



**Due Date: 23:00 pm on Thursday, December 28th, 2017**

## Analyzing Edge Preserving Filters



Original Image



Bilateral Filter Result



Mean Curvature Filter Result

### Overview

In this assignment, your goal is to analyze two different non-linear filters: Bilateral filter and mean curvature flow. The implementations of the filters are given in the "code" folder. You will run the implementations with several parameters and observe the changes at the results.

### Bilateral Filter

As you've learned in the class, bilateral filter is a well-known edge preserving smoothing filter proposed firstly in Aurich et al. [1]. Your aim is to analyze the this filter and comment about it's results. You have to observe the effects of the three different parameters:

- $\sigma_1$ ,
- $\sigma_2$ ,
- and window size.

### Mean Curvature Filter (MCF)

Your second filter is the mean curvature filter. The given implementation uses much more efficient and fast method to minimize the mean curvature of the given image which is proposed by Yuanhao Gong [2]. You should observe the effect of the two parameters:

- step size,
- iteration number parameter.

## The Details

- You have to give details about the given filters in your report.
- How do they preserve edges?
- How do they implement smoothing?
- What are the advantages and disadvantages of the given methods?
- What are the effects of the parameters? How do they effect to the result?
- Your answers and comments have to be corroborated via formulations or result images.

## Grading

The assignment will be graded out of 100:

- **Total 100:** REPORT: 100

## Late Policy

You have three days for late submission. You will lose 10 points from maximum evaluation score for each day (your submitted study will be evaluated over 90,80 and 70 for each late submission day). You have to submit your solution in deadline date + three days, otherwise it will not be evaluated.

## Academic Integrity

All work on assignments must be done individually unless stated otherwise. You are encouraged to discuss with your classmates about the given assignments, but these discussions should be carried out in an abstract way. That is, discussions related to a particular solution to a specific problem (either in actual code or in the pseudocode) will not be tolerated. In short, turning in someone else's work, in whole or in part, as your own will be considered as a violation of academic integrity. Please note that the former condition also holds for the material found on the web as everything on the web has been written by someone else.

## References

- [1] Aurich, V., Weule, J.: Non-linear Gaussian filters performing edge preserving diffusion. In: Proc. DAGM-Symposium, pp. 538–545 (1995)
- [2] Gong,Y.: Spectrally regularized surfaces, Doctoral Thesis, (2015)