

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.

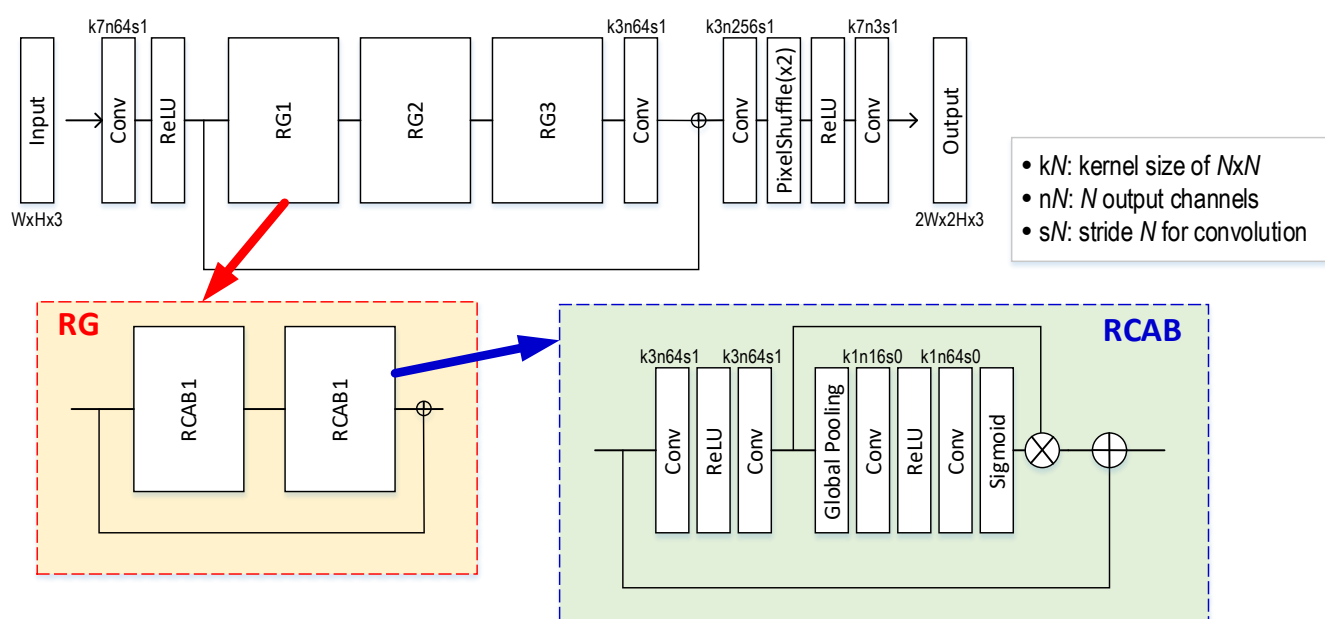
The data set for experiments is provided via a Dropbox link where the three sets of training and test images. The evaluation of the submitted trained networks for Homework Assignment 1 will be performed based on the correct implementation and performance of the given SR network.

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/enzo6fqyxxhl6c9/SR_pytorch.zip?dl=0

Implementation (You can use any Pytorch Functions)

- Convolutional layers
- Adam Optimizer
- L1 loss
- RCAN Structure (“Image Super-Resolution Using Very Deep Residual Channel Attention Networks”)
- Channel Attention
- 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 (A simple description of how to execute your codes)
- 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: **2019-10-07 23:59**
- Submission should go to the class TAs at: shki@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
 - The file name of your submission should be “HW1_*studentID*_*YourName*.zip”.
 - **<NOTE: If your train and test code are not working, your implementation score is zero!!!>**