Identifying animals in camera trap footage

Project Update - Final Milestone

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Module: Machine Learning Lab
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Data

- **dataset:** Island Conservation Dataset (Pacific Ocean & Caribbean)
  → 100 k RGB images, 47 classes, imbalanced

- only included images with a single animal (5k images excluded)

- **challenges**
  - animals are often only **partly visible**
  - many different **landscape types/backgrounds**

Baseline & Model

Baseline: predict majority class

Baseline accuracy = 25% (5 classes, balanced)

Image Preprocessing

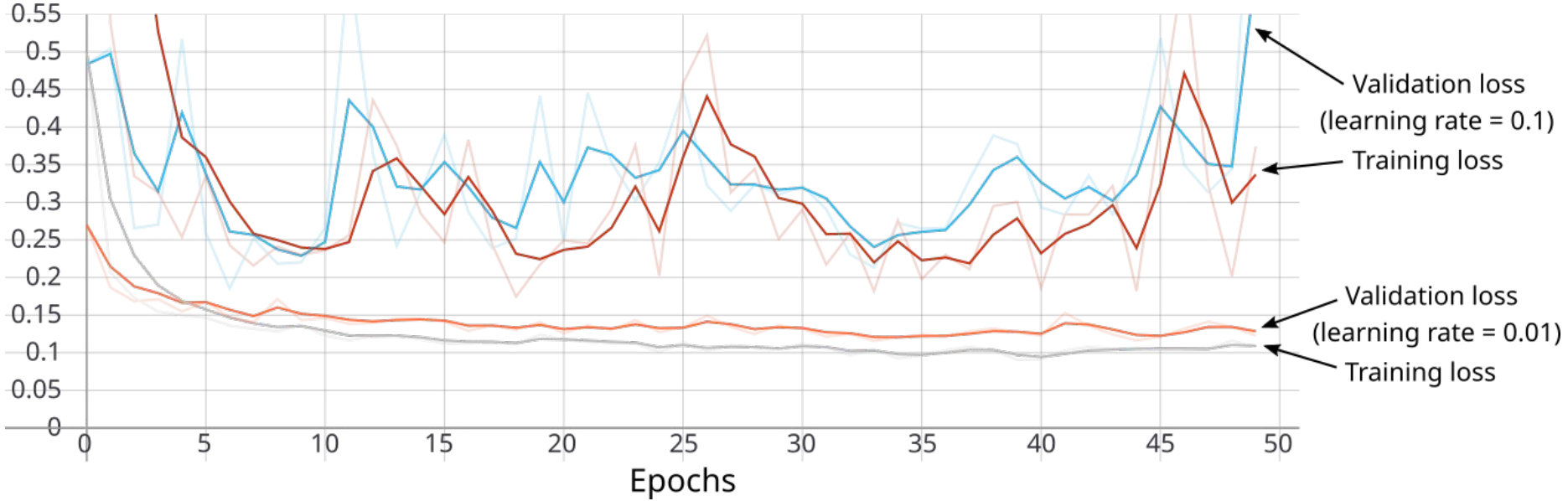
- random crop to smallest image size (1280 x 1024 px)
- transform to tensor
- normalizing

Model: Fine-tuning pre-trained ResNet-18

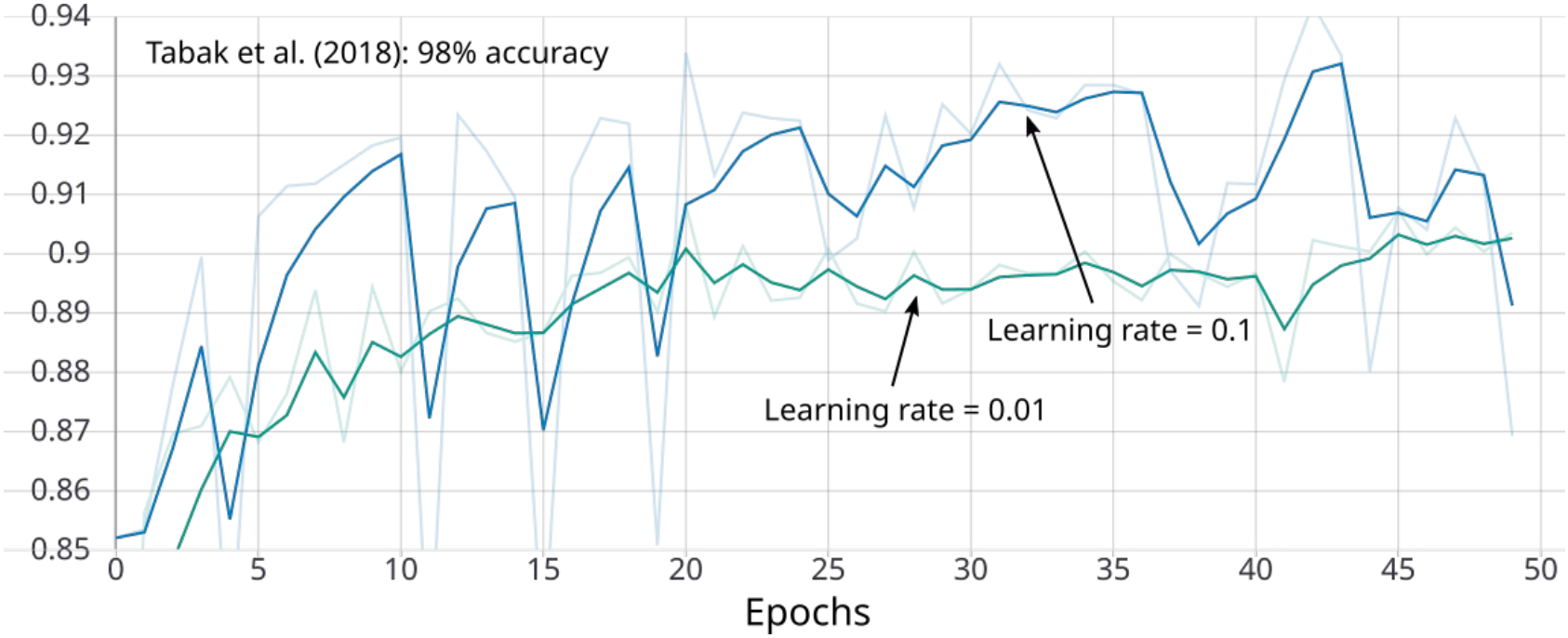
- 5k image subset: 5 most frequent classes à 1000 images
  → empty, rat, rabbit, petrel, iguana
- batch size: 64
- loss function: cross entropy
- learning rates: 0.1, 0.01
- 50 epochs

Methods: PyTorch + CUDA + university cluster

First results - loss



First results - mean accuracy



Outlook

1. Find optimal learning rate
2. Large balanced dataset (5 classes à 5k images = 25k)
3. Large imbalanced dataset (full top-5 classes = 100k images)
4. If computationally possible, train full model.
5. If possible, understand misclassified samples
   → Why are they hard to classify correctly?