

## Project 2: 2D Image Bilateral Filtering

Assigned: February 13, 2024 (Tuesday)

Due 11:59pm: February 23, 2024 (Friday)

The purpose of this project is to develop a non-linear, feature-preserving spatial filter by using the bilateral filtering discussed in the class:

$$h(x, \xi) = e^{-\frac{(x-\xi)^2}{2\sigma_s^2}} \cdot e^{-\frac{(f(x)-f(\xi))^2}{2\sigma_r^2}}$$

Please also implement the Gaussian filtering to compare the results.

### Notes:

- (1) For Gaussian filtering, you need to generate a global mask for the filter (making sure the total weight of the mask is 1). For bilateral filtering, you need to generate a mask for each pixel based on its local neighborhood. Again, the weights need to sum to 1 for each mask.
- (2) The neighborhood size for the mask may be adjusted but starting from a 5\*5 would be a good idea.
- (3) **Two output images** should be submitted: one for the Gaussian filtering and the other for the bilateral filtering, by using the sample image provided on Canvas.
- (4) Please also submit the source code with your output images.