CS 498 AML: Homework 8

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Convolutional neural networks

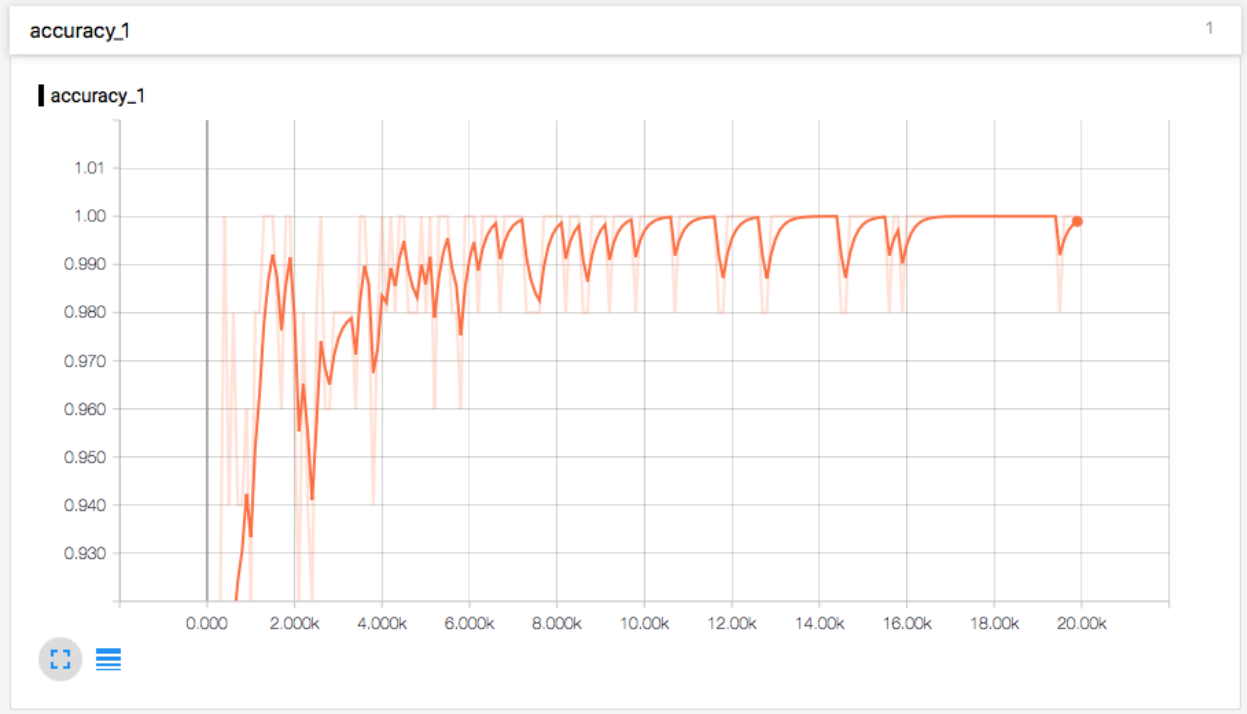
TENSORFLOW IS AN ENVIRONMENT FOR BUILDING, AMONG OTHER THINGS, NEURAL NETWORKS. YOU CAN BUILD MULTILAYER NETWORKS; CONVOLUTIONAL LAYERS; AND RESIDUAL NETWORKS USING TENSORFLOW. THERE IS A TOOL CALLED TENSORBOARD, WHICH WILL DISPLAY THE PROGRESS OF LEARNING.

MNIST

Obtain and install TensorFlow. Go through the "MNIST for beginners" tutorial. Now go through the "DEEP MNIST for experts" tutorial. Now go through the TensorBoard tutorial. Finally, insert appropriate lines of code into the TensorFlow example to log the accuracy on TensorBoard every 100 batches, for at least 2000 batches. Submit a screen capture the accuracy graph from TensorBoard.

After following *DEEP MNIST for experts* and training the neural net for 20000 batches, the net accurately predicted 99.19% of the digits. In comparison the neural net in *MNIST for beginners* trained for 20000 batches only achieved 91.88% accuracy.

