CSCI 631 Foundation of Computer Vision
HW 03

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1. Because the two types of filters use distinct filtering methods, their produced images are also diverse. The first filter, which makes use of nested loops to implement it, merely multiplies the picture pixels by the filter kernel and adds the resulting values to determine the filtered pixel value. The second filter applies the filter kernel to each pixel of the image using matrix multiplication and element-wise addition. It is implemented using convolution. The "imabsdiff" function in MATLAB, which determines the absolute difference between two pictures pixel by pixel, can be used to calculate the difference between the two filtered images.

2. **Conclusion:**
    a. Dealing with the image's edges was one problem encountered when developing the filter. The edges of the image are not completely covered by the filter kernel as it is applied to each pixel, leading to missing pixels in the filtered image. Padding the image before applying the filter is a way to get around this.
    b. The "imabsdiff" function, which determines the absolute difference between two images pixel by pixel, was used to compare the two types of photographs.The two filtered photos' differences are seen in the resulting difference image.
    c. One problem faced while working on this assignment was dealing with the edge cases when applying the filter. Padding the image before applying the filter can help overcome this issue. But to remediate this case, I am computing input_row and input_column as 2 values which allows us an option to not worry about padding.
    d. The issue of dealing with the edges of the image was surmounted by vomiting the padding the image before applying the filter. Optimizing the nested loop implementation was done by reducing the number of computations and minimizing the use of unnecessary variables.
    e. Yes, I understand how convolutions are computed. Convolution involves the element-wise multiplication of the filter kernel with a portion of the image, and then the sum of the resulting values to obtain the filtered pixel value. The convolution operation is carried out across the entire image, resulting in a filtered image.

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