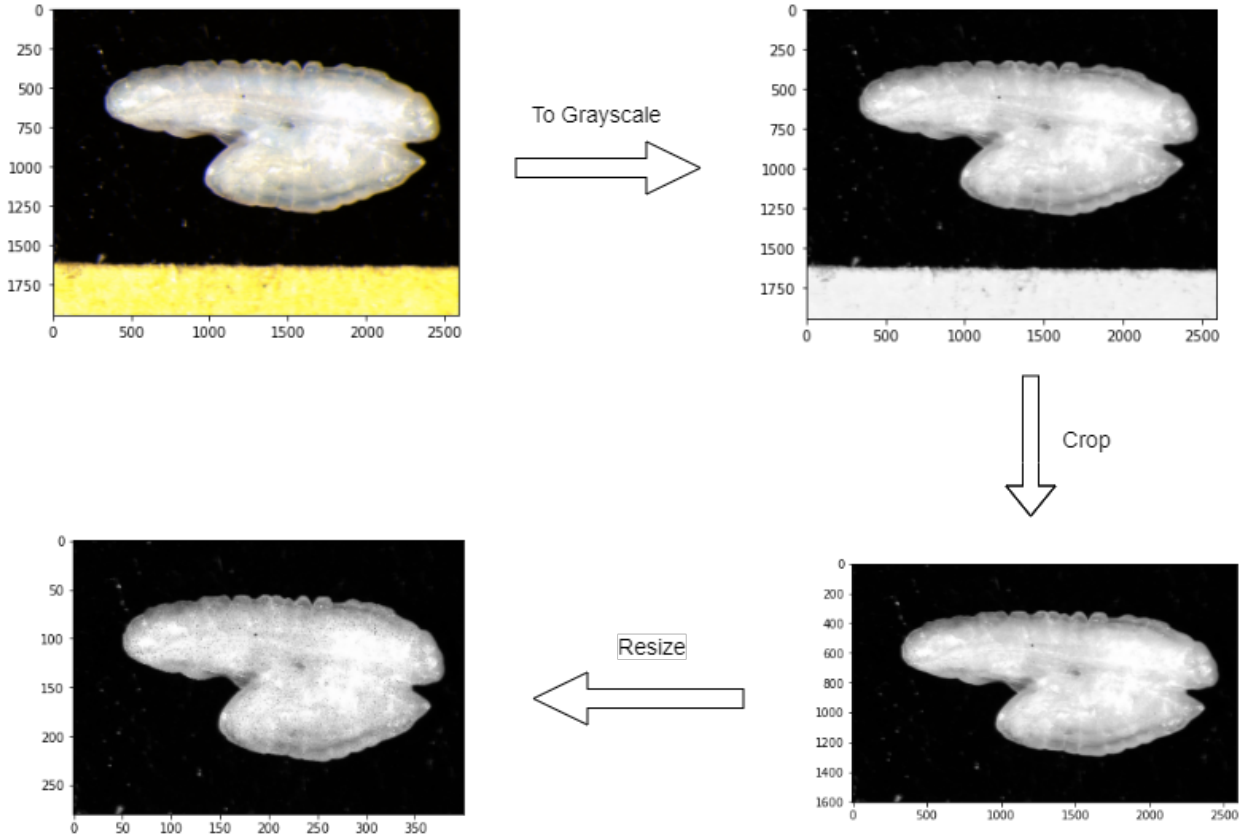
The data contains images of otoliths from herrings that were fished in eight different regions in Alaska. The goal of this project was to build a model that predicts a fish's location based on an image of it's otolith.

