

Humpback Whale Identification Challenge: a Kaggle competition

Fabian Glöckle, Jochen Sautter, Benjamin Wilhelm

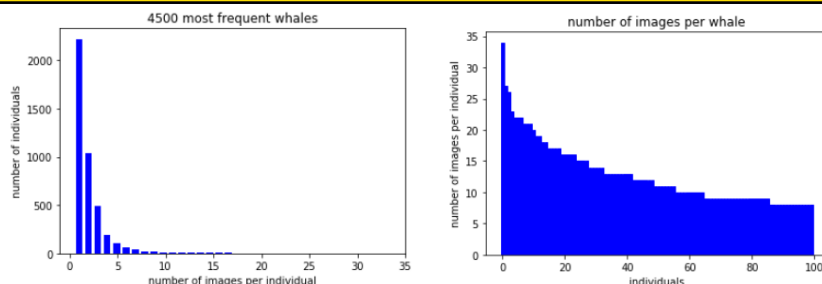
The Challenge

- 40 years of scientific whale monitoring generated a large collection of images of tail flukes of Humpback whales
- 25,000 images were assigned to >4,000 individual whales by researchers
- Try to recognise the whales by their flukes with a deep learning model



Statistics

- Sparse and unevenly distributed data base:
- 9,500 labeled images of 4,500 whales as training data
 - 2,000 whales, where only one image is available
 - 1,000 whales with 2 images
- 15,000 images as test data
- Images differ in shape, resolution, color / grayscale



Our approach

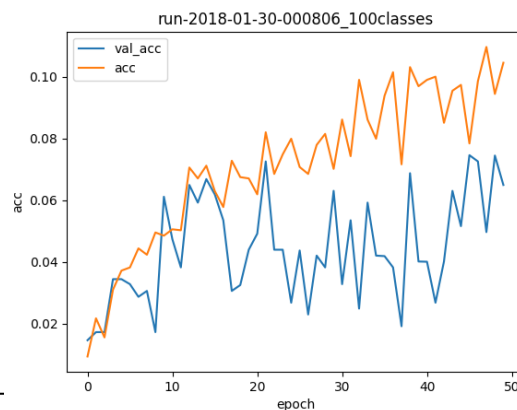
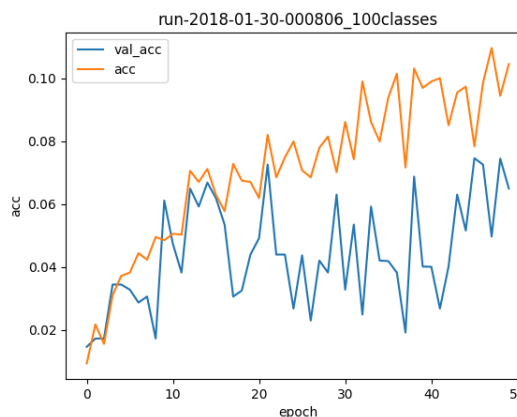
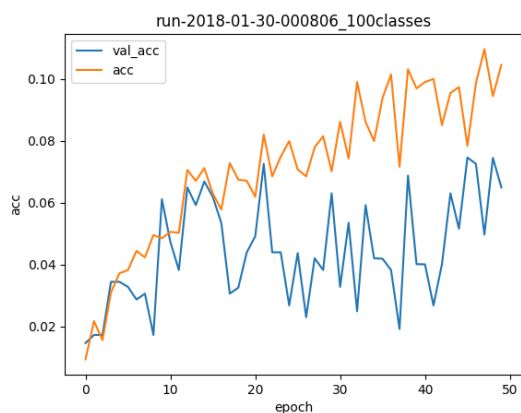
- Use large CNNs pretrained on image-net Database as provided by Keras library
- Add one or two dense layers for our classification task
- Freeze parameters of trained cnn base-models, and train on our task with dense layers
- Base Models used: InceptionV3, Xception, ResNet50

Fine-tuning

- After training of dense layers unfreeze the 2 top layer-blocks of the cnn base-model and train more epochs
- Use Data Augmentation: shifting, stretching, rotating
- Optimise Hyperparameter configuratoin using "HyperbandSter" framework (successive Halving combined with Bayesian optimisation)

Results

- 4 plots with
 - 3 or 4 models (bars for Accuracy / MAP)
 - MAP / Accuracy bars for 3 / 10 / 50 / 200 / 1000 / 4250 whales
 - plots with some learning curves
 - plot with Hyperband results



Asdf

