CS270B Homework 1

You can choose **one** of the three questions below. Your grade will be determined by the quality of your completion and the difficulty of the questions.

Question 1: Comparison of Denoising Methods

- Difficulty: ★★☆☆☆
- This question requires you to compare the denoising effect of the following methods:
    i. Gaussian Filter
    ii. Bilateral Filter
    iii. Guided Filter
    iv. FFDNet: Toward a Fast and Flexible Solution for CNN based Image Denoising
        - https://github.com/cszn/FFDNet
- In your report, you need to present the following:
    i. The core code of Gaussian Filter, Bilateral Filter and Guided Filter.
    ii. A screenshot of the Terminal/Notebook, showing you running the FFDNet code.
    iii. The qualitative result and quantitative result of each method.
    iv. Your analysis of the results.
- Test data is provided below:
    - SIDD-Medium Dataset, sRGB images only, Part 0: https://www.eecs.yorku.ca/~kamel/sidd/dataset.php.
    - Official download link: https://competitions.codalab.org/my/datasets/download/f5c7a97d-5431-4cc0-a101-f2d2fd1665f7
    - Baidu Drive link: https://pan.baidu.com/s/129YzbWFCBGgYqJJHisR_8Q
        - Code: fequ

Question 2: Improvements to Deep Learning Based Denoising Method.

- Difficulty: ★★★☆☆
    - If you re-train the network, we will consider the difficulty as: ★★★★☆
- Please choose any open source denoising project. You can see some open source projects in this website.

- You will need to make certain changes to their method and compare it to the original method. No improvement or negative improvement is acceptable. Your grade will depend largely on the reasonableness of your changes and the soundness of your experiments.

- In your report, you need to present the following:

  i. A screenshot of the Terminal/Notebook, showing you running the code.
  ii. Details of your changes, and the reasons of your changes.
  iii. The qualitative comparison and quantitative comparision with the original method.

- Test data is provided below:

  - SIDD-Medium Dataset, sRGB images only, Part 0: https://www.eecs.yorku.ca/~kamel/sidd/dataset.php.
  - Official download link: https://competitions.codalab.org/my/datasets/download/f5c7a97d-5431-4cc0-a101-f2d2fd1665f7
  - Baidu Drive link: https://pan.baidu.com/s/129YzbWFCBGgYqJJHisR_8Q
    - Code: fequ

Question 3: Denoising or Super-Resolution on Medical Images

- Difficulty: ★★★★★
- We have provided two medical images. Please design your method to denoise them. Your grade will be based mainly on the quality of the denoising or super-resolution.

- In your report, you need to present the following:

  i. The details of your method.
  ii. Your experimental process, including but not limited to: proposing the baseline, optimising the baseline, etc.
  iii. Your final result.
  iv. The ablation study of your method.

- The test data is provided below:

  - Baidu Drive link: https://pan.baidu.com/s/1I1Twok0n5bFsyR4JsjaswA
    - Code: vnx8