The data



Data processing

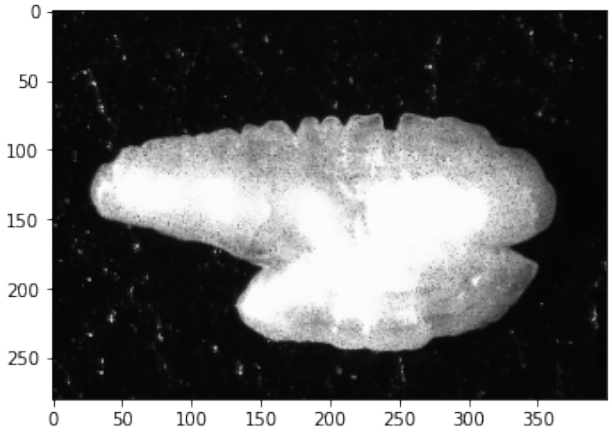
- Processing Training Images

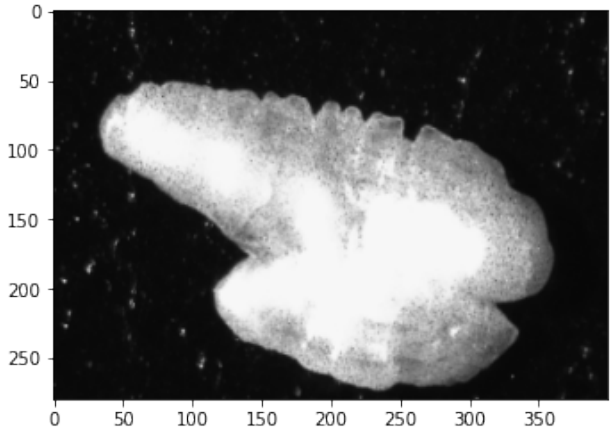


- When processing the testing images the cropping step was dropped.

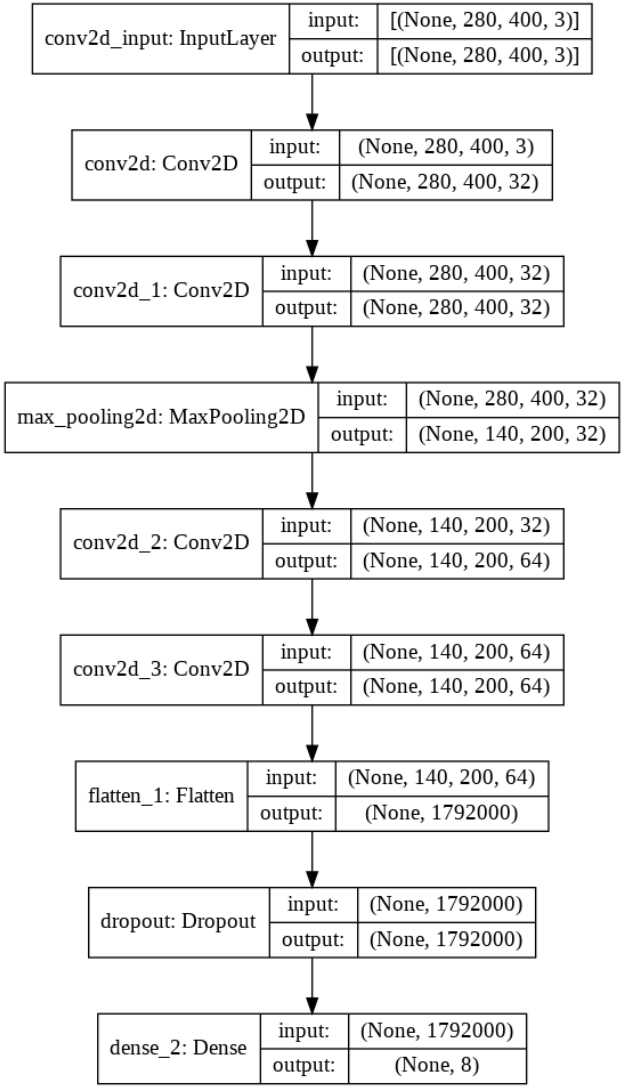
Data Augmentation

- Only 630 images in the training set.
- Augment the data by zooming and rotating images from the training set.
- After augmentation there are on average 1000 images per class in the training data.

