Computer Vision

Programming Task 05

Implement the following image filtering techniques using MATLAB or Python.

Tasks to be implemented:

1. **Averaging Filter**
   Write a function that takes an image as input and applies a box (averaging) filter with a specified kernel size (e.g., 3×3, 5×5). The function should output the filtered image.

2. **Weighted Average Filter**
   Modify the averaging filter function to incorporate a user-defined weight matrix (kernel) for a weighted average filter.

3. **Median Filter**
   Implement a function for median filtering. This function should take the image and kernel size as input and perform median filtering on each pixel's neighborhood.

4. **Weighted Median Filter**
   Similar to weighted averaging, modify the median filter function to allow for a user-defined weight matrix within the neighborhood.

5. **Max Filter**
   Write a function that performs max filtering on an image with a specified kernel size. This function should replace each pixel with the maximum value within its neighborhood.

6. **Min Filter**
   Implement a function for min filtering, similar to the max filter but replacing the pixel value with the minimum value in the neighborhood.

After applying each filter, show the original and the filtered images side-by-side.

Evaluation:

Anytime after CV mid-term exam.

Maximum Points: 10