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Image Processing via Filtering: Exercise Set 2

Please hand in the solutions of the below tasks until the next class.

Remark 1: To load the images depicted on this exercise sheet, run `load_images`.

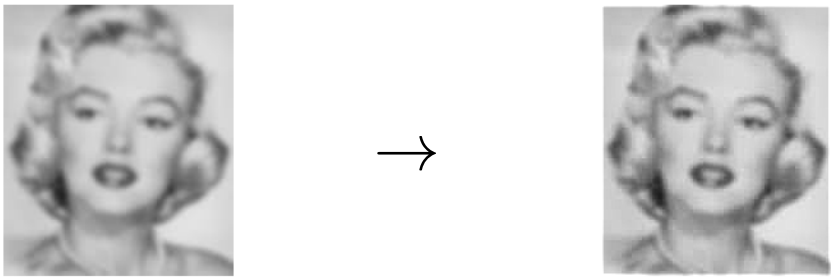
Remark 2: Throughout this exercise set, we use the convention that pixel intensities are *doubles*. (Note the commands used in `load_images` to convert the images accordingly.)

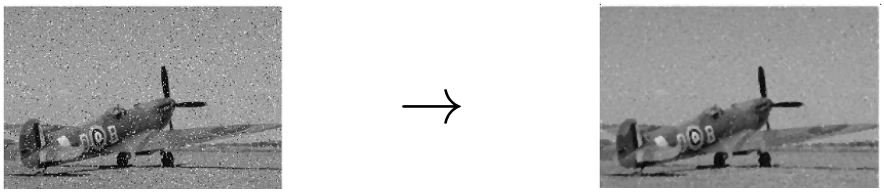
Remark 3: In `load_images` some images are converted to grayscale images via `rgb2gray`.

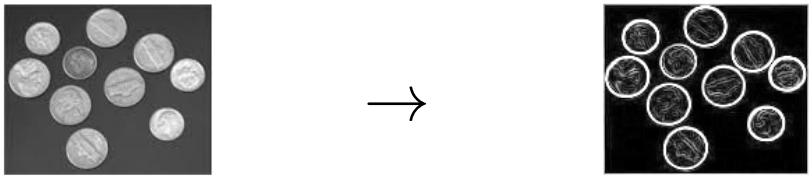
For the following tasks you can use the functions `imfilter` and `medfilt2`. (A description is given on `https://ch.mathworks.com/help/images/linear-filtering.html`)

Task 1 The below illustration depicts three image transformations. The goal is to reproduce the corresponding target image on the right (approximately) using appropriate filters. Use `imshow`.

Hint: The below transformations have the property that the each pixel in the target image depends only on the corresponding source-pixel and its 8 neighbors (vertically, horizontally and diagonally).

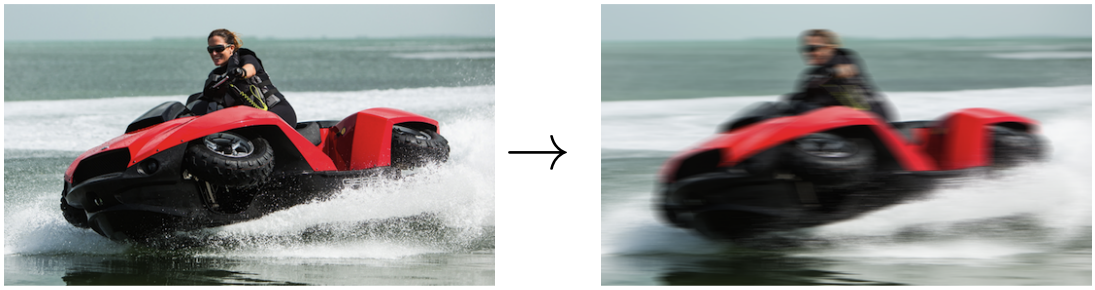
(a) 

(b) 

(c) 

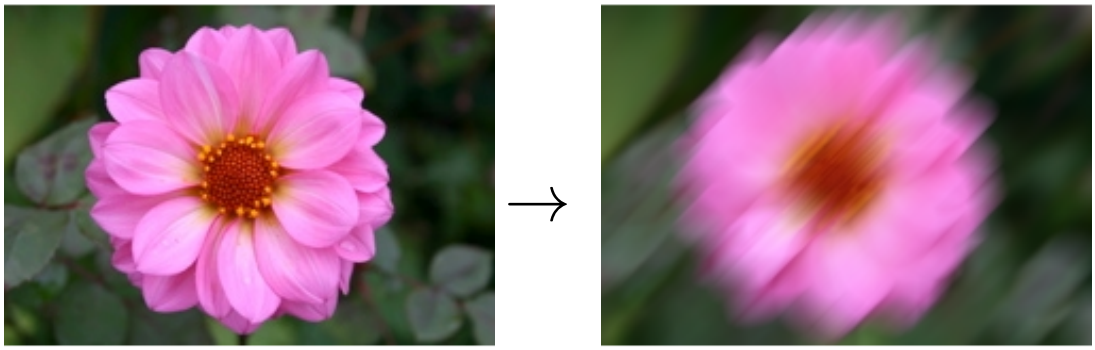
Task 2 The goal of this task is to add motion blur (i.e. blur in one direction only).

(a) In the transformation depicted below, the right image is blurred horizontally. Sketch a suitable filter-matrix and implement the corresponding operation using `imfilter`.
Remark: There are several plausible solutions.



Source: Prof. Noah Snavely, Cornell University

(b) In the transformation depicted below, the right image is blurred diagonally.
Sketch a suitable filter-matrix and implement the corresponding operation using `imfilter`.
Remark: There are several plausible solutions.



Source: Jerry Huxtable, `http://www.jhlabs.com/ip/blurring.html`