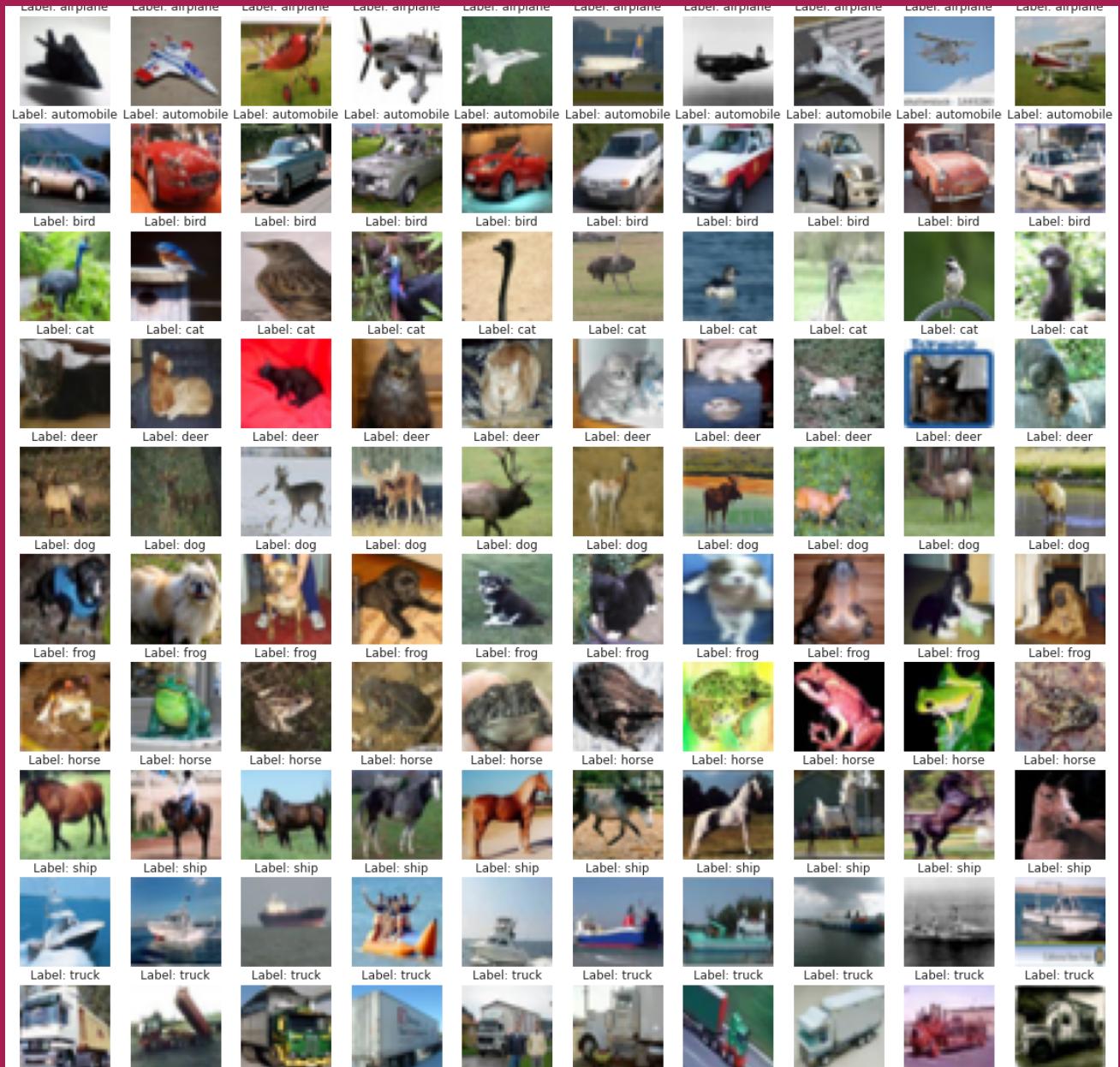


CIFAR-10



CIFAR-10

- Labelled subset of the 80 million tiny images dataset
- 60,000 color images with 10 classes
- Common benchmark dataset

Objective

Want to build a model that does not overfit the data, while still attaining a good accuracy

