**Deep Learning - Lab 3**

1. Open Google colab. Upload the 1D\_Convolution.ipynb to colab. Run all cells. Based on the result, explain how 1D convolution can be used to identify the edges in an image.

<https://colab.research.google.com/>

1. Upload the Image\_Filtering\_(Convolution).ipynb file to colab. Change the filters and see if you can obtain different kinds of edges from the image. Download the modified ipynb file.

**Note:** You may have to copy the lenna.png image to the google drive path mentioned in the file in the notebook file. When you run the notebook for the first time, you may have to click the authorization link and enter the authorization code to the text box displayed.

1. Upload the CNN\_with\_keras3.ipynb file to colab. Increase the number of epochs to 50.

Why does the validation error increases when the number of epochs are increased? Explain how you can modify the training process to stop that from happening.

Explain how the mini batch SGD (Stochastic Gradient Descent) algorithm can converge faster than the batch Gradient Descent algorithm.

**Submission:**

Create a github repository for lab 3.

Write the answers to questions 1 and 3 in a text document and upload this to the github repository.

Upload the modified ipynb in ex. 2 to the repository as well.

Add the github link to a text file and name the text file by your index number. Upload the text file to the submission link on the courseweb.

**Make sure results are visible in the notebook.**