**Department of Electronic and Telecommunication Engineering**

**University of Moratuwa, Sri Lanka**

**EN2550 - Fundamentals of Image Processing and Machine Vision**



**ASSIGMENT 4**

**Submitted By**

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Full code: <https://github.com/Ravindu-Yasas-Nagasinghe/EN2550-Computer-Vision-and-Image-Processing-Assigments>

**1)Linear Classification using gradient descent.**

Text

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Description automatically generatedHere our data set is CIFAR-10. There are 10 different classes in this data set. I use tensorflow to import the data set to python. Our score function for the linear classifier is f (x) = W x +b, and the loss function is the mean sum of squared errors function. I run for 300 epochs as instructed in the assignment. The code for 1layer linear classifier using gradient descent is as follows.

Text

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A picture containing text, gallery, room, colorful

Description automatically generatedAfter that I plot the weight matrix W as 10 images and plot the training loss, testing loss, training accuracy, testing accuracy and learning rate.

Weight matrix as 10 images

Chart

Description automatically generated with low confidenceInitial learning rate = 1.4 x 102

Loss, testing loss, training accuracy, testing accuracy, learning rate of the linear classifier for 300 epochs.

After 300 epochs train loss= 0.783117 ,test loss= 0.157547 ,train accuracy= 0.779982, test accuracy= 0.954830 , learning rate= 0.010474.

**2) 2 layer fully connected network**