ENGR 391: Computer Vision
Homework Assignment # 2
Spring 2024

Problem 1

In this problem we want to code the convolution operation. Recall convolution consists of multiplication, addition and shift operations. We caonsider the image shown below.

1	1	4	1	3	252	254	251	251	255
0	4	4	3	0	253	252	255	253	254
0	0	1	1	5	255	250	255	253	251
0	4	5	2	2	255	250	251	250	253
3	4	1	5	3	253	255	250	252	255
3	4	1	1	2	255	254	254	255	253
5	2	2	0	0	250	255	250	250	254
4	3	1	5	3	254	255	254	252	255
1	2	1	4	3	252	254	252	253	255
2	0	4	3	1	251	255	253	251	250

1. Write code to perform filtering operation in the space domain (using convolution). Use the following mask:

   $$[-1 \quad 0 \quad 1]$$

   Do not use built in functions for this question, write your own code for convolution. Note: Negative numbers should be mapped to zero and numbers bigger than 255 should be mapped to 255.

2. Show the resut of the convolution (as an image or a matrix).

3. Show and discuss your results.

Problem 2

1. Write code to read an image of your choice and convert it to gray level.

2. Add salt and pepper noise to the image. Use command `imnoise` or other equivalent functions.

3. Write code to perform median filtering. You can use built-in functions such as `sort`.

4. Use your code to perform median filtering on the image of question 2) (the image with salt and pepper noise).

5. Show and discuss your results.

Problem 3

Use histogram, histogram properties or other methods to read the hidden secret message in the image of figure 1. Discuss your method.

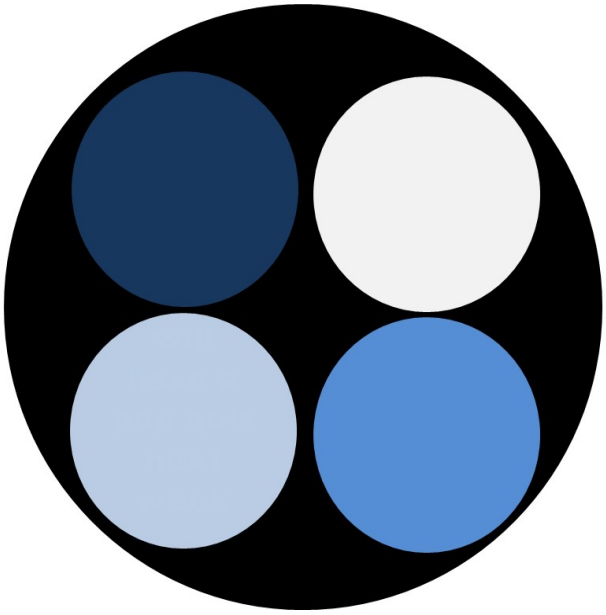

Figure 1: Image for Problem 3