Very Deep Learning: Exercise-2

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Aim: Object recognition using AlexNet.

Data-set: CIFAR-10 Dataset

A total of 60,000 32x32 colour images in 10 classes (airplane, automobile, bird, cat, deer, dog, frog, horse, ship, and truck.). There are 6,000 images per class.

There are 50,000 training images and 10,000 test images.

Library used to create the model: TensorFlow library

Number of steps used: 5,000/25,000

Layers used (Original-AlexNet):

- First Convolution Layer: Convolution and rectified linear activation.
- Local response normalization.
- First Pooling Layer: Max pooling.

- Second Convolution Layer: Convolution and rectified linear activation.
- Local response normalization.
- Second Pooling Layer: Max pooling.

- Third Convolution Layer: Convolution and rectified linear activation.

- Fourth Convolution Layer: Convolution and rectified linear activation.

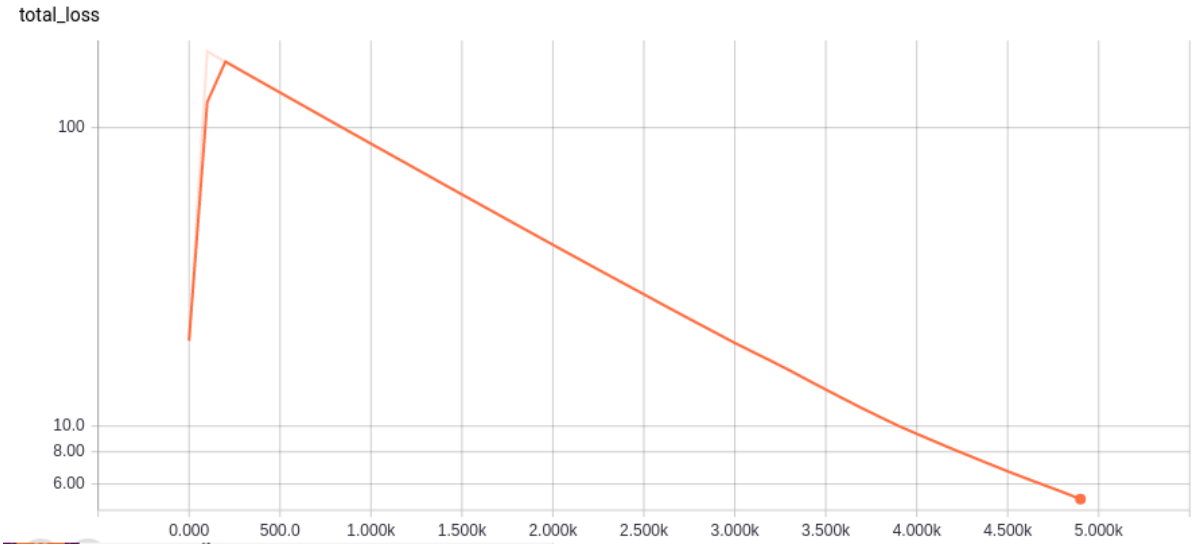
- Fifth Convolution Layer: Convolution and rectified linear activation.
- Third Pooling Layer: Max pooling.

- First Fully-connected Layer.
- Second Fully-connected Layer.
- Third Fully-connected Layer.

