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@imranm3

1 CNN Architecture (PyTorch):

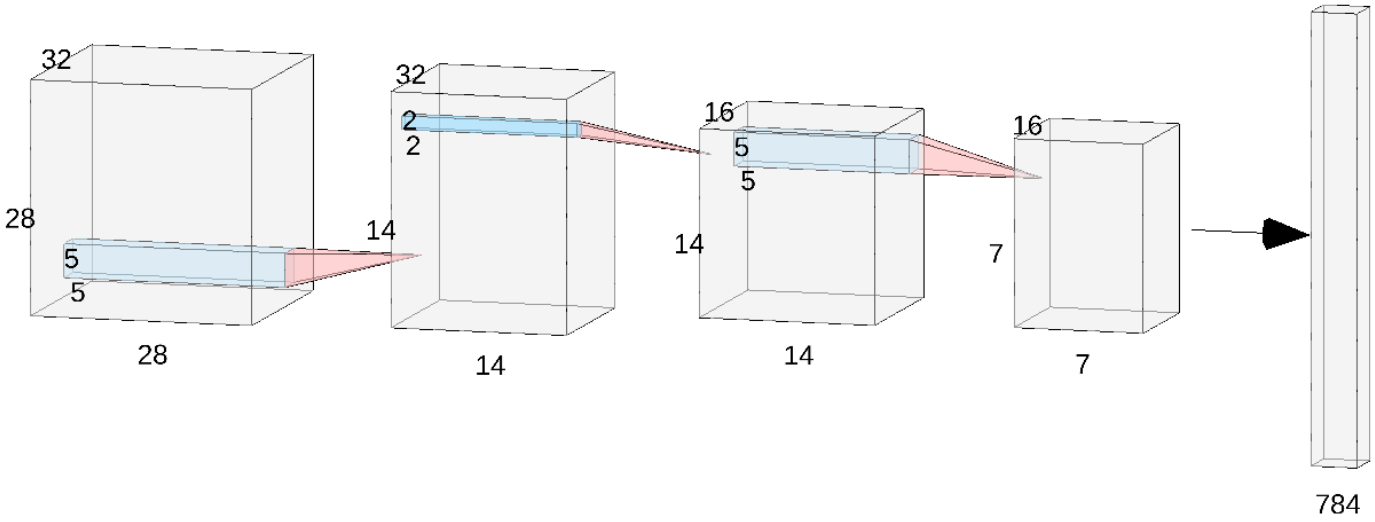

Figure 1: CNN Architecture Diagram

The model takes input of images with 28 x 28 dimensions. The first layer is consist of 32 channels of 5 x 5 convolutional filters, a ReLU activation, and 2 x 2 max-pooling downsampling with a stride of 2. This gives an output of 14 x 14 dimension. The next layer takes 14 x 14 output of layer 1. This layer is consist of 16 channels of 5 x 5 convolutional filters, a ReLU activation, and a final 2 x 2 max-pooling downsampling with a stride of 2. This produces an output of 7 x 7 dimension. The aiagram is shown in figure 1.

After the convolutional part, there's a flatten operation which creates 7 x 7 x 16 = 728 nodes, an intermediate layer of 1024 fully connected nodes, and a softmax operation to produce output of 10 class nodes probabilities. This architecture is shown in figure 2.

