

Assignment 3: Due On 9th November 2018 (11:55 PM IST)

1 Instructions

Answer all questions. Write your answers clearly. Please make sure that all your answers are present in a single pdf document. Upload on moodle, the python code, plots, images and pdf document as a single zip file named as “IE643_rollno.assignment3.zip”. All your files within the zip file should follow similar naming convention. There will be no extensions to the submission deadline.

You can score a maximum of 20 marks in this assignment.

2 Question

1. [Use only Python] The CIFAR-10 data set contains images containing different objects belonging to 10 different categories (*e.g.* airplane, automobile, bird, cat, etc) ¹. Note that there are 6000 images in each category. Choose a category C of your choice and construct a data set D containing 5000 images from the category C of CIFAR-10 data. Construct a validation set V using the remaining 1000 images.
 - (a) Use the attached GAN code and CNN code to construct a CNN-GAN.
 - (b) Train the CNN-GAN on the data D .
 - (c) Choose the best parameters for CNN-GAN (e.g. number of training iterations, learning rate, number of samples to train the discriminator and generator, etc.) using the validation set V .
 - (d) If needed, use heuristics from the attached paper ² to improve training.
 - (e) Prepare a plot of the training objective value against the iterations.
 - (f) Prepare a plot to depict the discriminator objective and the generator objective and check if they converge.
 - (g) After training, display 50 images (in a 10×5 grid) generated using the generator of CNN-GAN. Display 50 original images from the training data D in a 10×5 grid. Comment on the quality of the generated images.

¹<http://www.cs.toronto.edu/~kriz/cifar.html>

²<https://arxiv.org/pdf/1511.06434.pdf>