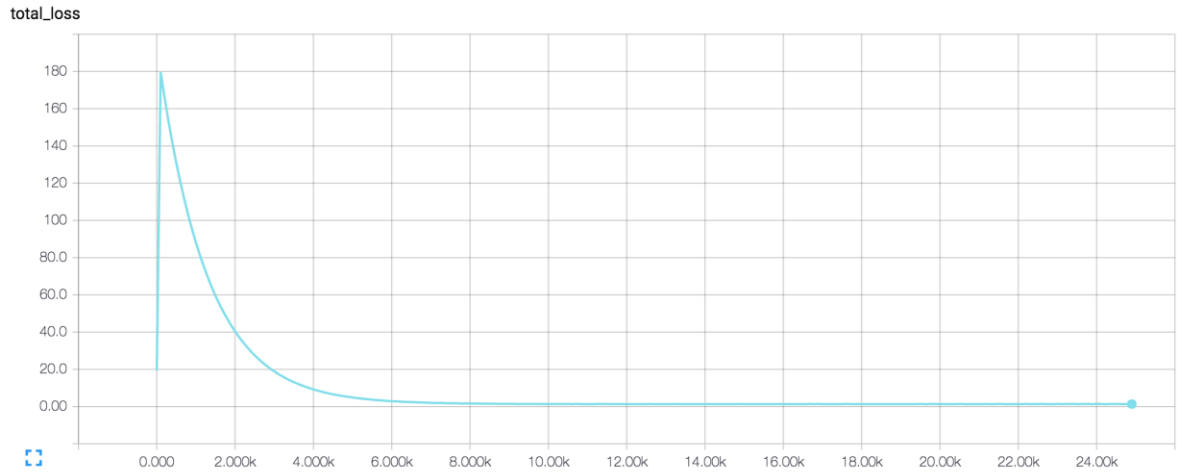
- Read-out Layer with Soft-max Regression.

Experiment Results:

Total loss with 5,000 steps:



Total loss with 25,000 steps:



Layers used (Small-AlexNet: removed one conv net):

- First Convolution Layer: Convolution and rectified linear activation.
- Local response normalization.
- First Pooling Layer: Max pooling.

- Second Convolution Layer: Convolution and rectified linear activation.
- Local response normalization.
- Second Pooling Layer: Max pooling.

- Third Convolution Layer: Convolution and rectified linear activation.

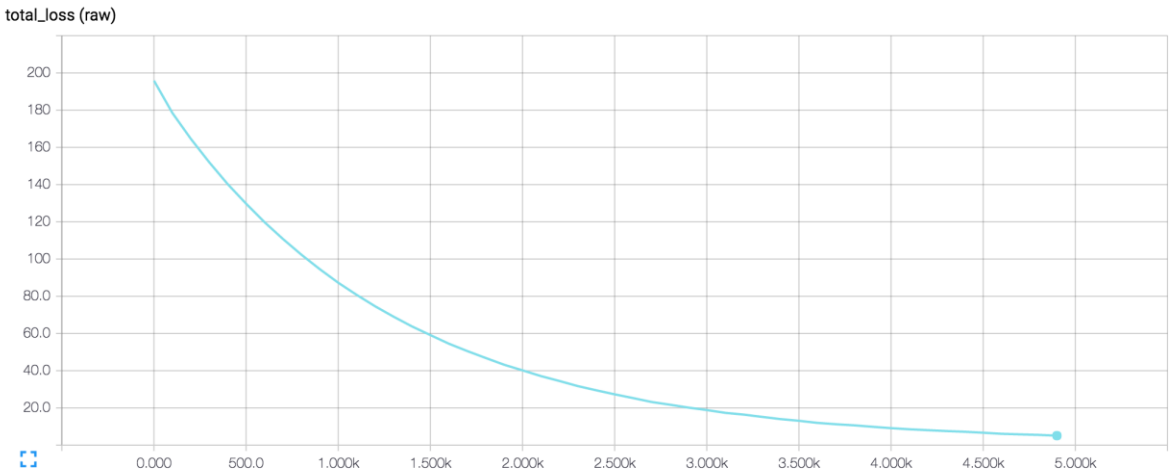
- Fourth Convolution Layer: Convolution and rectified linear activation.
- Third Pooling Layer: Max pooling.

- First Fully-connected Layer.
- Second Fully-connected Layer.

- Read-out Layer with Soft-max Regression.

Experiment Results:

Total loss with 5,000 steps:



Comparison of Loss:

Architecture	**Loss after 5,000 Steps**	**Loss after 25,000 Steps**
Original-AlexNet	5.7	1.4
Small-AlexNet	4.9	-