EXPLORATORY DATA ANALYSIS

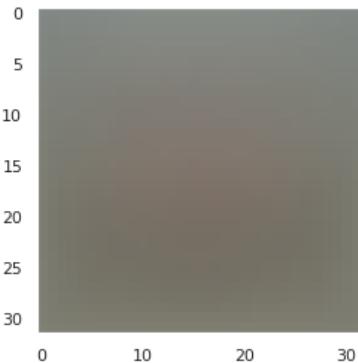
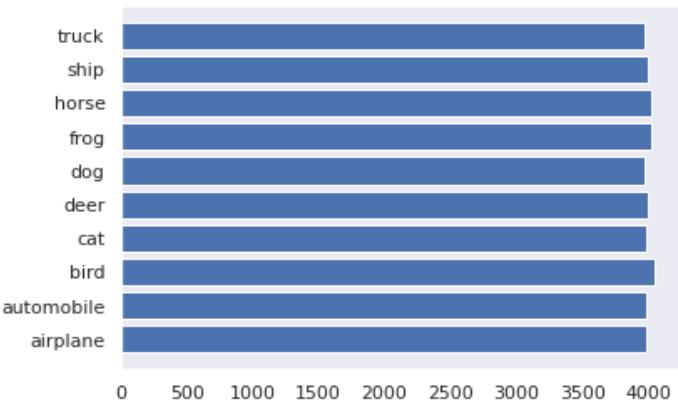
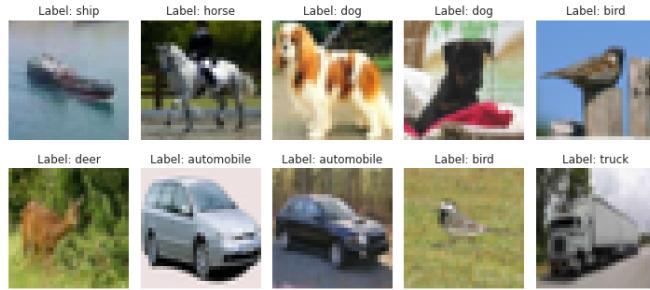


Image Format

32x32 Color Images in RGB Format. Pixel values between 0 and 255

Even class distribution

Balanced classes means that metrics like accuracy would be suitable for evaluating the problem

What does the “average” image look like?

Looks very blurry and cannot make anything out;

DATA PREPROCESSING

Data Split

Training Data: 40,000 Examples

Validation Data: 10,000 Examples

Testing Data: 10,000 Examples

Image Normalization

Images are normalized to improve convergence

Data Augmentation

Two types of data augmentation are attempted:

1. Basic Data Augmentation (Random Flips and Crops)
2. Cutmix Data Augmentation)

TRAINING AND EVALUATION



Optimizer: SGD with Momentum

SGD is known to generalize better than adaptive optimizers like Adam, and so is chosen

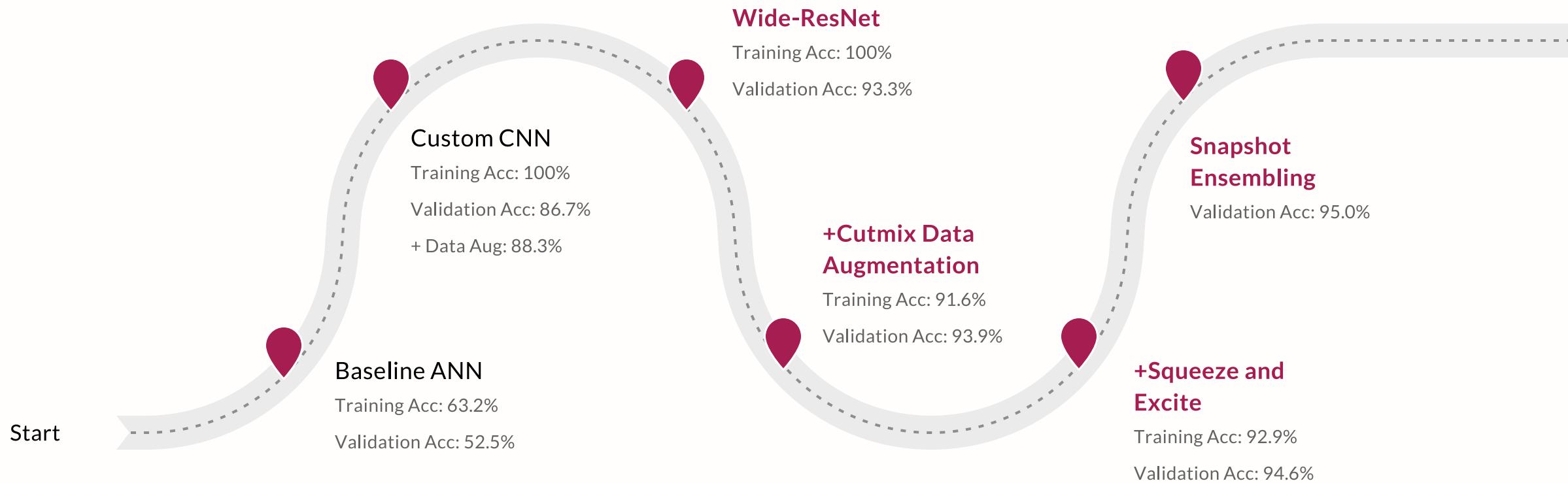
LR Scheduler: Cosine Decay with Warm Restarts

Introduced in SGDR paper, shown to lead to faster convergence, and good generalization

Hyperparameters

- Batch Size: 128, Learning Rate: 0.05, Momentum: 0.9

EXPERIMENTS



CONCLUSION

- Test Metrics

- Accuracy: 94.6%
- Does not appear to overfit as training accuracy slightly lower

- Ensemble vs Non Ensemble

- Ensembling three models only marginally improves performance
- Non Ensemble Test Score: 94.2%

- Error Analysis

- Has difficulty dealing with cats and dogs
- Less issues with cars

Loss/Acc Plot

