CS276 Fall 2021

Computational Photography

Assignment 2: Light Stage Continuous High-Frequency Relighting

In this project, we will explore how image-based neural rendering works in Light Stage. Specifically, we will require you to re-implement a paper called Light Stage Super-Resolution: Continuous High-Frequency Relighting. You can refer online source for more details about it. We will provide no template code for you. Unlike the instruction manual-like code, we will give you ample time to implement the whole project based on your coding style, framework, and preprocessing pipeline (if any). In addition, if anything is confusing, please read the original paper for details, which is sufficient for re-implementation.
Challenging as it is, the experience is valuable and exciting. We hope you enjoy it.

Dataset

We provide a raw OLAT dataset containing approximately 200 frames. One frame precisely consists of 96 images representing 96 different illumination conditions performing on one specific frame. Therefore, there are 200 $\times$ 96 = 19200 images in total. In addition, we will provide a lighting direction file formatted in txt, indicating the spatial positions of the corresponding 96 RGB lights. These are all the necessary data you will require. Since the resolution of one image is the shape of $(2048, 1440)$, the total size of the dataset exceeds 40GB. So, if you have any problems transferring the dataset, contact us on the piazza. The approach to the dataset is at the end of the page.

Submission

1. Write a report about the whole project and upload to Gradescope. You should at least provide the following aspects in your report:
    - Briefly state the main contributions in the original paper and the innovations that you think are valuable.
    - At least three results under different actions and lighting to show the improvement of your code compared to the baseline (direct image weighted sum).
    - A table to show that your method has a higher PSNR compared to the baseline
    - (If any) your other changes to the method in the original paper.

    Still, no more than 4 paper. Try to be clean, clear and accurate.
2. Zip your code, environment requirement file (xxxx.yaml if you are using conda for env management or xxx.txt if you prefer pip), results images and video(if any) and report. Send to the email attached below.

Attachment

1. Dataset: http://cloud-lan.deemos.com/s/BFmspSoRpS4XcwT
2. Submission: Gradescope and shensy@shanghaitech.edu.cn