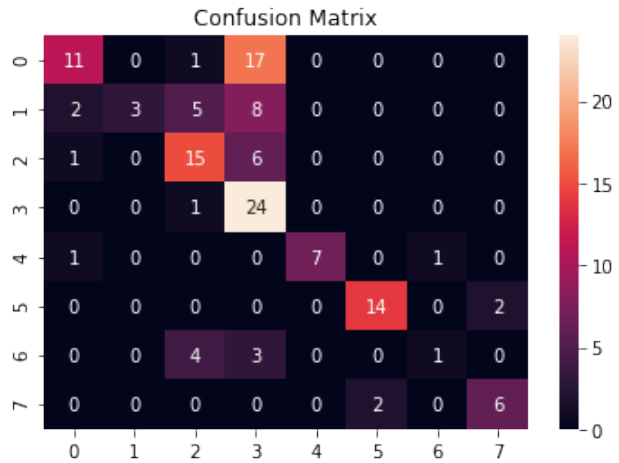




Base Model



- After training this model for around 150 epochs we got 60% testing accuracy.



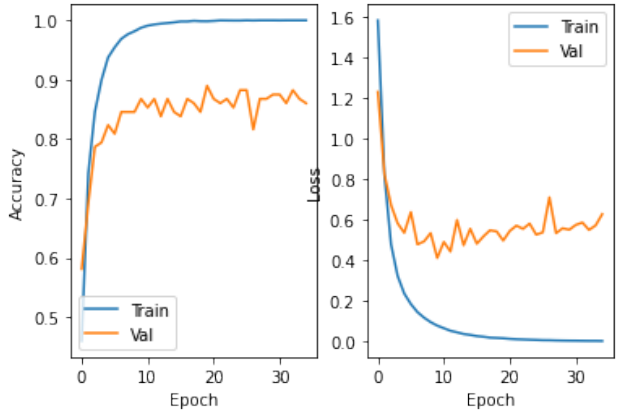
Main model

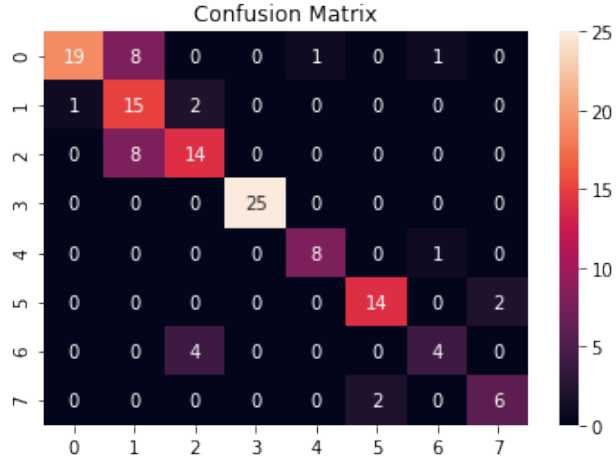
- The main model was the VGG16[1] deep convolutional network from the Visual Geometry Group at University of Oxford
- The model was imported with pre-trained weights and the first layers of the network were frozen in the training phase.
- The model was trained for 60 epochs with early stopping conditions based on validation accuracy.

