

The mechanisms, powers and limitations of some Data Augmentation techniques

DD2424 Group 118

Anton Strähle, Jan Alexandersson & Fredrika Lundahl

Spring 2020

Techniques

- ▶ Basic augmentations
 - ▷ Rotation
 - ▷ Shearing
 - ▷ Flipping
 - ▷ Brightness adjustments
- ▶ Fourier transform
- ▶ Mixup

Data



Evaluation

- ▶ Basic CNN (65%)
- ▶ MobileNet (75%)
- ▶ ResNet50 (95%)

Basic Augmentation



Figure: Rotation, shearing, flipping and brightness adjustments applied to a picture

Fourier Transform

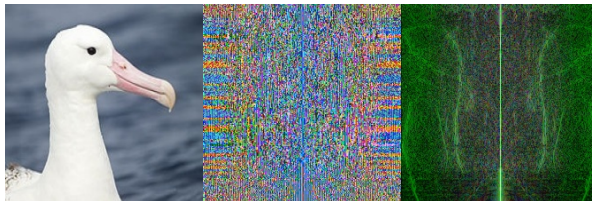


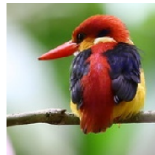
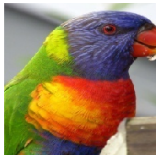
Figure: Left: Original image. Middle: Phase angles. Right: Amplitudes.

Fourier Transform

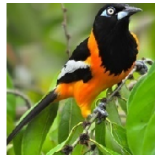
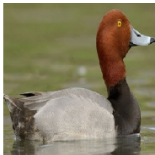
Table: Accuracies for the basic CNN

Data	Accuracy (%)
Raw Images	64.59
Fourier Angles	28.84
Fourier Amplitudes	48.42
Fourier Angles & Amplitudes	47.42

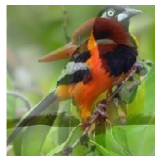
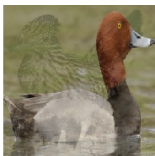
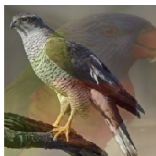
Mixup



+



=



Mixup



Figure: Three examples of mixup performed on images of different bird species.

Mixup performances on different networks (for best set of parameters)