Assignment1 of Artificial Intelligence/贾梦溪

Training parameter

Optimizer: SGD with momentum = 0.9.

Learning rate is initialized to 0.1, and decays to 0.035 after 30 epochs.

Input images are resized to 224x224x3.
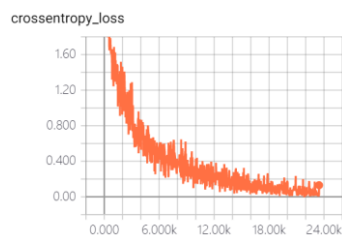
Epochs = 30, batch size = 64
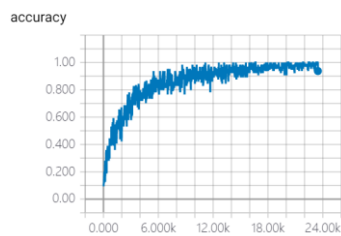
Training result

Cross entropy: 0.020

Training accuracy: 100.00%

Validation
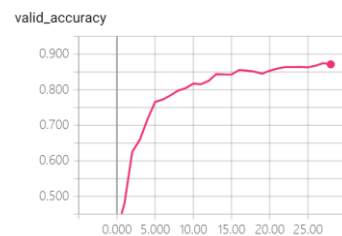
Validation accuracy: 87.050%
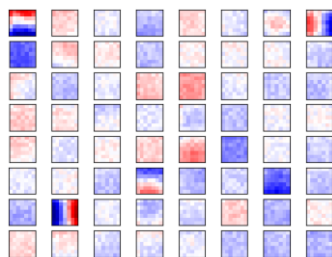

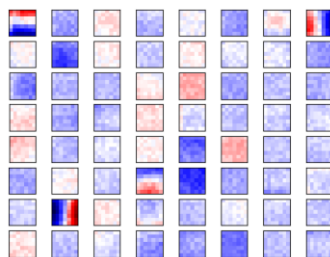(a) Loss   (b) Training accuracy   (c) Valid accuracy

Filter visualization
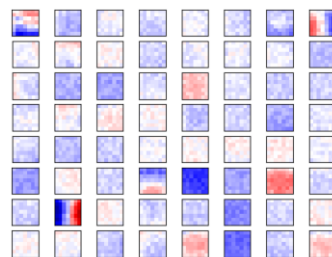
Conv1, kernel size = 7*7, stride = 2. 64 filters of 3 channels show below.
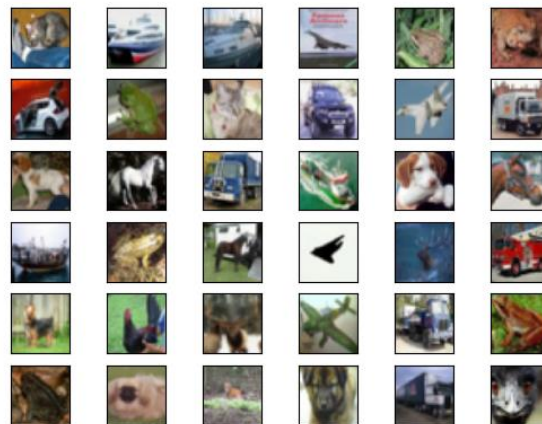

(a) Channel 0   (b) Channel 1   (c) Channel 2

Feature mapping visualization

Original image

Feature maps and its reconstruction (after deconvolution)

	Feature maps	Reconstruction
Conv1		
Conv5_x		

Note that, we implement a reverse network of ResNet-18 for feature map reconstruction where convolution layers are replaced by deconvolution layers and pooling layers by un-pooling layers (see more details in my code). Each reconstructed image has the same size as its corresponding original image. Result shows activation of discriminative parts of the image, where deeper feature is observed to represent more abstractive patterns, while conv1 focuses on low-level feature, for instance, color and texture.

Feedback

1.I spend about 3 days for this assignment

2.The course is attractive, you should keep your own style.

3.The assignment is basic on the whole, but I was confused by the feature mapping

visualization in section 2.8 at first. So I think more related knowledge should be

provided for us to refer to.

4. Maybe we should focus more on the basics.

Reference

[1] https://pytorch.org/docs/stable/_modules/torchvision/models/resnet.html

[2] https://www.jianshu.com/p/ec0967460d08

[3] https://github.com/kvfrans/feature-visualization

[4] https://github.com/utkuozbulak/pytorch-cnn-visualizations