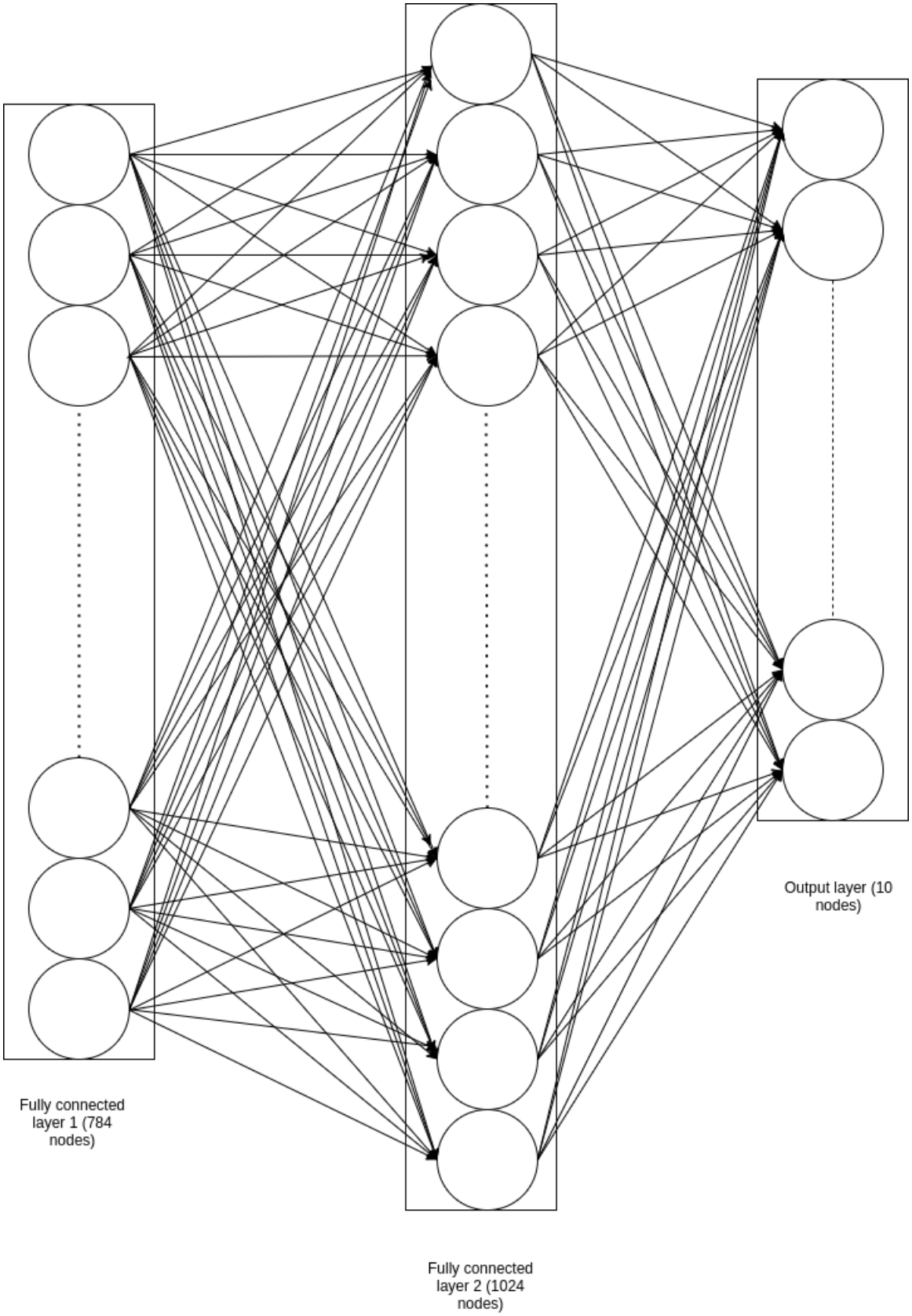

Figure 2: CNN Connected Layer Architecture

2 Accuracy:

2.1 PyTorch:

The accuracy of the model built using PyTorch is 98.5%. The plot of loss vs epoch is shown in figure 2.1.

Figure 3: Loss plot of PyTorch

2.2 Tensorflow:

The accuracy of the model built using Tensorflow is 98.99%. The plot of loss vs epoch is shown in figure 2.2.

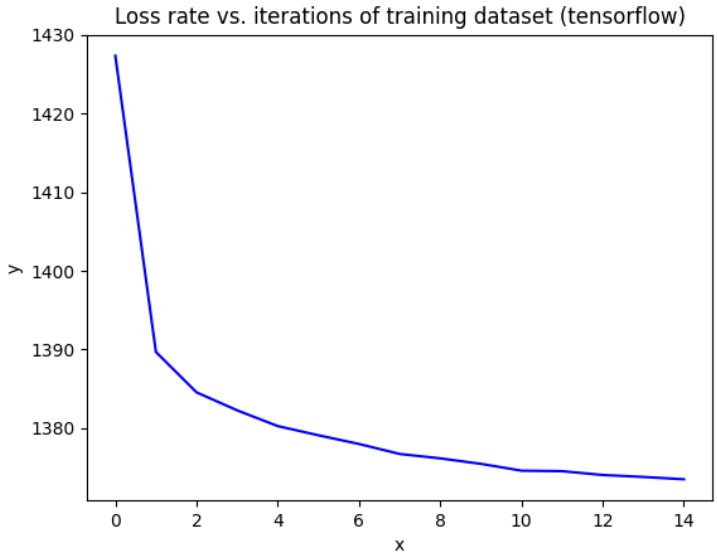

Figure 4: Loss plot of Tensorflow

3 Used technologies:

- Keras==2.4.3
- Keras-Preprocessing==1.1.2
- matplotlib==3.3.2
- numpy==1.18.5
- scipy==1.5.3
- tensorboard==2.3.0
- tensorboard-plugin-wit==1.7.0
- tensorflow==2.3.1
- tensorflow-estimator==2.3.0
- torch==1.7.0
- torchvision==0.8.1