

Task1

Visualize one batch of training images after do the normalization and random transformation for data augmentation.



Task 2

Train the ConvNet for 3 epoches, and the training time and accuracy are shown in the table below.

epoch	train Loss	acc
0/2	1.7111	0.3706
1/2	1.3406	0.5194
2/2	1.2234	0.5625

Training complete in **3m 51s**

Task 3

The number of convolutional layers is **3**, and the numbers of filters for each corresponding layer are **8, 16, 22** respectively. The filter sizes of the first two convolutional layers are the same and are changed alternatively (**3, 5, 7**), while the filter size of the last layer is fixed at **3**. The training results under three different cases are displayed in the table below.

filter size	last epoch accuracy	test accuracy
3	0.73442	0.6775
5	0.67398	0.6188
7	0.63612	0.6084

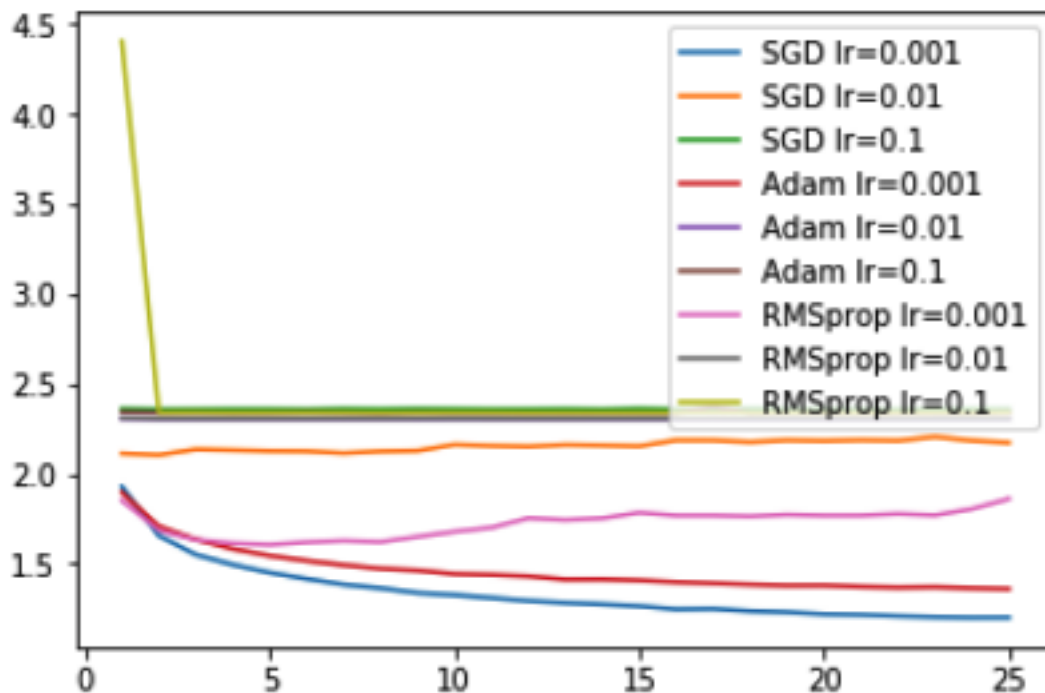
Task 4

Use Dropout in fully connected layers and Batch Normalization in convolutional layers. Dropout is used in the last two fully connected layers and batch normalization is applied to the last convolutional layer. According to the experiment results, the test accuracy is the highest when the batch size chosen for batch normalization is 4.

batch size	last epoch accuracy	test accuracy
2	0.5781	0.6404
4	0.61984	0.6798

Task 5

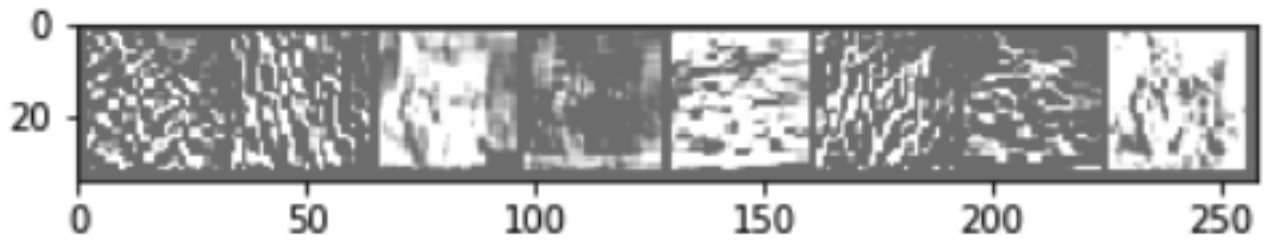
The loss curves of nine different combinations which are generated by three different optimizers (SGD, ADAM and RMSProp) with three different learning rates (0.001, 0.01, 0.1) are shown below.



Task 6

Using “cifarexample.jpg” as input image, visualize feature maps of the first and the last convolutional layer.

First convolutional layer activations



Last convolutional layer activations

