EE838B

Special Topic on Image Engineering: Advanced Image Restoration and Quality Enhancement

**Homework Assignment 1**

**Implementation and Verification of Single Image Super-Resolution (SISR)**

The first home assignment is to implement a given CNN-based super-resolution network for super-resolution and to train it properly. After training, the performance verification is required for test images by providing the performance measures in terms of PSNR and SSIM values.

The data set for experiments is provided via a Dropbox link where the three sets of training and test images. The evaluation of the submitted trained networks for Homework Assignment 1 will be performed based on the correct implementation and performance of the given SR network.

Dataset

* Training samples: 3,413 color images (512×512)
* Test samples: Set5 (5 images)
* Download links:
  + Training and Test data: <https://www.dropbox.com/s/wlslycal91sujdg/SR_data.zip?dl=0>
  + Skeleton code: <https://www.dropbox.com/s/eapn0csg0f5r1xf/EE838B_HW1_code_skeletons.zip?dl=0>

Implementation (You can use any Pytorch Functions)

* Convolutional layers
* Adam Optimizer
* L1 loss
* RRDB (Residual in Residual Dense Block) Structure (first proposed in paper named “ESRGAN: Enhanced Super-Resolution Generative Adversarial Networks”)
  + Do not copy from any Github, TA will check it. Please implement your own word.

<https://openaccess.thecvf.com/content_ECCVW_2018/papers/11133/Wang_ESRGAN_Enhanced_Super-Resolution_Generative_Adversarial_Networks_ECCVW_2018_paper.pdf>

* Pixel shuffle layer
* Training patch size : 64×64, batch size : 16
* The following SISR structure



* You just modify *Net1* function in “model.py” and input arguments of “main.py” in the skeleton code.

The following deliverables must be submitted:

* Both training and test codes (Pytorch)
* Readme.txt describes how to run your code, information of your code structure. It is recommended to follow the format (structure) of an attached example file name, “Readme.txt”.
* Report (including the SR images produced by your test code for the five test images, analysis of your results (PSNR and SSIM) and a simple code description for each component of the neural network)

Submission

* Due date: **2020-10-16 23:59**
* Submission should go to the class TAs at: [jhoh94@kaist.ac.kr](mailto:jhoh94@kaist.ac.kr)
* Submission format
  + Your report must include your name, student ID and e-mail
  + Your report must be in ZIP format with following directories:
    - source where readme.txt, training code and test code must reside
    - report where your report is put
  + You must submit “Readme.txt” that describes how to run your code, information of your code structure. It is recommended to follow the format (structure) of an attached example file name, “Readme.txt”.
  + The file name of your submission should be “EE838B\_HW1\_*studentID*\_*YourName*.zip”.
  + **<NOTE: If your train and test code are not working, your implementation score is zero!!!>**