[1] Very Deep Convolutional Networks for Large-Scale Image Recognition

Model Performance

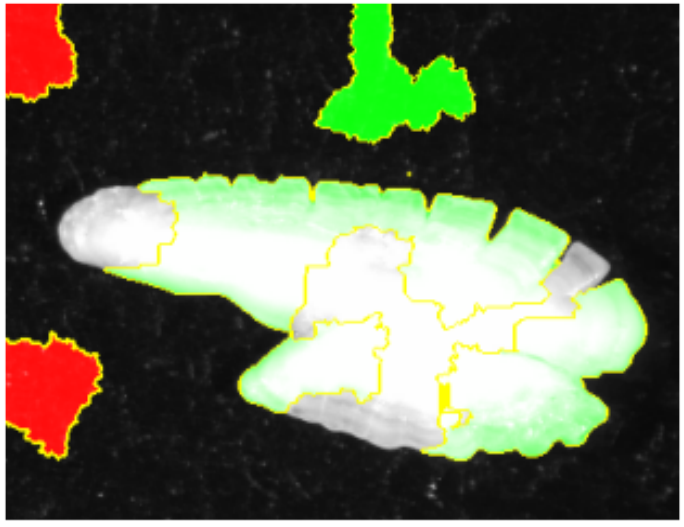
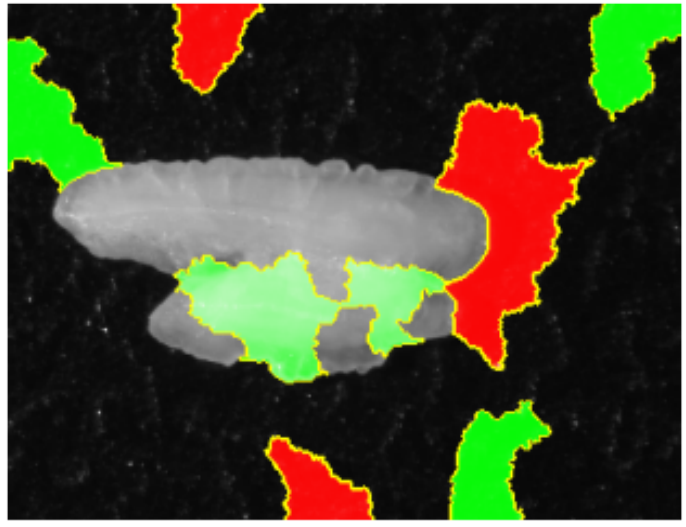
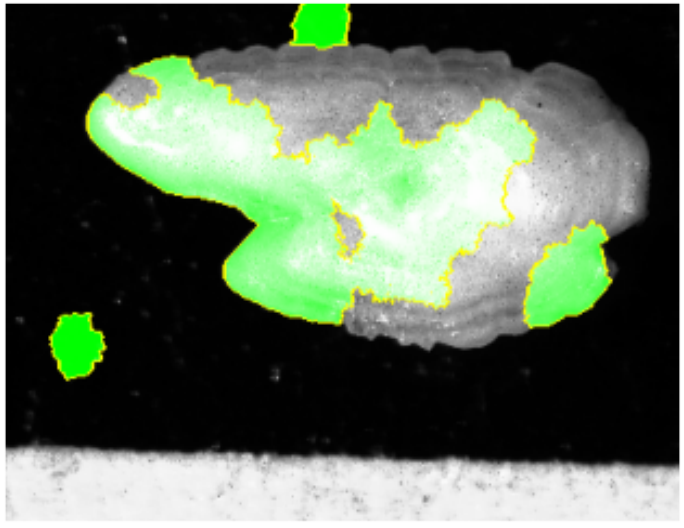
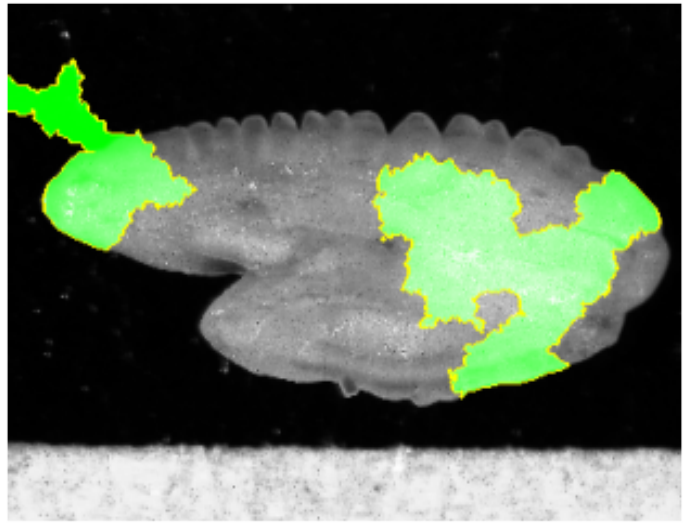
- This model achieved 78% testing accuracy after training for 35 epochs.
- The model reached 98% training accuracy after only 10 epochs.





Explainability

- I used `lime` to try understand how the main model makes predictions

Model deployment

I created a simple web-app using Flask to interact with the model. I put the app up on an AWS-EC2 instance, the app can be accessed here.

Thanks.