Indian Institute of Technology Guwahati
Deep Learning for Computer Vision (DA621): Assignment-1

Date: 9th **August, 2022**
Deadline: 21st **August, 2022 (end of the day, IST)**
Maximum Marks: 30
Instructor: Konda Reddy Mopuri, MFSDSAI, IITG
TA: Kamal Kumar
Please reach to the TA (well ahead of the deadline) in case of any queries.

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1. Develop an image (multi-class) classification pipeline over the CIFAR-10 dataset. Specifically, implement the following three different classifiers and report (their performance, your observations, etc.)

   - k-Nearest Neighbor classifier [5 Marks]

   - linear classifier with SVM (or, hinge) loss [10 Marks]

   - linear classifier with the softmax loss [10 Marks]

   - (Bonus-1) Instead of using the raw pixel values of the images, use some higher-level features (representations) and see if the classifier performances' improve [3 Marks]

   - (Bonus-2) Well organized code and pro-like commenting [2 Marks]

   Instructions for working and submitting

   - This assignment is based on the class discussions during the first week (dl4cv-0 to dl4cv-2)

   - For this assignment, you are suggested to use the Google drive, Colab environment, and Python libraries such as numpy, PIL, scikit, PyTorch, etc.

   - Implement the train/val/test splits and the use of validation data for hyper-parameter tuning (when required).

   - Make the code modular, separating different modules into separate functions (e.g. loss function, gradient computation, etc.)

   - Submit a zip file in the MS teams (zip should contain appropriately named notebooks in both pdf and .ipynb formats, along with a 2-page report summarizing your observations). You can search and find how to convert a colab notebook into a pdf without losing any of the text.

   - Honor code: Similar submissions will be examined. If they are found to be involved in any form of academic dishonesty, all those submissions will be punished with a maximal penalty of $-1 \times$ the Max. Marks