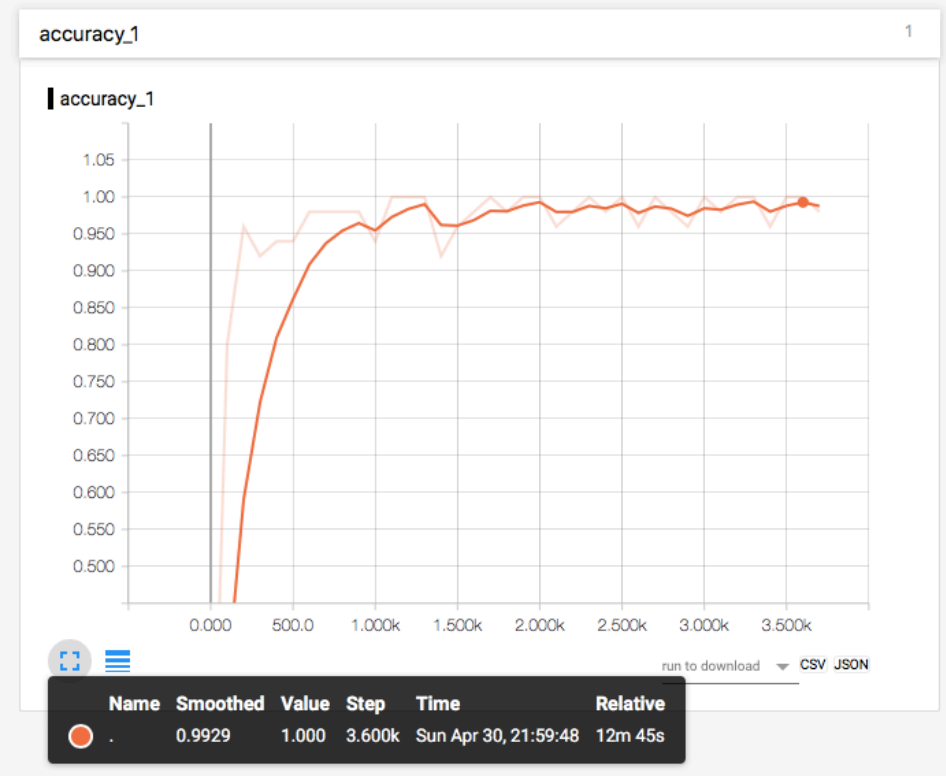
The following is a graph of the accuracy of *DEEP MNIST for experts* during training.



Modify the architecture that is offered in the DEEP MNIST tutorial to get the best accuracy you can. Submit a screen capture of TensorBoard graphs of accuracy. We will run a leaderboard of these graphs.

After modifying the architecture offered in the DEEP MNIST tutorial and training it for 4000 batches we achieved an accuracy of 99.11%.

The following is a graph of the accuracy of our modified *DEEP MNIST for experts* during training.

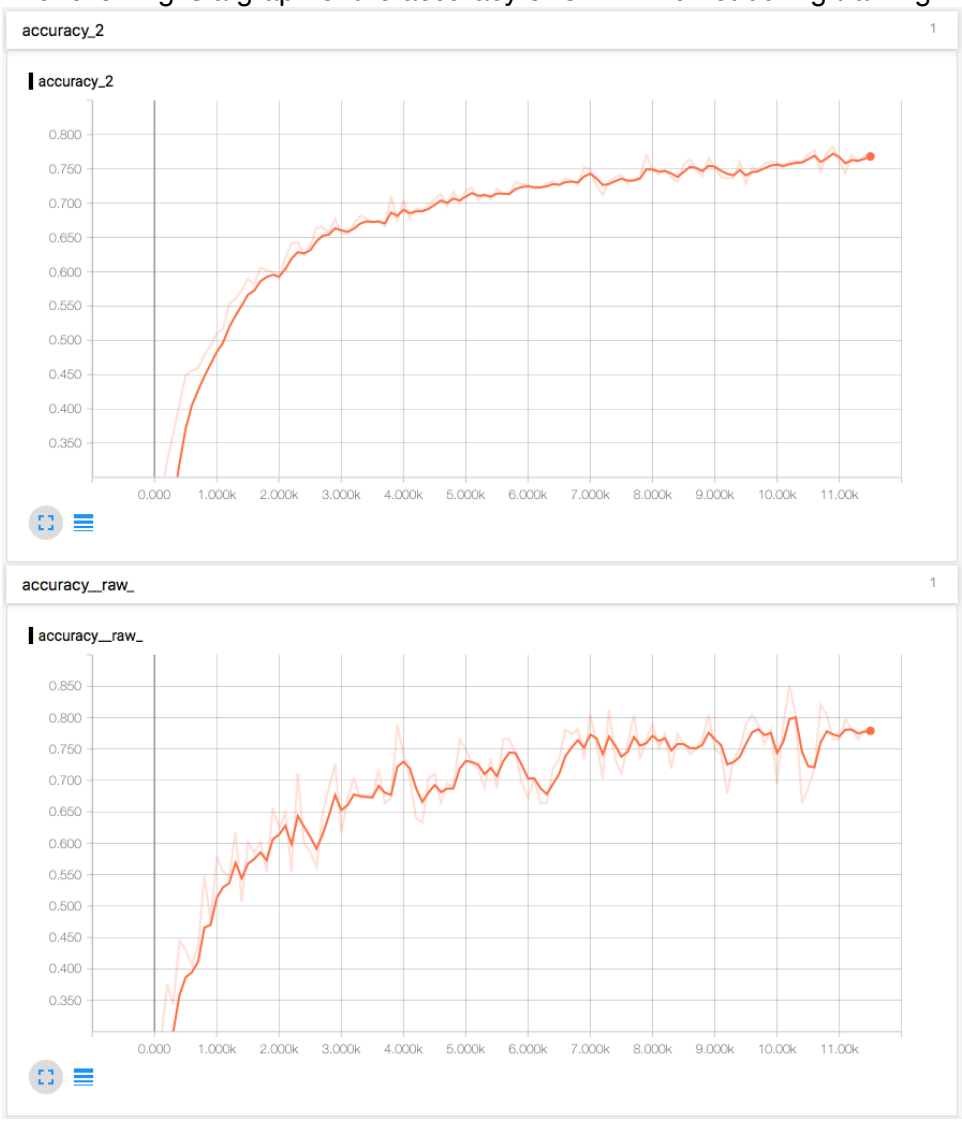


CIFAR-10

Go through the CIFAR-10 tutorial, and ensure you can run the code. Finally, insert appropriate lines of code into the TensorFlow example to log the accuracy on TensorBoard every 100 batches, for at least 2000 batches. You should screen capture the accuracy graph from TensorBoard, and submit this.

