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Homework 4 Report

Task 1: Optimize the baseline algorithm to get error below 1% error

Initial Baseline Error: **1.83%**

First started by making changes to epoch value:

Epoch 20: 1.53%

Epoch 30: 1.45%

Epoch 35: **1.40%**

Epoch 40: 1.48%

Epoch 35: 1.40%

Further, made changes to batch but it does not improve the accuracy. Also, keeping epoch as 35, which was the best-achieved accuracy.

Batch 150, epoch 30: 1.51%

Now, inserted dropout on hidden layer to reduce the overfitting with epoch 35.

Dropout 0.2, epoch 35: 1.70%

Dropout 0.1, epoch 35: 1.59%

Dropout 0.05, epoch 35: **1.48%**

Adding dropout to hidden layer did not give the best accuracy. Hence, added dropout to visible layer.

Dropout Visible 0.2, epoch 35: 1.53%

Dropout Visible 0.3, epoch 35: **1.33%**

Dropout Visible 0.4, epoch 35: 1.45%

Dropout Visible 0.5, epoch 35: 1.59%

Dropout Visible 0.3, epoch 40: 1.55%

Now tried adding dropout to both layer along with the fixed epoch value

Dropout Visible 0.3, dropout hidden: 0.1 epoch 35: 1.49%

Added an additional hidden layer along with the dropout at visible as well as hidden layer.

Additional Layer plus Dropout Visible 0.2, Dropout Hidden: 0.15 epoch 30: 1.28%

Conclusion: 1.28% was the best accuracy achieved.

Task 2: Optimize the CNN algorithm

For this task, started with making changes to epoch value and batch size, but it did not had any significant changes.

Later on made changes with dropout value which resulted in following results:

Dropout: 0.15

Result: 1.04

Dropout had little effect so kept dropout as 0.15.

Further, made changes by adding convolution, max pooling and hidden layers to the model architecture. Kept the dropout as 0.15. By doing this, I was able to achieve following result:

Result: 0.85%

This is the best I was able to achieve.