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## CS 331 Artificial Intelligence - Assignment 3 Part 1 - Report

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- Derivative of cross entropy cost function used in backpropagation for error calculation as described via email screenshots.
- Biases and weights were initialized with a uniform random distribution between -1 to 1 for further accuracy, and biases were also updated in weight\_update along with weights.
- Normalized RGB range from 255 max (uint8) to 0-1 (float32) for all flattened images read from the datasets to improve accuracy.
- A seed was set for random to test improvements in accuracy over change in parameters.
- Moderately high learning rate / larger step size proved most beneficial (0.1 shows very steady increase). Learning rates with approximate model accuracy ranges on training data:

0.01 : 35-45%

0.1 : 91-94% (Most steady accuracy increase till max)

1 : 90-94% (Very fluctuating but returns high accuracy at the end)

92% accuracy on test data provided (test.txt, text-labels.txt)