After following the CIFAR-10 tutorial and training the neural net for 11500 batches, the net accurately classified 79.1% of the images.

The following is a graph of the accuracy of CIFAR-10 net during training.

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2017-05-04 15:29:00.788580: precision @ 1 = 0.791
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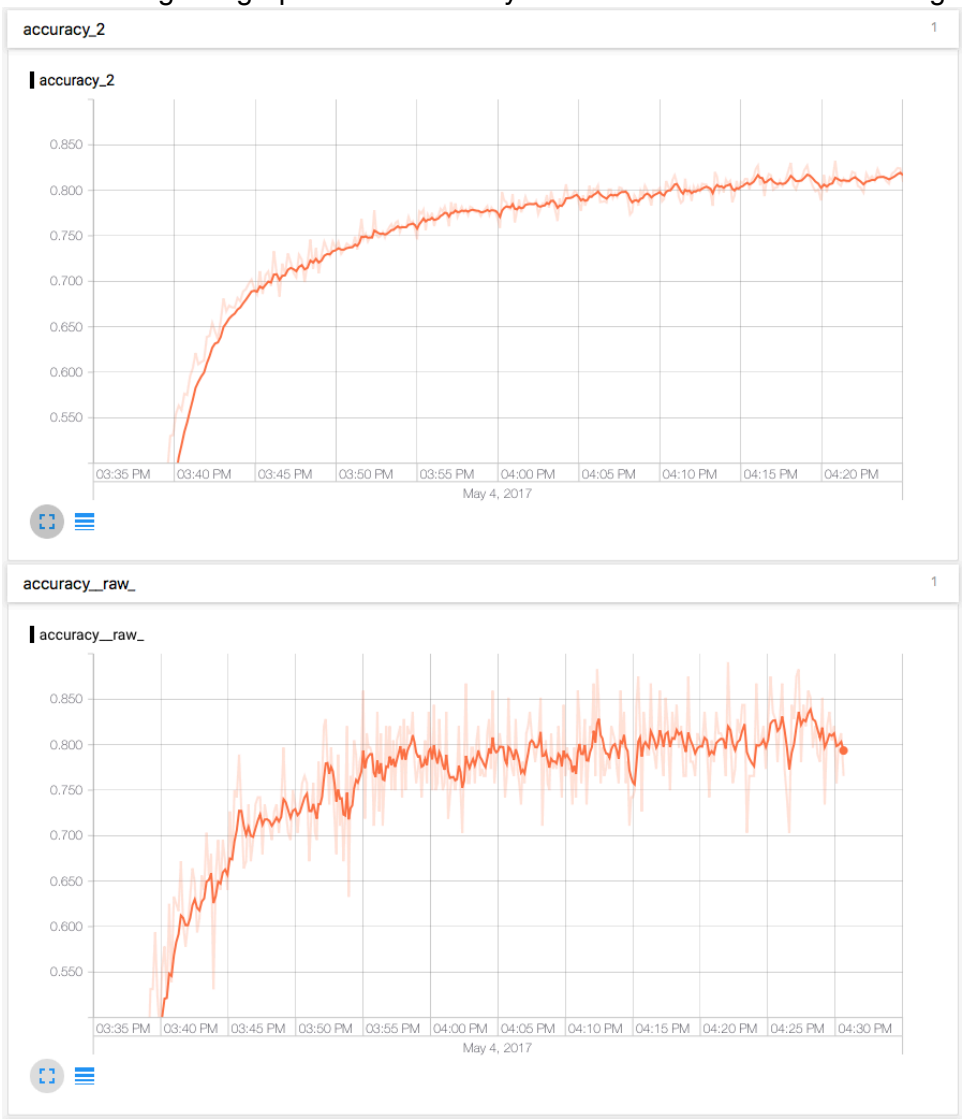
Modify the architecture that is offered in the CIFAR-10 tutorial to get the best accuracy you can. Anything better than about 93.5% will be comparable with current research. Submit a screen capture of TensorBoard graphs of accuracy. We will run a leaderboard of these graphs.

After following modifying the neural net in the CIFAR-10 tutorial and training it for 33000 batches, the net accurately classified 84.9% of the images.

The following is a graph of the accuracy of modified CIFAR-10 net during training.

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2017-05-04 16:31:28.033079: precision @ 1 = 0.849
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