

Liu
2nd Place



kaggle

The Nature Conservancy Fisheries Monitoring

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Agenda

1. Background
2. Summary
3. Feature selection & engineering
4. Training methods
5. Important findings
6. Simple model

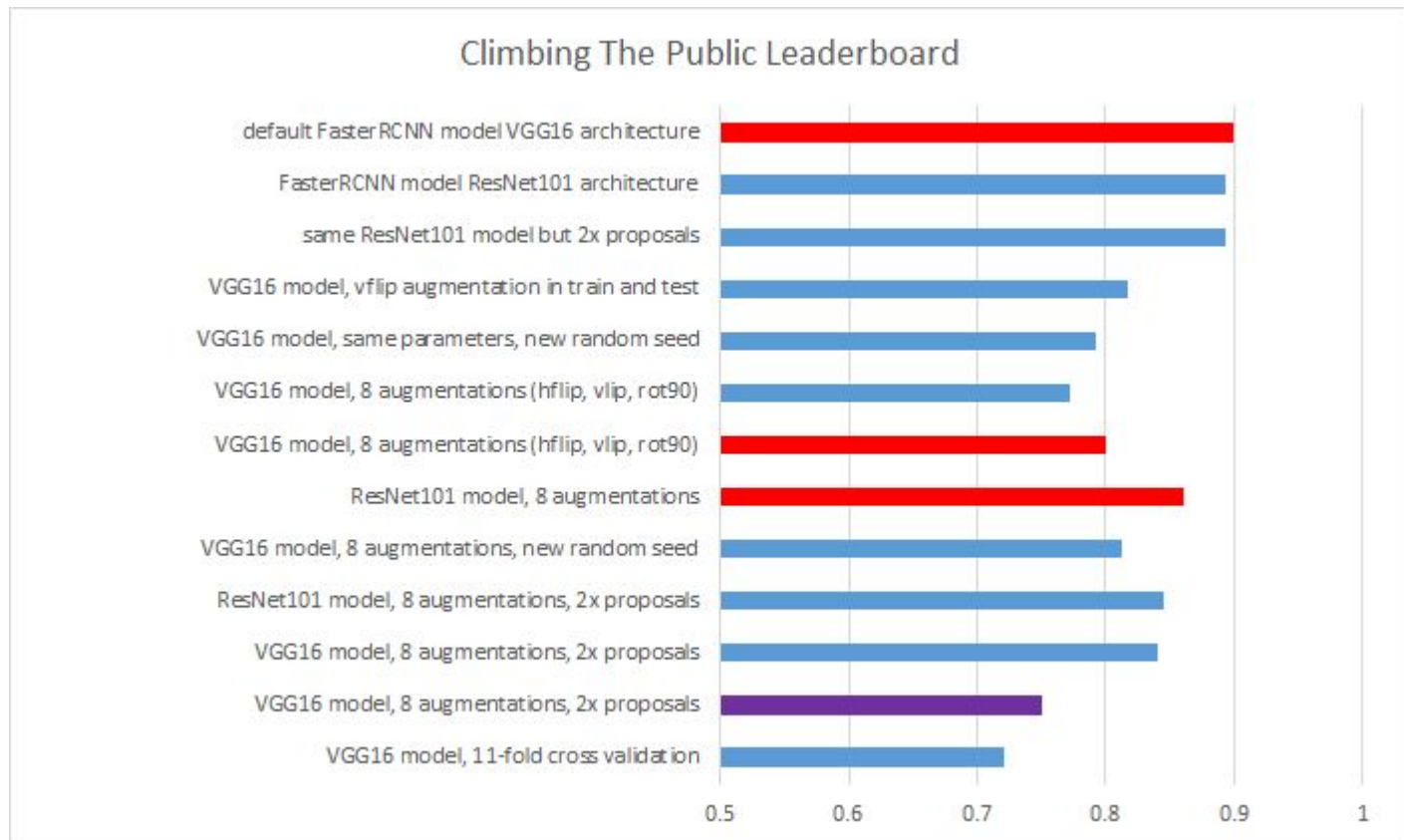
Background

- Phd from Vilnius University
- Used CNNs in Kaggle's:
 - Challenges in Representation Learning: Facial Expression Recognition Challenge
 - National Data Science Bowl
 - State Farm Distracted Driver Detection

Summary

- Used CNNs in object detection frameworks
- Optimized for detection speed
 - SSD, YOLO
- Optimized for classification accuracy
 - Faster RCNN, RFCN
 - VGG16, ResNet101
- Ensemble of ~20 Faster RCNN models
- ~1 week to train all variations from scratch

- Data augmentation
 - Horizontal flip
 - Vertical flip
 - Rotation by 90 degrees
- Fish annotations
 - Bounding box
 - Head-tail points
 - Merged bounding box
- Proposals for classifications
 - 300 (default)
 - 600



fish annotations: red - head-tail points, blue - bounding box, violet - merged bounding box (for multiple fishes in single image)

- 11-fold cross validation
 - The only “correct” model
 - Folds created semi-automatically
 - Actually, ensemble of 11 models
 - Arithmetic mean of predictions
- 2nd best my submission
 - Could be in the 3rd place overall on private leaderboard if my best submission failed

Important and
Interesting
Findings

- Stage2 contained only new boats
- Split training data correctly
- Used early-stopping to avoid overfitting the public leaderboard
- Used data augmentation both on training and testing images (which was not readily available in open-source FasterRCNN framework)
- Did not try to classify species of fish by the boat it was caught in :)

Simple Model

- I believe that single FasterRCNN model could do the job with correct (and enough) training data provided

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